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EXTRA

ENVIRONMENTAL, INC.
Environmental Engineers

VOLUNTARY INVESTIGATION WORKPLAN

Waters Edge (Proposed Senior Housing)
200 East Main Street
Port Jervis, New York

Prepared for:
City of Port Jervis
Port Jervis, New York

Prepared by:
IVI Environmental, Inc.
White Plains, New York

IVI Project No. E1015676
February 6, 2001

IVI

IVI
ENVIRONMENTAL, INC.
Environmental Engineers

February 6, 2001

Mr. Thomas L. Gibbons
Engineering Geologist
Division of Environmental Remediation
50 Wolf Road
Albany, New York 12233
(518) 457-7924 (tel)
(518) 457-4198 (fax)

Re: IVI Project No: E1015676
Voluntary Investigation Workplan
Waters Edge (Proposed Senior Housing)
200 East Main Street
Port Jervis, New York

Dear Mr. Gibbons:

IVI Environmental, Inc. (IVI) is pleased to submit this Voluntary Investigation Workplan (Workplan) for the Waters Edge Proposed Senior Housing property located at 200 East Main Street in Port Jervis, New York (Subject).

This Workplan includes a detailed Scope of Work as discussed during the on-site meeting between IVI, the New York State Department of Environmental Conservation (NYSDEC), and the City of Port Jervis, on January 18, 2001. In addition, this Workplan includes a Community Air Monitoring Plan in accordance with New York State Department of Health (NYSDOH) requirements (Section 5.6), a Quality Assurance Project Plan (Section 6.0) and a Site-Specific Health and Safety Plan (Appendix C).

Please call me if you have any comments or questions.

Sincerely,

IVI Environmental, Inc.

Charles B. Mulligan Jr.
Project Manager

Reviewed by:
David R. Lent, C.P.G.
Assistant Manager, Phase II/III Department

CBM/lp

cc: R. Michael Worden, City of Port Jervis, Mayor
Vince Lopez, City of Port Jervis, Dept. of Public Works
John S. Hicks, City of Port Jervis, Corporate Counsel
Robert Cozzy, NYSDEC
Steve Bates, NYSDOH

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1.0 EXECUTIVE SUMMARY

IVI Environmental, Inc. (IVI) has prepared this Voluntary Investigation (Investigation) Workplan (Workplan) for the Waters Edge property located at 200 East Main Street in Port Jervis, New York (Subject) formerly occupied by the Barrier Chemical Facility. This Workplan provides a detailed description of the Investigation to be conducted at the Subject in accordance with the requirements of the New York State Department of Environmental Conservation (NYSDEC) Division of Environmental Remediation. The objectives of this Investigation are as follows: 1) to further delineate the extent of contamination documented in IVI's previous Phase II Environmental Site Assessment report dated November 27, 2000; 2) to determine if an abandoned underground storage tank (UST) has impacted the Subject; 3) to determine if an UST exists at the abandoned residential structure; and 4) to provide a Remedial Action Workplan (RAWP) to address contaminated soil and groundwater found at the Subject. The Investigation Scope of Work includes the following activities: 1) an UST assessment; 2) groundwater monitoring well sampling; 3) a Geoprobe investigation; 4) a test pit investigation; 5) a geophysical survey; and 6) report preparation.

Included with this Workplan in Appendix A are the following figures and tables pertaining to the Subject: 1) Site Location Plan, 2) Sample Location Plan, 3) Workplan Master Schedule. A Proposed Sampling Plan which indicates the samples to be collected and analytical parameters to be performed is given as Table 1 in Appendix B. Additionally, the following Appendices are attached to this Workplan: 1) Tables (Appendix B); 2) report logs including Field, Boring, and Monitoring Well, Purging and Sampling Data Logs (Appendix C); and 3) a site-specific health and safety plan (Appendix D) which provides specific procedures to ensure safe work practices during the course of this Investigation and fulfills the Occupational Safety and Health Administration (OSHA) requirements under 29 CFR 1910.120.

2.0 INTRODUCTION

IVI has prepared this Workplan under contract with the City of Port Jervis for the Waters Edge Proposed Senior Housing property located at 200 East Main Street, Port Jervis, New York. This Workplan provides a detailed description of the Investigation to be conducted at the Subject in accordance with the items discussed during the on-site meeting between IVI, the NYSDEC, and the City of Port Jervis on January 18, 2001.

This Workplan is organized into the following six sections: 1) Executive Summary; 2) Introduction, including Objectives, Site Location and Description, History, Topography, Geology, and Hydrogeology; 3) Summary of Previous Environmental Site Assessments and Investigations; 4) Identification of Areas of Concern (AOCs); 5) Voluntary Investigation Workplan; and 6) Quality Assurance Project Plan.

2.1 Objectives

The objectives of this Investigation are as follows: 1) to further delineate the extent of contamination documented in IVI's previous Phase II Environmental Site Assessment report dated November 27, 2000; 2) to determine if an abandoned UST has impacted the subsurface; 3) determine if a UST exists at an abandoned residential structure; and 4) provide a Remedial Action Workplan to address contaminated soil and groundwater found at the Subject.

Ultimately, our goal is to address soil and groundwater contamination issues such that the Subject may be redeveloped for senior housing.

2.2 Site Location and Description

The Subject is located at 200 East Main Street in Port Jervis, Orange County, New York. The Subject is identified on local tax maps as Section 14, Block 6, Lot 28. The property, which is situated in a suburban area characterized by residential and commercial retail and office development, consists of an approximately 7-acre parcel improved with an approximately 80-year-old, 100,000 SF vacant industrial facility. Barrier Industries manufactured industrial janitorial chemicals on-site from 1978 until December 1993. The site was first developed prior to 1921 with a silk mill and several storage and residential buildings.

Site improvements include three separate buildings, including a house, interconnected production and storage buildings and a boiler building. The buildings are of slab-on-grade and basement construction, and the superstructures are of structural steel and masonry bearing walls. Exterior walls feature metal panels, concrete masonry units (CMU) and brick. The sloped roofs are covered with asphalt shingles and the flat roofs are covered with a built-up roofing system.

2.0 INTRODUCTION – continued

Interior finishes include floor coverings of carpet, resilient floor tile, sheet vinyl, ceramic tile, bare concrete, and painted concrete. Walls are of painted and papered gypsumboard, painted and papered plaster, and painted concrete block. Ceilings typically consist of painted drywall, a suspended system with inlaid acoustical ceiling tiles, bare concrete or an open system that exposes the underside of the roof.

Heating was reportedly provided by gas-fired boilers. Air conditioning was provided by electric DX thru-wall units. Vertical transportation is provided by a traction freight elevator in the 5-story process tower.

The proposed development plan includes demolition of all on-site structures, placement of up to six feet of clean fill, and construction of a senior housing complex.

2.3 Site History

Based upon our Phase I Environmental Site Assessment, dated August 21, 2000, Barrier Industries manufactured industrial janitorial chemicals on-site from 1978 until December 1993. The site was first developed prior to 1921 with a silk mill and several storage and residential buildings.

2.4 Site Topography

The site slopes gently from the northwest to southeast at an average gradient of 2%. The topography of the area is best described as gently sloping, properties to northwest are at a higher topographic elevation. According to the United States Geological Survey (USGS) *Port Jervis South, NY, NJ, PA* 7.5 Minute Series topographic map, the Subject's topographic elevation ranges from 450' to 430' above mean sea level (msl).

2.5 Site Geology

According to the October, 1981 *Soil Survey of Orange County, New York,* issued by the United States Department of Agriculture, Soil Conservation Service, the soils at the site are classified as sandy loam or gravelly sandy loam of the Basher, Otisville and Hoosic series. Permeability of these soils is moderate to rapid. According to the aforementioned Soil Survey, parent material of soils in Orange County is typically glacial till with some soils formed from alluvium.

IVI reviewed a letter report pertaining to test pits excavated at the Subject, prepared by Advanced Testing Company, Inc. on behalf of Warwick Properties, dated July 6, 1998. This report stated that soils at the site consist of fill material composed of silty sand, gravel, cinders, and traces of brick.

2.0 INTRODUCTION – continued

Subsurface soils encountered during IVI's Phase II Assessment were composed of fine brown sand with small quantities of clay and silt. Bedrock is anticipated to be located more than 20' below ground surface (bgs).

2.6 Site Hydrogeology

Under natural, undisturbed conditions, shallow groundwater flow generally follows the topography of the land surface and, on this basis, the topography suggests that groundwater flow across the site is in a southeasterly direction. However, localized conditions can alter flow direction and thus the presumed flow may not coincide with the actual in the subject area. Shallow groundwater was encountered at a depth of approximately 15' bgs during IVI's Phase II Environmental Site Assessment.

3.0 SUMMARY OF PREVIOUS ENVIRONMENTAL SITE ASSESSMENTS AND INVESTIGATIONS

IVI reviewed three environmental site assessments performed on the Subject between July 1998 and December 2000. A summary of each of the assessments is given below.

3.1 Phase I Environmental Field Inspection Report, dated July 6, 1998, prepared by Advanced Testing Corporation (ATC) on behalf of Warwick Properties

According to this report the Subject was the site of Barrier Systems, which manufactured institutional cleaning supplies and floor waxes. ATC noted some asbestos-containing pipe insulation within the buildings, and also stated that lead based paint (LBP) may be present on painted surfaces. Additionally, ATC advanced six test pits, to depths of 6' to 8' bgs on the Subject. A total of two composite soil samples were collected from the test pits and analyzed for EPA Priority Pollutants. With the exception of chromium, copper, lead, nickel, and zinc, no contaminants were detected above laboratory Method Detection Limits (MDLs). According to this report, ATC was informed by a NYSDEC representative that the concentrations of the metals identified were considered normal background levels. ATC concluded that based on the sampling data, the on-site soils were generally free of pollutants and would not present a hazard to persons exposed during construction activities. ATC further recommended that the soils be visually monitored as work progresses and additional evaluation be conducted should conditions significantly different from those observed in their investigation be encountered.

3.2 Phase I Environmental Site Assessment (ESA), dated August 21, 2000, prepared by IVI Environmental, Inc. on behalf of Community Preservation Corporation.

According to this report, the site was formerly improved with the Barrier Facility, prior to which the site was improved with a silk mill. This report identified numerous recognized environmental conditions in conjunction with the Subject. The issue of primary concern was the historical manufacturing of cleaning supplies. According to this report, an estimated 15,000 drums, pails, lab chemical containers, and approximately 200 storage tanks and reactor vessels of hazardous wastes, chemical products, and product precursors were abandoned in the facility, in trailers and outside the building when the company filed for bankruptcy.

Chemicals discovered on site included various acids and volatile organic compounds including 1,1,1 trichloroethane and toluene. Several complaints and chemical releases were reported and finally, after freezing temperatures caused water pipes and drums to burst, the NYSDEC investigated the site and initiated an emergency removal and cleanup action. This led to the inclusion of the Subject on the USEPA CERCLIS and NYSDEC Inactive Hazardous Waste Disposal Sites databases. The drums were overpacked, sorted, categorized and shipped off site for disposal. The cleanup was turned over to the USEPA and completed in 1995. Additionally, a monitoring well, indicating previous investigation, was noted on Lot 2 of the Subject. Further, an abandoned UST was noted adjacent to the boiler room on Lot 3.

3.0 SUMMARY OF PREVIOUS ENVIRONMENTAL SITE ASSESSMENTS AND INVESTIGATIONS - continued

Based on these findings, IVI recommended that a subsurface investigation be conducted on the Subject. IVI also noted the possible presence of asbestos-containing materials and LBP.

3.3 Phase II Environmental Site Assessment (ESA), dated November 27, 2000, prepared by IVI Environmental, Inc. on behalf of the Community Preservation Corporation.

IVI conducted a Phase II ESA on the Subject in November 2000 to address the areas of environmental concern identified in the Phase I ESA described above. This Assessment consisted of the advancement of five borings and the collection of five soil samples and three groundwater samples. The soil samples were analyzed for volatile and semi-volatile organic compounds (VOCs and SVOCs) in accordance with EPA Methods 8260 and 8270 (base neutrals only), respectively, Additionally, three of the five soil samples, were also analyzed for SVOCs (acid extractables) and pesticides, via EPA Methods 8270 and 8081, respectively. The groundwater samples were analyzed for VOCs, SVOCs, pesticides, priority pollutant metals (PPMs), and pH in accordance with EPA Methods 8260, 8270, 8081, 200.7 (245 for mercury), and 305, respectively.

The analytical results of the soil samples indicated that no VOCs, SVOCs or pesticides, were present above laboratory MDLs in the soil samples collected. The analytical results of the groundwater samples indicated that six VOCs were present above their respective laboratory MDLs in the samples collected. Specifically, 1,1,1 trichloroethane at 30 parts per billion (ppb), 1,1 dichloroethane at 3 ppb, chloroform at 3 ppb, p&m xylenes at 2 ppb, tetrachloroethylene (PCE) ranging from 2 to 12 ppb, and trichloroethylene (TCE) ranging from 5 to 67 ppb, were detected in the Subject's groundwater. In addition, the concentrations of 1,1,1 trichloroethane, PCE, and TCE exceeded their respective NYSDEC Groundwater Quality Standard (GQS) of 5 ppb given in 6 NYCRR Chapter X Part 703. Only one SVOC, diethylphthalate at 13 ppb, was detected in the groundwater samples. However, the concentration of diethylphthalate detected was below its NYSDEC GQS of 50 ppb.

Additionally, eleven metals were detected in the Subject's groundwater, seven of which exceeded their respective NYSDEC GQS. Specifically, arsenic at concentrations up to 0.075 parts per million (ppm), beryllium at concentrations up to 0.031 ppm, cadmium at concentrations up to 0.014 ppm, chromium at concentrations up to 0.824 ppm, copper at concentrations up to 0.699 ppm, lead at concentrations up to 3.55 ppm, nickel at concentrations up to 0.589 ppm, and selenium at concentrations up to 0.2 ppm, were found in excess of their respective NYSDEC GQS of 0.025 ppm, 0.003 ppm, 0.005 ppm, 0.05 ppm, 0.2 ppm, 0.025 ppm, 0.1 ppm, and 0.01 ppm, respectively. Additionally, the pH of the Subject's groundwater ranged from 1.6 to 5.84, which was outside the NYSDEC GQS range of 6.5 to 8.5. No pesticides were present above laboratory MDLs in the samples collected.

4.0 IDENTIFICATION OF AREAS OF CONCERN (AOC)

Based on the results of the previous site assessments and investigations conducted on the Subject, and conversations with the NYSDEC, the following AOCs at the Subject have been identified: 1) soil and groundwater contamination due to historical operations; 2) the abandoned UST associated with the boiler room; 3) a potential UST associated with abandoned residential structure; and 4) a transformer substation located near the Subject's northern property boundary.

5.0 VOLUNTARY INVESTIGATION WORKPLAN

The scope of this Workplan was developed based on the results of previous environmental site assessments and investigations conducted on the Subject from July 1998 to December 2000, which are summarized in Section 3 of this report, and items discussed during the on-site meeting between IVI, the NYSDEC, and the City of Port Jervis on January 18, 2001.

The following tasks will be performed as part of this Workplan: 1) an UST assessment; 2) groundwater monitoring well sampling; 3) a Geoprobe investigation; 4) a test pit investigation; 5) a geophysical survey around an abandoned residential structure; and 6) report preparation. A summary of each of these tasks is presented below. In addition, the proposed sampling locations are shown on the Proposed Sample Location Plan given as Figure 2 in Appendix A. A summary of the proposed sample locations and proposed analytical parameters to be utilized is provided in Table 1 in Appendix B.

All field sampling procedures and management of samples will be conducted in accordance with NYSDEC protocols outlined in NYSDEC's "Sampling Guidelines and Protocols" document dated March, 1991.

5.1 Geophysical Survey

IVI will conduct a geophysical survey to determine the location of the abandoned UST, whether any USTs associated with the abandoned residential structure are present and the locations of the two existing monitoring wells. Specifically, IVI will screen the area of the abandoned UST, around the perimeter of the abandoned residential structure, and the suspected area of the existing monitoring wells, using a metal detector capable of identifying ferrous and non-ferrous metal objects.

5.2 UST Assessment

IVI will excavate test pits around the abandoned UST to delineate petroleum contamination, should any exist. All soil removed will be visually inspected for evidence of contamination and screened for VOCs with a photoionization detector (PID). Each test pit will be advanced to the soil/groundwater interface. Upon delineation of contamination extent, IVI will collect up to four confirmatory soil samples. The soil samples will be collected from below the invert of the UST, or the six-inch interval immediately above the soil/groundwater interface, which ever occurs first. Additionally, two groundwater samples will be collected downgradient of the UST and, outside the area of the petroleum contaminated soil, if any. Groundwater samples will be collected by advancing a Geoprobe hydropunch-type sampling tool 3' below the water table. The tool will be retracted 4' exposing a stainless steel No. 10 slot screen across the groundwater interface. Groundwater samples will be extracted from the sampling tool using dedicated polyethylene tubing equipped with a check valve or a peristaltic pump. All equipment will be properly decontaminated between sampling events.

5.0 VOLUNTARY INVESTIGATION WORKPLAN - continued

Soil and groundwater samples collected will be transferred to appropriate sample containers, packed on ice in a cooler, and sent to an Environmental Laboratory Approval Program (ELAP), Contract Laboratory Protocol (CLP) – certified laboratory for analysis. Laboratory analysis will include VOCs and SVOCs in accordance with the NYSDEC Spill Technology and Remediation Series (STARS) Memo #1, protocols.

5.3 Monitoring Well Sampling

As described in Section 5.1 above, IVI will attempt to locate the two monitoring well reported to be present on-site. IVI will then collect groundwater samples from the existing monitoring wells. Prior to sampling, IVI will inspect the wells and obtain measurements of water levels and well bottoms to determine well volumes. The wells will then be purged of three to five well volumes to obtain groundwater samples that are representative of the aquifer conditions. IVI will collect water quality parameter readings, including dissolved oxygen (DO), pH, specific conductance, turbidity and temperature, prior to purging, and following the second and all subsequent well volume purges. Purging will continue until successive readings are within ten percent.

Groundwater samples will be transferred to appropriate sample containers, packed on ice in a cooler, sent for analysis to an ELAP, CLP-certified laboratory and analyzed via NYS Analytical Service Protocol (ASP) for 95-1 (VOCs), 95-2 (SVOCs) (acid extractables only), and CLP metals. All samples will be collected and managed in accordance with good and customary engineering protocols. In the event that the wells can not be located, IVI will collect groundwater samples utilizing Geoprobe equipment as discussed in Section 5.2 above.

5.4 Test Pit Investigation

IVI will excavate up to six test pits (TP-1 through TP-6) on the southwestern portion of the site. The pits will be advanced to a maximum depth of 6' bgs. All soil removed will be visually inspected for evidence of contamination and screened for VOCs with PID. A total of three composite soil samples (one sample per two test pits) will be collected. The soil samples will be transferred to appropriate sample containers, packed on ice in a cooler, sent for analysis to a certified laboratory and analyzed via NYS ASP for 95-1 (VOCs), and 95-2 (SVOCs, base neutrals and acid extractables).

5.0 VOLUNTARY INVESTIGATION WORKPLAN - continued

5.5 Geoprobe Investigation

IVI will advance approximately 13 borings on the Subject using Geoprobe equipment. The borings will be advanced in various areas as specified by the NYSDEC during the January 18, 2001 meeting. Specifically, the following borings will be advanced: 1) six borings (B-6 through B-11) along the southern property line, 2) two borings (B-12 to B-13) inside the Subject's building near IVI's previous boring B-4, 3) one boring (B-14) in the northwest corner of the Subject where acids were stored, 4) two borings (B-15 and B-16) near the transformer substation, and 5) two borings (B-17 and B-18) downgradient of the abandoned UST(discussed in Section 5.2). These boring locations are shown on the Proposed Sample Location Map, given as Figure 2 in Appendix A

Each boring (except borings B-15 and B-16) will be advanced from the ground surface to the depth of the soil/groundwater interface located approximately 15' bgs. At boring locations B-6, B-7, and B-8, continuous soil samples will be collected using 4' long macrocore samplers and screened in the field for VOCs using a PID. One soil sample from each boring (B-6, B-7 and B-8) will be collected at the interval which indicates the highest level of contamination based on field screening results. Should no contamination be identified, the soil sample will be collected from the interval just above the soil/groundwater interface. One groundwater sample will be collected as discussed in Section 5.2 above, from each boring location (except borings B-15 and B-16).

Each groundwater sample will be transferred to appropriate sample containers, packed on ice, and analyzed via NYS ASP for 95-1 (VOCs), 95-2 (SVOCs) (acid extractables only), CLP-metals (filtered) and EPA Method 305 for pH, if warranted based on field screening measurements. Of note, groundwater samples collected for metals analysis will be collected within unpreserved containers and filtered by the lab prior to analysis. An engineer/geologist will be on site at all times to supervise boring advancement, screen and collect soil samples, and prepare boring logs.

Soil samples collected from boring B-6, B-7 and B-8 will be analyzed via NYS ASP 95-1 (VOCs), 95-2 (SVOCs) (acid extractables), and CLP-metals. No soil samples are to be collected from the remaining borings unless warranted based upon field screening results.

Finally, borings B-15 and B-16 will be advanced to a depth of 2' bgs in the vicinity of the transformer substation. One composite soil sample will be collected and analyzed via ASP 95-3 for PCBs.

5.0 VOLUNTARY INVESTIGATION WORKPLAN - continued

5.6 Community Air Monitoring Plan

IVI will conduct Community Air Monitoring as required by the New York State Department of Health (NYSDOH) in accordance with NYSDOH Generic Community Air Monitoring Plan dated June, 2000. IVI will conduct real-time air monitoring, for VOCs and particulate levels at the perimeter of the work area according to the following plan:

5.6.1 Volatile Organic Vapor Monitoring

VOCs will be monitored at the downwind perimeter of the work area on a continuous basis. All readings will be recorded and be available for NYSDEC and NYSDOH personnel to review. If total organic vapor levels exceed 5 ppm above background, work activities will be halted and monitoring will be continued under the provisions of the Vapor Emission Response Plan. If any organic levels greater than 5 ppm over background are identified 200 feet downwind from the work area 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 the work activities, or as the result of an emergency, organic levels persist above 5 ppm above background 200 feet downwind or half the distance to the nearest residential or commercial property from the work area, 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 if organic vapor levels are approaching 5 ppm above background persist for more than 30 minutes in the 20 Foot Zone, then the Major Vapor Emission Response Plan shall automatically be placed into effect;

However, the Major Vapor Emission Response Plan shall be immediately placed into effect if organic vapor levels are greater than 10 ppm above background.

5.6.1.1 Vapor Emissions Response Plan

If the ambient air concentration of organic vapors exceeds 5 ppm above background at the perimeter of the work area, activities will be halted and monitoring continued. If the organic vapor level decreases below 5 ppm above background, work activities will 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 work area,

5.0 VOLUNTARY INVESTIGATION WORKPLAN - continued

activities will resume, provided the organic vapor level 200 feet downwind of the work area 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 25 ppm at the perimeter of the work area, activities will be shutdown. When work shutdown occurs, downwind air monitoring as directed by the Safety Officer 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 section.

5.6.1.2 Major Vapor Emission Plan

Upon activation, the following activities will be undertaken:

1. All Emergency Response Contacts as listed in the Health and Safety Plan of the Workplan will be notified.

2. The local police authorities will immediately be contacted by the Safety Officer and advised of the situation.

3. Frequent air monitoring will be conducted at 30 minutes intervals within the 20 Foot Zone. If two successive readings below action levels are measured, air monitoring may be halted or modified by the Safety Officer.

5.6.2 Particulate Vapor Monitoring

Particulates will be continuously monitored upwind, and downwind of the work area at temporary particulate monitoring stations. If the downwind particulate level is 150 $\mu g/m^3$ greater than the upwind particulate level, then dust suppression techniques must be employed. All readings will be recorded and be available for NYSDEC and NYSDOH personnel to review.

5.7 Waste Management

The following wastes will be generated as part of this Investigation: 1) soil cuttings from Geoprobe operations; 2) well purge water; 3) decontamination water; and 4) disposable sampling equipment.

5.0 VOLUNTARY INVESTIGATION WORKPLAN - continued

5.7.1 Soil

All soil cuttings generated from drilling operations will be screened in the field with a PID. If field screening results do not indicate the presence of contamination, then soil cuttings from Geoprobe macrocore samples will be backfilled into the borehole. However, if field screening results indicate the presence of contamination, then these soil cuttings will be placed into DOT-approved 55-gallon drums. The drums will be labeled and stored on-site until the soil sampling analytical results are available. The label will include a description and source of the contents of each drum. Based on the soil sampling results, the drummed soil will be disposed of in accordance with all applicable regulations.

5.7.2 Groundwater

Well purge water will be transferred into DOT-approved 55-gallon labeled drums and stored on-site until groundwater samples are analyzed. The label will include a description and source of the contents of each drum. Based on the groundwater sampling results, the drummed water will be disposed of in accordance with all applicable regulations.

5.7.3 Decontamination Water

Wastewater generated from the cleaning of drilling equipment and field screening equipment, such as the water quality analyzer and oil/water interface probe, will be collected and transferred into DOT-approved 55-gallon labeled drums. The drums will be stored on-site until soil and groundwater samples are analyzed. The label will include a description and source of the contents of each drum. Based on the sampling results, the drummed wastewater will be disposed of in accordance with all applicable regulations.

5.7.4 Disposable Sampling Equipment

All disposable sampling equipment including latex gloves and disposable bailers will be collected and sealed in plastic trash bags, and stored on-site until soil and groundwater samples are analyzed. The label will include a description and source of the contents of each bag. Based on the sampling results, the bagged sampling equipment will be disposed of in accordance with all applicable regulations.

5.0 VOLUNTARY INVESTIGATION WORKPLAN - continued

5.8 Report Preparation

Following completion of field activities and receipt of analytical data, IVI will prepare a report documenting the findings of this Investigation. This report will provide conclusions and recommendations for any additional work necessary.

5.9 Project Schedule

The proposed Project Master Schedule is delineated in a Microsoft Project GANTT Chart, included as Figure 3 in appendix A this Workplan. The estimated duration for completion of this Investigation, following receipt of NYSDEC approval of this Workplan, is 66 business days.

6.0 QUALITY ASSURANCE PROJECT PLAN (QAPP)

6.0 Quality Assurance/Quality Control

Quality Assurance/Quality Control (QA/QC) procedures will be used to provide performance information with regard to accuracy, precision, sensitivity, representativeness, completeness, and comparability associated with the sampling and analysis activities to be conducted as part of this Investigation. Field QA/QC procedures will be used to ensure that samples collected are representative of the actual conditions of the Subject, and do not contain contaminants introduced either from the field activities or from sample transit. Laboratory QA/QC procedures and analyses will be used to demonstrate whether analytical results have been biased either by interfering compounds present in the sample matrix or by laboratory techniques that may have introduced systematic or random errors to the analytical process. A summary of the QA/QC samples to be collected and analyzed as part of this Investigation, is provided in Table 1. A summary of the field and laboratory QA/QC procedures to be followed as part of this Investigation is given below.

6.1 Field QA/QC

Field QA/QC will include the following procedures: 1) calibration of field equipment; 2) the collection of trip, matrix duplicate, and field blank samples; 3) the use of dedicated and disposable field sampling equipment; 4) proper sample handling and preservation; 5) proper sample custody; and 6) the completion of report logs. A description of each of these procedures is provided below.

6.1.1 Calibration of Field Equipment

All field analytical equipment used will be calibrated in the field on a daily basis in accordance with manufacturer's specifications.

6.1.2 Collection of Field QA/QC Samples

Trip blanks will be prepared by the CLP-certified laboratory with deionized laboratory grade water and one blank will accompany all sample shipments to the laboratory. The water used will be from the same source as that used for the laboratory method blank. The trip blank will be handled and transported in the same manner as the samples collected which it will accompany. Trip blanks will be analyzed for VOCs in accordance with ASP 95-1 to identify the presence of cross-contamination as a result of sample shipment, e.g. contaminated from the air, shipping containers, or from other items coming into contact with the sample bottles.

6.0 QUALITY ASSURANCE PROJECT PLAN (QAPP) - continued

Matrix duplicate samples will be collected at a frequency of 10 percent of all samples collected. Aqueous matrix duplicates will be obtained by collecting two successive samples from the same location. Non-aqueous matrix duplicates collected for VOC analysis will be obtained by collecting two successive samples from the same location without homogenizing each aliquot. Non-aqueous matrix duplicates collected for analyses other than VOCs will be collected by delivering the field sample to a mixing container and homogenizing the sample before splitting it into two separate sample containers. Duplicate samples will be analyzed for same VOCs, SVOCs, and PPMs to provide a measure of intralaboratory precision of the entire analytical process.

One field blank will be collected on a daily basis. The field blank will be collected by pouring deionized laboratory grade water over or through the sampling implement used to collect the sample (bailer, macrocore sampler, tip of backhoe bucket, etc.) and gathering this water into appropriate sample containers preserved in the same manner as other aqueous matrix samples. The water used for the field blank will be from the same source as that used for the laboratory method blank. The field blank will be analyzed for same parameters as the samples collected on the same day for the same sampling activity to determine whether the field sampling equipment is cross-contaminating the samples.

6.1.3 Use of Dedicated and Disposable Field Sampling Equipment

Dedicated and disposable polyethelyene bailers will be used to purge and sample the monitoring wells, to eliminate the possibility of cross-contamination during groundwater sampling activities.

Disposable sampling equipment including latex gloves, dedicated tubing, and disposable acetate liners will be used to prevent cross-contamination between samples. All downhole equipment used to collect soil and groundwater samples during Geoprobe investigation, and excavating equipment, as well as field screening equipment will be decontaminated after each sample by washing them with laboratory grade Alconox detergent and deionized water, and thoroughly air-drying the equipment.

6.0 QUALITY ASSURANCE PROJECT PLAN (QAPP) - continued

6.1.4 Sample Handling and Preservation

For each of the analytical parameters analyzed, a sufficient sample volume will be collected to allow the specified analytical method to be performed according to protocol, and to provide sufficient sample for reanalysis if necessary.

Samples obtained for metals analysis will be collected in plastic containers because metals tend to adsorb to glass surfaces. Because plasticizers and other organic compounds inherent in plastic containers may contaminate samples requiring organic analysis, these samples will be collected in glass containers.

Appropriate sample preservation techniques, including cold temperature storage at 4° C and pH adjustment with nitric acid, will be utilized to ensure that the analytical parameters in the samples analyzed by the laboratory have not changed from the time the sample was collected in the field.

Samples will be analyzed prior to the respective holding time for each of the analytical parameters to ensure the integrity of the analytical results.

Samples collected for VOC analysis will be bottled with zero headspace to prevent premature loss of VOCs from diffusion into existing airspaces above the samples. This will be accomplished by filling VOC vials used to collect aqueous samples till groundwater overflows the top of the vial, screwing the cap on tightly, and turning the vial upside down to ensure that no air bubbles are trapped inside. For soil samples, jars will be packed to the top of the container.

Additionally, any rocks, sticks, leaves, and any other debris will be removed from the sample prior to filling the container.

6.1.5 Sample Custody

Sample handling in the field will conform to appropriate sample custody procedures. Field custody procedures include proper sample identification, chain-of-custody forms, and packaging and shipping procedures. Sample labels will be attached to all sampling bottles before field activities begin to ensure proper sample identification. Each label will identify the site and sample location.

6.0 QUALITY ASSURANCE PROJECT PLAN (QAPP) - continued

Proposed sampling locations are indicated in the Proposed Sample Location Plan. Actual sampling locations, if different than proposed, will be marked on the Sample Location Plan which will be revised accordingly.

Each cooler will be lined with two 6-mil thick plastic bags. Styrofoam or bubble wrap will be used to absorb shock and prevent breakage of sample containers. VOC vials will be packaged inside a plastic "Ziplock" bag prior to placement inside the cooler. Ice or ice packs will be placed in between the plastic bags for sample preservation purposes.

After each sample is collected and appropriately identified, the following information will be entered into the chain-of-custody form: 1) site name and address; 2) sampler(s)' name(s) and signature(s); (3) names and signatures of persons involved in the chain of possession of samples; 4) sample number; 5) number of containers; 6) sample location; 7) date and time of collection; 8) type of sample, sample matrix and analyses requested; 9) preservation used (if any); and 10) any pertinent field data collected (pH, temperature, conductivity, DO).

The sampler will sign and date the "Relinquished" blank space prior to removing one copy of the custody form and sealing the remaining copies of the form in a Ziplock plastic bag taped to the underside of the sample cooler lid. After sample containers are sufficiently packed and the chain-of-custody form completed, the 6-mil plastic bags will be sealed around the samples by twisting the top and securely taping the bag closed to prevent leakage. A sample custody seal will be placed around the neck of the bag which will include the signature of the project manager, and/or his designee, and the date.

The sample cooler will be sealed with tape prior to delivery or shipment to Chemtech. Additionally, sample custody seals will be placed around the cooler lid to detect unauthorized tampering with samples following collection and prior to the time of analysis. The seals will be attached in such a way that it will be necessary to break them in order to open the container. Seals will be affixed at the time of sample packaging and will include the signature of the project manager and/or his designee and the date.

6.0 QUALITY ASSURANCE PROJECT PLAN (QAPP) - continued

Samples sent to Chemtech by overnight carrier will be packaged and labeled for shipment in compliance with current U.S. Department of Transportation (DOT) and International Air Transport Association (IATA) dangerous goods regulations, as well as any additional requirements stipulated by the courier.

6.1.6 Report Logs

The following project logs will be completed during the course of this investigation: 1) field logs; 2) boring logs; 3) monitoring well development purging and sampling data logs; and 4) monitoring well installation details. A field log will be completed on a daily basis which will describe all field activities including: 1) project number, name, manager, and address; 2) date; 3) weather; 4) attendees on-site and associated affiliations; 5) description of field activities; and 6) all pertinent sample collection information including sample identification numbers, description of samples, location of sampling points, number of samples taken, method of sample collection and any factors that may affect its quality, time of sample collection, name of collector, and field screening results.

A boring log will be completed for each Geoprobe boring advanced. The following information will be included on each boring log: 1) project number, name, manager, and location; 2) date; 3) drilling or excavating company and method used; 4) boring number; 5) water table depth; and 6) all pertinent soil sample information including sample number, interval, depth, amount recovered, color, composition, percent moisture, visual and olfactory observations of contamination, and field screening readings.

A monitoring well purging and sampling data log will be completed following, purging and sampling of each monitoring well. For purging and sampling activities, the following information will be recorded: 1) project number, name, manager, and location, 2) monitoring well number, 3) well casing diameter and stick-up height, 4) depth of well from top of well and roadbox casings, 5) date, 6) time, and 7) water analyzer used. Additionally, the following information will be recorded: 1) distance from top of well casing to water 2) height of water column; 3) volume factor and well volume, 4) the pH, temperature, conductivity, and dissolved oxygen content associated with the number of well volumes removed.

A sample of each of these logs is provided in Appendix B of this Workplan.

6.0 QUALITY ASSURANCE PROJECT PLAN (QAPP) - continued

6.2 Laboratory QA/QC

Chemtech, a CLP-certified laboratory, will be used for all sample analyses to be performed as part of this Investigation. This laboratory will follow the following QA/QC protocols.

6.2.1 Sample Custody

All samples will be delivered to Chemtech within 24 hours of sample collection. Samples will be received by laboratory personnel who will inspect the sample cooler(s) to check the integrity of the custody seals. The cooler(s) will then be opened, the samples unpackaged and the information on the chain-of-custody form examined. If the samples shipped match those described on the chain-of-custody form, the laboratory sample custodian will sign and date the form on the next "Received" blank and assume responsibility for the samples. If problems are noted with the sample shipment, the laboratory custodian will sign the form and record problems in the "Remarks" box. The custodian will then immediately notify the Project Manager so appropriate follow-up steps can be implemented on a timely basis.

All samples will then be logged into a sample log book and/or computerized information system. The following information will be recorded: 1) date and time of sample receipt; 2) project number; 3) field sample number; 4) laboratory sample number (assigned during log-in procedure); 5) sample matrix; 6) sample analytical parameters; 7) storage location; and 8) log-in person's initials. A record of the information detailing the handling of a particular sample through each stage of analysis will be provided by the completion of a laboratory chronicle form. The following information will be included on this form: 1) job reference; 2) sample matrix; 3) sample number; 4) date sampled; 5) date and time received by laboratory; 6) holding conditions; 7) analytical parameters; 8) extraction date, time and extractor's initials (if applicable), 9) analysis date, time, and analyst's initials, and 10) QA batch number, date reviewed, and reviewer's initials.

All information relevant to the samples will be secured at the end of each business day. All samples will be stored in a designated sample storage refrigerator, access to which will be limited to laboratory employees.

Legend

- ⌖ Proposed Boring Location
- ▪ Proposed Test Pit Location
- • Previous Boring Advanced by IVI

Map based on Survey prepared by
Pietrzak & Pfau Engineering and Surveying,
PLLC
dated March 15, 1998

−100 0 50 100

(IN FEET)

Figure 2 - Proposed Sample Location Plan

Project Name: Waters Edge
Port Jervis, New York
Project Number: E1015676

IVI Environmental Inc.
105 Corporate Park Drive
White Plains, NY 10604
(914) 694-9600 (tel)
(914) 694-3724 (fax)

Date: 1/26/01

Scale 1"= 100'

Map based on Survey prepared by
Pietrzak & Pfau Engineering and Surveying, PLLC
dated March 15, 1998

−100 0 50 100

(IN FEET)

Figure 1 - Site Plan

Project Name: Waters Edge
Port Jervis, New York
Project Number: E1015676

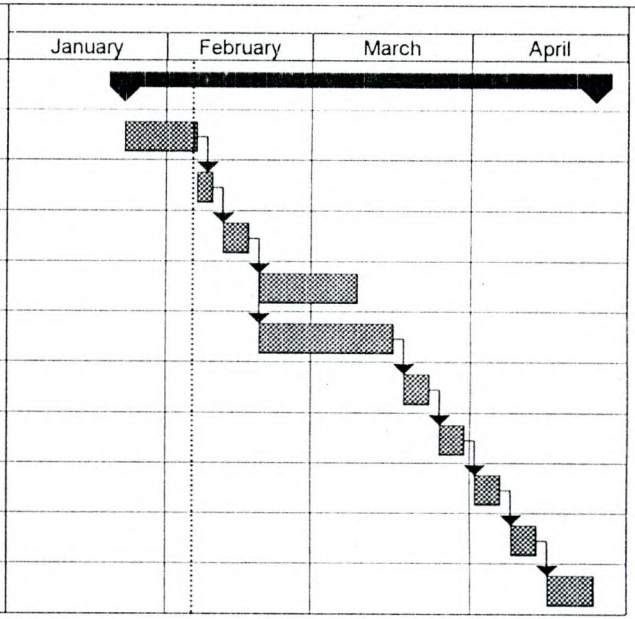
IVI Environmental Inc.
105 Corporate Park Drive
White Plains, NY 10604
(914) 694-9600 (tel)
(914) 694-3724 (fax)

Date: 1/26/01

Scale 1"= 100'

Figure 3: Master Schedule
Voluntary Investigation
Waters Edge (Proposed Senior Housing)
Port Jervis, New York

ID	Task Name	Duration	Start	Finish
1	**1.0 Voluntary Investigation**	65 days	Wed 1/24/01	Tue 4/24/01
2	a. Workplan Preparation and Submittal	10 days	Wed 1/24/01	Tue 2/6/01
3	b. NYSDEC Review of Workplan	3 days	Wed 2/7/01	Fri 2/9/01
4	c. Field Investigation	5 days	Mon 2/12/01	Fri 2/16/01
5	d. Lab Analysis	15 days	Mon 2/19/01	Fri 3/9/01
6	e. VIR/ RAWP Preparation and Submittal	20 days	Mon 2/19/01	Fri 3/16/01
7	f. NYSDEC Review of VIR/RAWP	5 days	Mon 3/19/01	Fri 3/23/01
8	g. Respond to NYSDEC comments and submit RIR/VAWP to DOH	5 days	Mon 3/26/01	Fri 3/30/01
9	h. NYSDOH Review of VI/RAW	5 days	Mon 4/2/01	Fri 4/6/01
10	i. Final VIR/RAWP Preparation and Submittal	5 days	Mon 4/9/01	Fri 4/13/01
11	j. NYSDEC Review and Approval Letter	7 days	Mon 4/16/01	Tue 4/24/01



Project: Waters Edge (Proposed Senior Housing)

Project No: E1015676

Task
Split
Progress
Milestone
Summary
Rolled Up Task
Rolled Up Split
Rolled Up Milestone
Rolled Up Progress
External Tasks
Project Summary

Table 1
Summary of Proposed Sampling Plan
Waters Edge (Proposed Senior Housing)
Port Jervis, New York

Sample Location	Matrix	Analytical Parameter/Constituent
B-6	Soil/Groundwater	VOCs/SVOCs (AE only)/CLP Metals/(pH for water)
B-7	Soil/Groundwater	VOCs/SVOCs (AE only)/CLP Metals/(pH for water)
B-8	Soil/Groundwater	VOCs/SVOCs (AE only)/CLP Metals/(pH for water)
B-9	Groundwater	VOCs/SVOCs (AE only)/CLP Metals/pH
B-10	Groundwater	VOCs/SVOCs (AE only)/CLP Metals/pH
B-11	Groundwater	VOCs/SVOCs (AE only)/CLP Metals/pH
B-12	Groundwater	VOCs/SVOCs (AE only)/CLP Metals/pH
B-13	Groundwater	VOCs/SVOCs (AE only)/CLP Metals/pH
B-14	Groundwater	VOCs/SVOCs (AE only)/CLP Metals/pH
B-15	Soil	PCBs
B-16	Soil	PCBs
B-17	Groundwater	Stars List VOCs/SVOCs
B-18	Groundwater	Stars List VOCs /SVOCs
MW-1	Groundwater	VOCs/SVOCs (AE only)/CLP Metals/pH
MW-2	Groundwater	VOCs/SVOCs (AE only)/CLP Metals/pH
TP-1	Soil	VOCs/SVOCs
TP-2	Soil	VOCs/SVOCs
TP-3	Soil	VOCs/SVOCs
TP-4	Soil	VOCs/SVOCs
TP-5	Soil	VOCs/SVOCs
TP-6	Soil	VOCs/SVOCs
TP-7	Soil	Stars List VOCs/SVOCs
TP-8	Soil	Stars List VOCs/SVOCs
TP-9	Soil	Stars List VOCs/SVOCs
TP-10	Soil	Stars List VOCs/SVOCs

Notes:

1. AE = Acid Extractable
2. PCBs = Polychlorinated Biphenyls
3. SVOCs = Semi- Volatile Organic Compounds
4, VOCs = Volatile Organic Compounds
5. Quality Assurance/Quality Control Samples (i.e. trip blanks, field blanks and matrix duplicates) will be collected and analyzed in accordance with Section 6.0 of the Voluntary Investigation Workplan.
6. All groundwater samples collected from Geoprobe borings will be filtered for CLP-metals analysis.

K:Projects/E1015676/Waters Edge Voluntary Investigation/Table 1

IVI Environmental, Inc.

105 Corporate Park Drive
White Plains, New York 10604
(914) 694-9600

Field Log

Project No.: _____

Date: _____

Project Name: _____

Project Address: _____

Project Manager: _____

Weather: _____

Attendees: _____

Observations

Notes:

For field screening activities, field observations should include field instrument readings. For sampling activities, field observations should include location of sampling points and justification, number of samples taken, method of sample collection and any factors that may affect its quality, time of sample collection, name of collector, sample identification numbers and description of samples.

Page ____of ____

Date: _____

Project Name: _____

Field Log (continued)

Observations

Notes:

For field screening activities, field observations should include field instrument readings. For sampling activities, field observations should include location of sampling points and justification, number of samples taken, method of sample collection and any factors that may affect its quality, time of sample collection, name of collector, sample identification numbers and description of samples.

IVI Environmental, Inc.

105 Corporate Park Drive
White Plains, New York 10604
(914) 694-9600 (tel)
(914) 694-2903 (fax)

Boring Log

Project No.: _____

Date: _____

Project Name: _____

Location: _____

Project Manager: _____

Drilling Company: _____

Total Depth: _____

Method Used: _____

Water Table Depth: _____

Boring No.: _____

Depth (feet)	Sample No.	Sample Interval	Recovered (feet)	Field Screening Result (ppm)	Soil Identification and Remarks (include color, composition, moisture, and visual and olfactory observations of contamination)

IVI Environmental, Inc.

105 Corporate Park Drive
White Plains, New York 10604
(914) 694-9600

Monitoring Well
Purging and Sampling Data Log

Project No.:	Monitoring Well:
Project Name:	Well Casing Diameter: in.
Project Manager:	Well Stick-up Height: ft.
Project Location:	Depth of Well from Top of Well Casing: ft.
Water Analyzer Used:	Depth of Well from Top of Roadbox Casing: ft.

WELL DEVELOPMENT DATA

DATE:		Distance from Top of Well Casing to:		Height of Water Column (ft.)	Volume Factor[1]	Well Volume (gal.)
	Time	Water (ft.)	Free Product (ft.)			
Before Development						
After Development				NA	NA	NA

Volume of Groundwater Removed During Development: gal.

Comments:

WELL PURGING AND SAMPLING DATA

DATE:

Distance from top of well casing to water: ft.

Distance from top of well casing to free product: ft.

Number of Well Volumes	Time	pH	Temp °C	Conductivity uS/cm	Dissolved Oxygen (ppm)
0					
1					
2					
3					
4					
5					

Comments:

Notes:

[1]Volume Factor = 0.163 gal./ft. and 0.653 gal./ft. for 2" and 4" diameter well casings, respectively.
NA = Not Applicable

SITE HEALTH AND SAFETY PLAN

Waters Edge (Proposed Senior Housing)
200 East Main Street
Port Jervis, New Jersey

Prepared for
Town of Port Jervis
Port Jervis, New York

Prepared by:
IVI Environmental, Inc.
White Plains, New York 10460

IVI Project No. E1015676
February 2, 2001

IVI

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1.0 INTRODUCTION

This section of the Site Health and Safety Plan (HASP) document defines general applicability and general responsibilities with respect to compliance with Health and Safety programs.

1.1 Scope and Applicability of the Site Health and Safety Plan

The purpose of this Site Health and Safety Plan is to define the requirements and designate protocols to be followed at the Site during investigation and remediation activities. Applicability extends to all Government employees, contractors, subcontractors, and visitors.

All personnel on site, contractors and subcontractors included, shall be informed of the site emergency response procedures and any potential fire, explosion, health, or safety hazards of the operation. This HASP summarizes those hazards in Table 3.1 and defines protective measures planned for the site.

This plan must be reviewed and an agreement to comply with the requirements must be signed by all personnel prior to entering the exclusion zone or contamination reduction zone.

During development of this plan, consideration was given to current safety standards as defined by the Environmental Protection Agency (EPA)/Occupational Health and Safety Administration (OSHA)/National Institute of Occupational Safety and Health (NIOSH), health effects and standards for known contaminants, and procedures designed to account for the potential for exposure to unknown substances. Specifically, the following reference sources have been consulted:

- OSHA 29 CFR 1910.120 and EPA 40 CFR 311
- USEPA, Office of Emergency and Remedial Response, Emergency Response Team, Standard Operating Safety Guides
- NIOSH/OSHA/USCG/EPA Occupational Health and Safety Guidelines
- American Conference of Governmental Industrial Hygienists (ACGIH) Threshold Limit Values

1.2 Visitors

All visitors entering the contamination reduction zone and exclusion zone at the Site will be required to read and verify compliance with the provisions of this HASP. In addition, visitors will be expected to comply with relevant OSHA requirements such as medical monitoring (Sec. 6.0), training (Sec. 4.0), and respiratory protection (if applicable). Visitors will also be expected to provide their own protective equipment.

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2.0 KEY PERSONNEL/IDENTIFICATION OF HEALTH AND SAFETY

In the event that a visitor does not adhere to the provisions of the HASP, he/she will be requested to leave the work area. All nonconformance incidents will be recorded in the site field log.

2.1 Key Personnel

The following personnel and organizations are critical to the planned activities at the Site. The organizational structure will be reviewed and updated periodically by the site supervisor.

Field Investigation Team (FIT) Representatives:

David R. Lent, C.P.G.
Jerry F. Vorbach, P.E., C.H.M.M.
Keith Diorio
Charles B. Mulligan Jr.
Peter Biolchini
Richard Crooks

2.2 Site Specific Health and Safety Personnel

The Site Health and Safety Officer (HSO) has total responsibility for ensuring that the provisions of this HASP are adequate and implemented in the field. Changing field conditions may require decisions to be made concerning adequate protection programs. Therefore, it is vital that personnel assigned as HSO be experienced and meet the additional training requirements specified by OSHA in 29 CFR 1910.120 (see Section 4.0 of this HASP). The HSO is also responsible for conducting site inspections on a regular basis in order to ensure the effectiveness of this plan.

The HSO at the site is David R. Lent.

Designated alternates include:

Charles B. Mulligan Jr.
Peter Biolchini
Richard Crooks
Keith Diorio

2.0 KEY PERSONNEL/IDENTIFICATION OF HEALTH AND SAFETY

2.3 Organizational Responsibility

Field Investigation Team (FIT): The FIT is responsible for performing the sample collection activities delineated in the Workplan including the Soil and Groundwater Sampling

3.0 TASK/OPERATION SAFETY AND HEALTH RISK ANALYSIS

3.1 Historical Overview of Site

This HASP defines the hazards and methods to protect personnel from those hazards identified in previous site work or background information. For a thorough overview of historical information concerning the Subject, see the following documents:

- Phase I Environmental Assessment Water's Edge, Port Jervis, New York, dated August 21, 2000, prepared by IVI on behalf of Community Preservation Corporation, Inc.

- Phase II Environmental Site Assessment Water's Edge, Port Jervis, New York, prepared by IVI on behalf of Community Preservation Corporation, dated November 27, 2000.

The property, which is situated in a suburban area characterized by residential and commercial retail and office development, consists of a 5.4-acre parcel improved with an approximately 80-year-old, 100,000 SF vacant industrial facility. Barrier Industries manufactured industrial janitorial chemicals on-site from 1978 until December 1993. The site was first developed prior to 1921 with a silk mill and several storage and residential buildings.

Based on the results of investigation conducted by IVI, the Subject's groundwater has been impacted by chlorinated solvents and priority pollutant metals, likely due to the historical manufacturing operations conducted on-site.

The following activities, which will be performed as part of the Voluntary Investigation of the Subject, are covered by this Health and Safety Plan (HASP): Soil and Groundwater Sampling.

3.0 TASK/OPERATION SAFETY AND HEALTH RISK ANALYSIS - continued

3.2 Task by Task Risk Analysis

The evaluation of hazards is based upon the knowledge of the site background presented in Section 3.1 above, and anticipated risks posed by the specific tasks to be performed. The following subsections describe each task/operation in terms of the specific hazards associated with it. In addition, the protective measures to be implemented during completion of those tasks are also identified.

Table 3.1 provides a summary of task analysis and chemical hazards for each task to be performed at the Subject.

TABLE 3.1
TASK ANALYSIS
CHEMICAL HAZARDS OF CONCERN

Contaminant	TLV/IDLH	Source/Concentration	Routes of Exposure
Soil and Groundwater Sampling			
Tetrachloroethylene	50 ppm/ Not applicable, potential human carcinogen (NIOSH, 1987)	Groundwater/0-12 ug/l	Inhalation, Ingestion and Contact
Trichloroethylene	50 ppm /IDLH: Not applicable, potential human carcinogen (NIOSH 1987)	Groundwater/0- 67 ug/l	Inhalation, Ingestion and Contact
1,1,1 Trichloroethylene	50 ppm /IDLH: Not applicable, potential human carcinogen (NIOSH 1987)	Groundwater/0- 30 ug/l	Inhalation, Ingestion and Contact
Chloroform	2ppm /2 ppm: potential human carcinogen (NIOSH 1987)	Groundwater/0- 3 ug/l	Inhalation, Ingestion and Contact
p&m Xylenes	100 ppm /IDLH: Not applicable, (NIOSH 1987)	Groundwater/0- 2 ug/l	Inhalation, Ingestion and Contact
1,1 Dichloroethane	100 ppm /IDLH: Not applicable, (NIOSH 1987)	Groundwater/0- 3 ug/l	Inhalation, Ingestion and Contact

Notes:
1. TLV = Threshold Limit Value
2. IDLH = Immediately Dangerous to Life and Health
3. (C) = ACGIH designated carcinogen
4. ACGIH = American Conference of Governmental Industrial Hygienists
5. NIOSH = National Institute of Occupational Safety and Health

3.0 TASK/OPERATION SAFETY AND HEALTH RISK ANALYSIS - continued

3.3 Task Hazard Descriptions

3.3.1 Soil and Groundwater Sampling

A. Hazard Identification

Hazards generally encountered during soil and groundwater sampling include the following:

- Exposure to vapors of volatile organics when the well head or sampling devices is initially opened.
- Back strain due to lifting bailers or pumps from down-well depths and moving equipment (generators) to well locations.
- Slipping on wet, muddy surfaces created by spilled water.
- Electrical hazards associated with use of electrical equipment around water or wet surfaces.
- Possible water splashing in eyes during sampling.

B. Hazard Prevention

- To minimize exposure to volatiles when the well head is initially opened, a field monitoring instrument (Photoionization Detector (PID)) should be placed near the opening to monitor organic levels. The breathing zone should also be monitored. The action levels on the instruments should be chosen before site work begins, and should be outlined in the safety plan. To prevent contact with contaminated groundwater, or product material, provide adequate protective equipment.
- Back strain can be prevented by employing proper lifting and bailing techniques. Heavy equipment, such as pumps and generators, should be only lifted with the legs, preferably using two or three personnel.
- Slipping on wet surfaces can be prevented by placing all purged water in drums for removal. Also, if the area is wet, wear boots with good treads and be alert of where personnel are walking to decrease the chance of slipping.

3.0 TASK/OPERATION SAFETY AND HEALTH RISK ANALYSIS - continued

- Ground fault interrupters should be used in the absence of properly grounded circuitry or when pumps are used around wet conditions.
- Electrical extension cords should be protected or guarded from damage (i.e., cuts from other machinery) and be maintained in good condition.
- Eye protection should be worn as appropriate to prevent water splashing into eyes.

3.4 Physical Hazards

3.4.1 General Description

Tetrachloroethylene - Tetrachloroethylene, also called perchloroethylene, is a clear colorless volatile liquid having an ether-like odor. It is used as dry cleaning solvent, a vapor degreasing solvent, drying agent for metals, and for the manufacture of other chemicals. It is non-combustible, insoluble in water and its vapors are heavier than air. ((C) AAR, 1986)

Trichloroethylene - Trichloroethylene is a clear colorless volatile liquid having a chloroform-like odor. It is used as a solvent, fumigant, in the manufacture of other chemicals, and for many other uses. It is heavier than water and is slightly soluble in water. It is non-combustible. ((C) AAR, 1986)

1,1,1 Trichloroethane- 1,1,1-Trichloroethane is a colorless liquid with a sweet, chloroform-like odor. It is used as a solvent for fats, oils, waxes, resins and other products. It may be irritating to skin, eyes and mucus membranes; and in high concentrations the vapors may have a narcotic effect. It is moderately flammable at high temperatures and, when involved in fire, may emit highly toxic and irritating fumes. (NOAA, 1987)

1,1 Dichloroethane- Oily liquid; colorless; chloroform-like ethereal odor. Sinks and mixes with water. (USCG, 1985)

Chloroform Is a clear colorless heavy liquid with a characteristic odor. It is used as a solvent, to make other chemicals, as fumigant, and for other uses. It is heavier than water and slightly soluble in water. ((C)AAR, 1986)

P&m Xylenes- Xylene is a clear colorless liquid with a characteristic aromatic odor. It is used as a solvent for paints and adhesives, and to make other chemicals. It has a flash point of 81-90 deg F. Its vapors are heavier than air. ((C) AAR, 1986)

3.0 TASK/OPERATION SAFETY AND HEALTH RISK ANALYSIS - continued

3.4.2 Health Hazards

Tetrachloroethylene - Vapor: Irritating to eyes, nose and throat. If inhaled, will cause difficult breathing, or loss of consciousness. Liquid: Irritating to skin and eyes. Harmful if swallowed. (USCG, 1985)

Trichloroethylene – Vapor is irritating to eyes, nose and throat. If inhaled, will cause nausea, vomiting, difficult breathing, or loss of consciousness. Liquid: Irritating to skin and eyes. If swallowed, will cause nausea, vomiting, difficult breathing, or loss of consciousness. (USCG, 1985)

1,1,1 Trichloroethane- Vapor: Irritating to eyes, nose and throat. If inhaled, will cause dizziness or difficult breathing. Liquid: Irritating to skin and eyes. If swallowed, may produce nausea. (USCG, 1985)

1,1 Dichloroethane- If swallowed may cause nausea, vomiting and faintness. Irritating to skin and eyes. (USCG, 1985)

Chloroform- If swallowed may cause nausea, vomiting and faintness. Irritating to skin and eyes. (USCG, 1985)

P&m Xylenes May be poisonous if inhaled or absorbed through skin. Vapors may cause dizziness or suffocation. Contact may irritate or burn skin and eyes. Fire may produce irritating or poisonous gases. Runoff from fire control or dilution water may cause pollution. (DOT, 1984)

3.4.3 Fire/Explosion Hazards

Tetrachloroethylene - Not flammable. Poisonous gases are produced when heated. Toxic, irritating gases may be generated in fires. (USCG, 1985)

Trichloroethylene - Combustible. Poisonous gases are produced in fire. Toxic and irritating gases are produced in fire situations. (USCG, 1985)

1,1,1 Trichloroethane- Combustible. Poisonous gases are produced in fire. Toxic and irritating gases are generated in fires. (USCG, 1985)

1,1 Dichloroethane- Flammable. Poison gas may be produced in fire or when heated. Containers may explode in fire. When heated to decomposition, emits highly toxic fumes to phosgene. Explosion hazard. (USCG, 1985)

Chloroform- It is nonflammable under most conditions, but it will burn under extreme fire conditions. (USCG, 1985)

3.0 TASK/OPERATION SAFETY AND HEALTH RISK ANALYSIS - continued

P&m Xylenes Extinguish with foam, dry chemical, or carbon dioxide. Water may be ineffective on fire. Cool exposed containers with water. (USCG, 1985)

3.4.4 Fire Fighting

Tetrachloroethylene - Extinguish fire using agent suitable for type of surrounding fire (material itself does not burn or burns with difficulty). ((C) AAR, 1986)

Trichloroethylene - Extinguish fire using agent suitable for type of surrounding fire (material does not burn or burns with difficulty). ((C) AAR, 1986)

1,1,1 Trichloroethane- Cool all affected containers with flooding quantities of water. Apply water from as far a distance as possible. Extinguish fire using agent suitable for type of surrounding fire (material itself does not burn or burns with difficulty). Keep run-off water out of sewers and water sources. ((C) AAR, 1986)

1,1 Dichloroethane- Extinguish with alcohol foam, carbon dioxide, or dry chemical. Water may be ineffective on fire. (USCG, 1985)

Chloroform- Extinguish with alcohol foam, carbon dioxide, or dry chemical. When heated it liberates phosgene; hydrogen chloride, chlorine and toxic and corrosive oxides of carbon and chlorine. It develops acidity from prolonged exposure to air and light. Chloroform explodes when in contact with aluminum powder or magnesium powder or with alkali metals and dinitrogen tetroxide. (EPA, 1986)

P&m Xylenes Extinguish with foam, dry chemical, or carbon dioxide. Water may be ineffective on fire. Cool exposed containers with water. (USCG, 1985)

3.4.5 Non-Fire Response

Tetrachloroethylene - Keep material out of water sources and sewers. Build dikes to contain flow as necessary. Attempt to stop leak if without hazard. Land Spill: Dig a pit, pond, lagoon, or holding area to contain liquid or solid material. Dike surface flow using soil, sand bags, foamed polyurethane, or foamed concrete. Absorb bulk liquid with fly ash or cement powder. Water Spill: If dissolved, apply activated carbon at ten times the spill amount in region of 10 ppm or greater concentration. Remove trapped material with suction hoses. Air Spill: Apply water spray or mist to knock-down vapors. Vapor knockdown water is corrosive or toxic and should be diked for containment. ((C) AAR, 1986)

3.0 TASK/OPERATION SAFETY AND HEALTH RISK ANALYSIS - continued

Trichloroethylene - Keep material out of water sources and sewers. Build dikes to contain flow as necessary. Land Spill: Dig a pit, pond, lagoon, or holding area to contain liquid or solid material. Dike surface flow using soil, sand bags, foamed polyurethane, or foamed concrete. Absorb bulk liquid with fly ash or cement powder. Water Spill: Use natural barriers or oil spill control booms to limit spill motion. If dissolved, apply activated carbon at ten times the spill amount in region of 10 ppm or greater concentration. Remove trapped material with suction hoses. Use mechanical dredges or lifts to remove immobilized masses of pollutants and precipitates. ((C) AAR, 1986)

1,1,1 Trichloroethane- Keep material out of water sources and sewers. Attempt to stop leak if without hazard. Use water spray to knock-down vapors. Land Spill: Dig a pit, pond, lagoon or holding area to contain liquid or solid material. Dike surface flow using soil, sand bags, foamed polyurethane, or foamed concrete. Absorb bulk liquid with fly ash, cement powder, sawdust, or commercial sorbents. Water Spill: Use natural barriers or oil spill control booms to limit spill motion. Use natural deep water pockets, excavated lagoons, or sand bag barriers to trap material at bottom. Remove trapped material with suction hoses. ((C) AAR, 1986)

1,1 Dichloroethane- Wear goggles, self-contained breathing apparatus, and rubber overclothing (including gloves). Stop discharge if possible. Keep people away. Shut off ignition sources. Avoid contact with liquid. Isolate and remove discharged material. Notify local health and pollution control agencies. (USCG, 1985)

Chloroform- Utilize protective clothing to handle all materials. Stop discharge if possible. Prevent entry to sewers, waterways, and confined spaces.

P&m Xylenes Keep sparks, flames, and other sources of ignition away. Keep material out of water sources and sewers. Build dikes to contain flow as necessary. Attempt to stop leak if without hazard. Use water spray to knock-down vapors. Land Spill: Dig a pit, pond, lagoon, or holding area to contain liquid or solid material. Dike surface flow using soil, sand bags, foamed polyurethane, or foamed concrete. Absorb bulk liquid with fly ash, cement power, sawdust, or commercial sorbents. Apply "universal" gelling agent to immobilize spill. Apply fluorocarbon-water foam to diminish vapor and fire hazard. Water Spill: Use natural barriers or oil spill control booms to limit spill motion. Use surface active agent (e.g. detergent, soaps, alcohols) to compress and thicken spilled material. Inject "universal" gelling agent to solidify enriched spill and increase effectiveness of booms. If dissolved, apply activated carbon at ten times the spilled amount in region of 10 ppm or greater concentration. Remove trapped material with suction hoses.

3.0 TASK/OPERATION SAFETY AND HEALTH RISK ANALYSIS - continued

3.4.6 First Aid

Tetrachloroethylene - If this chemical comes in contact with the eyes, immediately wash the eyes with large amounts of water, occasionally lifting the lower and upper lids. Get medical attention immediately. Contact lenses should not be worn when working with this chemical. If this chemical comes in contact with the skin, promptly wash the contaminated skin with soap and water. If this chemical penetrates through the clothing, promptly remove the clothing and wash the skin with soap and water. Get medical attention promptly. If a person breathes in large of amounts of this chemical, move the exposed person to fresh air at once. If breathing has stopped, perform artificial respiration. Keep the affected person warm and at rest. Get medical attention as soon as possible. If this chemical has been swallowed, get medical attention immediately. (NIOSH, 1987)

Trichloroethylene - If this chemical comes in contact with the eyes, immediately wash the eyes with large amounts of water, occasionally lifting the lower and upper lids. Get medical attention immediately. Contact lenses should not be worn when working with this chemical. If this chemical comes in contact with the skin, immediately wash the contaminated skin with soap and water. If this chemical penetrates through the clothing, immediately remove the clothing, wash the skin with soap and water, and get medical attention promptly. If a person breathes in large amounts of this chemical, move the exposed person to fresh air at once. If breathing has stopped, perform artificial respiration. Keep the affected person warm and at rest. Get medical attention as soon as possible. If this chemical has been swallowed, get medical attention immediately (NIOSH, 1987).

1,1,1 Trichloroethane- If this chemical comes in contact with the eyes, immediately wash the eyes with large amounts of water occasionally lifting the lower and upper lids. Get medical attention immediately. Contact lenses should not be worn when working with this chemical. If this chemical penetrates through the clothing, promptly remove the clothing and wash the skin with soap and water. Get medical attention promptly. If a person breathes in large amounts of this chemical, move the exposed person to fresh air at once. If breathing has stopped, perform artificial respiration. Keep the affected person warm and at rest. Get medical attention as soon as possible. If this chemical has been swallowed, get medical attention immediately. (NIOSH, 1987)

3.0 TASK/OPERATION SAFETY AND HEALTH RISK ANALYSIS - continued

1,1 Dichloroethane- If this chemical comes in contact with the eyes, immediately wash the eyes with large amounts of water, occasionally lifting the lower and upper lids. Get medical attention immediately. Contact lenses should not be worn when working with this chemical. If this chemical comes in contact with the skin, promptly flush the contaminated skin with soap and water. If this chemical penetrates through the clothing, promptly remove the clothing and flush the skin with water. If irritation persists after washing, get medical attention. If a person breathes in large amounts of this chemical, move the exposed person to fresh air at once. If breathing has stopped, perform artificial respiration. Keep the affected person warm and at rest. Get medical attention as soon as possible. If this chemical has been swallowed, get medical attention immediately. (NIOSH, 1987)

Chloroform- If this chemical comes in contact with the eyes, immediately wash the eyes with large amounts of water, occasionally lifting the lower and upper lids. Get medical attention immediately. Contact lenses should not be worn when working with this chemical. If this chemical comes in contact with the skin, promptly wash the contaminated skin and soap and water. If this chemical penetrates through the clothing, promptly remove the clothing and wash the skin with soap and water. Get medical attention promptly. If a person breathes in large amounts of this chemical, move the exposed person to fresh air at once. If breathing has stopped, perform artificial respiration. Do not administer mouth to mouth, if victim has ingested or inhaled the substance, utilize pocket mask with a one way valve. Keep the affected person warm and at rest. Get medical attention as soon as possible. If this chemical has been swallowed, get medical attention immediately. (NIOSH, 1987)

P&m Xylenes If this chemical comes in contact with the eyes, immediately wash the eyes with large amounts of water, occasionally lifting the lower and upper lids. Get medical attention immediately. Contact lenses should not be worn when working with this chemical. If this chemical comes in contact with the skin, promptly wash the contaminated skin and soap and water. If this chemical penetrates through the clothing, promptly remove the clothing and wash the skin with soap and water. Get medical attention promptly. If a person breathes in large amounts of this chemical, move the exposed person to fresh air at once. If breathing has stopped, perform artificial respiration. Keep the affected person warm and at rest. Get medical attention as soon as possible. If this chemical has been swallowed, get medical attention immediately. (NIOSH, 1987)

4.0 PERSONNEL TRAINING REQUIREMENTS

Consistent with OSHA's 29 CFR 1910.120 regulation covering Hazardous Waste Operations and Emergency Response, all site personnel are required to be trained in accordance with the standard. At a minimum, all personnel are required to be trained to recognize the hazards on-site, the provisions of this HASP, and the responsible personnel.

4.1 Preassignment and Annual Refresher Training

Prior to arrival on site, each employer will be responsible for certifying that his/her employees meet the requirements of preassignment training, consistent with OSHA 29 CFR 1910.120 paragraph (e)(3). The employer should be able to provide a document certifying that each general site worker has received 40 hours of instruction off the site, and 24 hours of training for any workers who are on site only occasionally for a specific task. If an individual employee has work experience and/or training that is equivalent to that provided in the initial training, an employer may waive the 40-hour training so long as that equivalent experience is documented or certified. All personnel must also receive 8 hours of refresher training annually.

4.2 Site Supervisors Training

Consistent with OSHA 29 CFR 1910.120 paragraph (e)(8), individuals designated as site supervisors require an additional 8 hours of training.

The following individuals are identified as site supervisors:

Name	Title/Responsibility
David R. Lent	Assistant Manager Phase II Department

4.3 Training and Briefing Topics

The following items will be discussed by a qualified individual at the site pre-entry briefing(s) or periodic site briefings.

TABLE 4.1
TRAINING AND BRIEFING TOPICS SUMMARY

Training	Frequency
Air Monitoring, Sec. 7.0; [29 CFR 1910.120(h)]	Periodic
Chemical Hazards, Table 3.1	Periodic

4.0 PERSONNEL TRAINING REQUIREMENTS – continued

Training	Frequency
Engineering Controls and Work Practices	Periodic
Handling Drums and Containers, [29 CFR 1910.120(j)]	Periodic
Overhead and Underground Utilities	Periodic
Personnel Protective Equipment, Sec. 5.0	Periodic
Site Control, Sec. 8.0; [29 CFR 1910.120(d)]	Periodic
Site Characterization and Analysis, Sec. 3.0	Periodic
Spill Containment, Sec. 12.0; [29 CFR 1910.120(b)(4)(j)]	Periodic
Training Requirements, Sec. 4.0; [29 CFR 1910.120(e)]	Periodic

5.0 PERSONAL PROTECTIVE EQUIPMENT TO BE USED

This section describes the general requirements of the EPA designated Levels of Protection (A-D), and the specific levels of protection required for each task at the Site.

5.1 Levels of Protection

Personnel wear protective equipment when response activities involve known or suspected atmospheric contamination, vapors, gases, or particulates may be generated by site activities, or when direct contact with skin-affecting substances may occur. Full facepiece respirators protect lungs, gastrointestinal tract, and eyes against airborne toxicants. Chemical-resistant clothing protects the skin from contact with skin-destructive and absorbable chemicals.

The specific levels of protection and necessary components for each have been divided into four categories according to the degrees of protection afforded:

Level A: Should be worn when the highest level of respiratory, skin, and eye protection is needed.

Level B: Should be worn when the highest level of respiratory protection is needed, but a lesser level of skin protection. Level B is the primary level of choice when encountering unknown environments.

Level C: Should be worn when the criteria for using air-purifying respirators are met, and a lesser level of skin protection is needed.

Level D: Should be worn only as a work uniform and not in any area with respiratory or skin hazards. It provides minimal protection against chemical hazards.

Modifications of these levels are permitted, and routinely employed during site work activities to maximize efficiency. For example, Level C respiratory protection and Level D skin protection may be required for a given task. Likewise the type of chemical protective ensemble (i.e., material, format) will depend upon contaminants and degrees of contact.

The Level of Protection selected is based upon the following:

- Type and measured concentration of the chemical substance in the ambient atmosphere and its toxicity.
- Potential for exposure to substances in air, liquids, or other direct contact with material due to work being done.
- Knowledge of chemicals on-site along with properties such as toxicity, route of exposure, and contaminant matrix.

5.0 PERSONAL PROTECTIVE EQUIPMENT TO BE USED – continued

In situations where the type of chemical, concentration, and possibilities of contact are not known, the appropriate Level of Protection must be selected based on professional experience and judgment until the hazards can be better identified.

5.2 Level A Personnel Protective Equipment:

- Supplied air respirator approved by the Mine Safety and Health Administration (MSHA) and National Institute for Occupational Safety and Health (NIOSH). Respirators may be positive pressure-demand, self-contained breathing apparatus (SCBA), or positive pressure-demand, airline respirator (with escape bottle for Immediately Dangerous to Life and Health (IDLH) or potential for IDLH atmosphere)
- Fully encapsulating chemical-resistant suit
- Coveralls
- Long cotton underwear
- Gloves (inner)
- Boots, chemical-resistant, steel toe and shank (depending on suit construction, worn over or under suit boot)
- Hard hat (under suit)
- Disposable gloves and boot covers (worn over fully encapsulating suit)
- Cooling unit
- 2-way radio communications (intrinsically safe)

5.3 Level B Personnel Protective Equipment:

- Supplied-air respirator (MSHA/NIOSH approved). Respirators may be positive pressure-demand, self-contained breathing apparatus (SCBA), or positive pressure-demand, airline respirator (with escape bottle for IDLH or potential for IDLH atmosphere)
- Chemical-resistant clothing (overalls and long-sleeved jacket; hooded, one or two-piece chemical-splash suit; disposable chemical-resistant, one-piece suits)
- Long cotton underwear
- Coveralls
- Gloves (outer), chemical-resistant
- Gloves (inner), chemical-resistant
- Boots (outer), chemical-resistant, steel toe and shank
- Boot covers (outer), chemical-resistant (disposable)
- Hard hat (face shield)
- 2-way radio communications (intrinsically safe)

5.0 PERSONAL PROTECTIVE EQUIPMENT TO BE USED – continued

5.4 Level C Personnel Protective Equipment:

- Air-purifying respirator, full-face, cartridge-equipped (MSHA/NIOSH approved)
- Chemical-resistant clothing (coveralls; hooded, one-piece or two-piece chemical splash suit; chemical-resistant hood and apron, disposable chemical-resistant coveralls)
- Coveralls
- Long cotton underwear
- Gloves (outer), chemical-resistant
- Gloves (inner), chemical-resistant
- Boots (outer), chemical-resistant, steel toe and shank
- Boot covers (outer), chemical-resistant (disposable)
- Hard hat (face shield)
- Escape mask
- 2-way radio communications (intrinsically safe)

5.5 Level D Personnel Protective Equipment:

- Coveralls
- Gloves
- Boots/shoes, leather or chemical-resistant, steel toe and shank
- Safety glasses
- Hard hat

5.6 Reassessment of Protection Program

The Level of Protection provided by PPE selection shall be upgraded or downgraded based upon a change in site conditions or findings of investigations. When a significant change occurs, the hazards should be reassessed. Some indicators of the need for reassessment are:

- Commencement of a new work phase, such as the start of drum sampling or work that begins on a different portion of the site.
- Change in job tasks during a work phase.
- Change of season/weather.
- When temperature extremes or individual medical considerations limit the effectiveness of PPE.
- Contaminants other than those previously identified are encountered.
- Change in work scope, which effects the degree of contact with contaminants.

5.0 PERSONAL PROTECTIVE EQUIPMENT TO BE USED – continued

5.7 Work Mission Duration

Before the workers actually begin work in their PPE ensembles, the anticipated duration of the work mission should be established. Several factors limit mission length, including:

- Air supply consumption (SCBA use).
- Suit/Ensemble permeation and penetration rates for chemicals (section 5.8.).
- Ambient temperature and weather conditions (heat stress/cold stress).
- Capacity of personnel to work in PPE.

5.8 Personal Protective Equipment Recommended for Site

The following specific clothing materials are recommended for the site:

A. Soil and Groundwater Sampling – Level D: safety goggles and chemical resistant gloves.

5.9 SOP for Personal Protective Equipment

Proper inspection of PPE features several sequences of inspection depending upon specific articles of PPE and it's frequency of use. The different levels of inspection are as follows:

- Inspection and operation testing of equipment received from the factory or distributor.
- Inspection of equipment as it is issued to workers.
- Inspection after use or training and prior to maintenance.
- Periodic inspection of stored equipment.
- Periodic inspection when a question arises concerning the appropriateness of the selected equipment, or when problems with similar equipment arise.
- The primary inspection of the PPE in use for activities at the Subject will occur prior to immediate use and will be conducted by the user. This ensures that the specific device or article has been checked-out by the user and that the user is familiar with its use.

5.0 PERSONAL PROTECTIVE EQUIPMENT TO BE USED - continued

TABLE 5.1
SAMPLE PPE INSPECTION CHECKLIST

CLOTHING

Before use:

- Determine that the clothing material is correct for the specified task at hand.
- Visually inspect for:
  - imperfect seams
  - non-uniform coatings
  - tears
  - malfunctioning closures
- Hold up to light and check for pinholes.
- Flex product:
  - observe for cracks
  - observe for other signs of shelf deterioration
- If the product has been used previously, inspect inside and out for signs of chemical attack:
  - discoloration
  - swelling
  - stiffness

During the work task:

- Evidence of chemical attack such as discoloration, swelling, stiffening, and softening. Keep in mind, however, that chemical permeation can occur without any visible effects.
- Closure failure.
- Tears.
- Punctures.
- Seam Discontinuities.

GLOVES

Before use:

- Visually inspect for:
  - imperfect seams
  - tears
  - non-uniform coating
  - pressurize glove with air; listen for pin-hole leaks.

5.0 PERSONAL PROTECTIVE EQUIPMENT TO BE USED - continued

5.10 SOP for Respiratory Protection Devices

The following subsections define standard operating procedures for air purifying respirators and self-contained breathing apparatus.

5.10.1 Cleaning and Disinfecting Air Purifying Respirators and Self Contained Breathing Apparatus

The backpiece is cleaned with cleaning solution and a brush. For Self-Contained Breathing Apparatus (SCBA), the facepiece is combined with the regulator following cleaning and an operational check is performed.

5.10.2 SCBA Inspection and Checkout

A. Monthly Inspection

1. Check cylinder label for current hydrostatic test date.
2. Inspect cylinder for large dents or gouges.
3. Inspect cylinder gauge for damage.
4. Complete routine inspection
5. Fill out the appropriate records with results and recommendations.

B. Routine Inspection

Perform immediately prior to donning or after cleaning. Before proceeding, check the following equipment:

1. Valves

   - By-pass valve is closed.
   - Mainline valve is closed

2. Backpack and Harness Assembly

   - Visually inspect straps for wear, damage, and completeness.
   - Check wear and function of belt.
   - Check packplate and cylinder holder for damage.

5.0 PERSONAL PROTECTIVE EQUIPMENT TO BE USED - continued

3. Cylinder and High Pressure Hose Assembly

- High-pressure hose connector is tight on cylinder fitting.
- Check cylinder to assure that it is firmly attached to backplate.
- Open cylinder valve; listen or feel for leakage around packing and hose connection.
- Check high-pressure hose for damage or leaks.

4. Regulator

- Regulator outlet is not covered or obstructed.
- Cover regulator outlet with palm of hand.
- Open mainline valve.
- Note stoppage of airflow after positive pressure builds.
- Close mainline valve.
- Remove hand from regulator outlet.
- Open by-pass valve slowly to assure proper function
- Close by-pass valve.
- Open mainline valve.
- Note pressure reading on regular gauge.
- Close cylinder valve while keeping hand over regulator outlet.
- Slowly remove hand from outlet and allow air to flow.
- Note pressure when low-pressure warning alarm sounds; it should be between 550-650 psi.
- Remove hand from regulator outlet.
- Close mainline valve.
- Check regulator for leaks by blowing air into regulator for 5-10 seconds. Draw air from outlet for 5-10 seconds. If a positive pressure or vacuum cannot be maintained there is a leak. DO NOT USE SCBA.

5. Facepiece and Corrugated Breathing Hose

- Inspect hand harness and facepiece for damage, serrations, and deteriorated rubber.
- Inspect lens for damage and proper seal in facepiece. Inspect exhalation valve for damage and dirt build-up.
- Stretch breathing hose and carefully inspect for holes and deterioration.
- Inspect connector for damage and presence of washer.
- Perform negative pressure test with facepiece donned.

5.0 PERSONAL PROTECTIVE EQUIPMENT TO BE USED - continued

6. Storage

- Refill cylinder to 2216 psi.
- Close cylinder valve.
- Tightly connect high-pressure hose to cylinder.
- Bleed pressure from high-pressure hose by opening mainline valve.
- Close by-pass valve.
- Close mainline valve.
- Fully extend all straps.
- Store facepiece in a clean plastic bag for protection.

5.11 Specific Levels of Protection Planned for the Site

The following levels of protection will be utilized during activities at the Subject:

- Level D

Table 5.2 presents the level of protection planned for the completion of each task.

Table 5.2
SPECIFIC LEVELS OF PROTECTION PLANNED FOR EACH TASK TO BE CONDUCTED AT THE SITE

- LEVEL D Tasks: Soil and Groundwater Sampling

6.0 MEDICAL SURVEILLANCE REQUIREMENTS

Medical monitoring programs are designed to track the physical condition of employees on a regular basis as well as survey preemployment or baseline conditions prior to potential exposures. The medical surveillance program is a part of each employer's Health and Safety program.

6.1 Baseline or Preassignment Monitoring

Prior to being assigned to a hazardous or a potentially hazardous activity involving exposure to toxic materials, employees must receive a preassignment or baseline physical. The contents of the physical is to be determined by the employer's medical consultant. As suggested by NIOSH/OSHA/USCG/EPA's Occupational Safety & Health Guidance Manual for Hazardous Waste Site Activities, the minimum medical monitoring requirements for work at the Site is as follows:

- Complete medical and work histories.
- Physical examination.
- Pulmonary function tests (FVC and FEV1).
- Chest X-ray (every 2 years)
- EKG.
- Eye examination and visual acuity.
- Audiometry.
- Urinalysis.
- Blood chemistry and heavy metals toxicology.

The preassignment physical should categorize employees as fit-for-duty and able to wear respiratory protection.

6.2 Periodic Monitoring

In addition to a baseline physical, all employees require a periodic physical within the last 12 months unless the advising physician believes a shorter interval is appropriate. The employer's medical consultant should prescribe an adequate medical, which fulfills OSHA 29 CFR 1910.120 requirements. The preassigned medical outlined above may be applicable.

All personnel working in contaminated or potentially contaminated areas at the Subject will verify currency (within 12 months) with respect to medical monitoring. This is done by indicating date of last physical on the safety plan agreement form.

6.0 MEDICAL SURVEILLANCE REQUIREMENTS - continued

6.3 Exposure/Injury/Medical Support

As a follow-up to an injury or possible exposure above established exposure limits, all employees are entitled to and encouraged to seek medical attention and physical testing. Depending upon the type of exposure, it is critical to perform follow-up testing within 24-48 hours. It will be up to the employer's medical consultant to advise the type of test required to accurately monitor for exposure effects.

6.4 Exit Physical

At termination of employment or reassignment to an activity or location, which does not represent a risk of exposure to hazardous substances, an employee shall require an exit physical. If his/her last physical was within the last 6 months, the advising medical consultant has the right to determine adequacy and necessity of exit exam.

7.0 FREQUENCY AND TYPES OF AIR MONITORING/SAMPLING

This section explains the general concepts of an air monitoring program and specifies the surveillance activities that will take place during project completion at the Subject.

The purpose of air monitoring is to identify and quantify airborne contaminants in order to verify and determine the level of worker protection needed. Initial screening for identification is often qualitative, i.e., the contaminant, or the class to which it belongs, is demonstrated to be present but the determination of its concentration (quantification) must await subsequent testing. Two principal approaches are available for identifying and/or quantifying airborne contaminants:

- The on-site use of direct-reading instruments.
- Laboratory analysis of air samples obtained by a gas sampling bag, collection media (i.e., filter, sorbent) and/or wet-contaminant collection methods.

7.1 Direct-Reading Monitoring Instruments

Unlike air sampling devices, which are used to collect samples for subsequent analysis in a laboratory, direct-reading instruments provide information at the time of sampling, enabling rapid decision-making. Data obtained from the real-time monitors are used to assure proper selection of personnel protection equipment, engineering controls, and work practices. Overall, the instruments provide the user the capability to determine if site personnel are being exposed to concentrations which exceed exposure limits or action levels for specific hazardous materials.

Of significant importance, especially during initial entries, is the potential for IDLH conditions or oxygen deficient atmospheres. Real-time monitors can be useful in identifying any IDLH conditions, toxic levels of airborne contaminants, flammable atmospheres, or radioactive hazards. Periodic monitoring of conditions is critical, especially if exposures may have increased since initial monitoring or if new site activities have commenced.

Table 7.1. Excerpted from Occupational Safety and Health Guidelines for Hazardous Waste Site Activities, provides an overview of available monitoring instrumentation and their specific operating parameters.

7.0 FREQUENCY AND TYPES OF AIR MONITORING/SAMPLING - continued

TABLE 7.1
DIRECT-READING INSTRUMENTS FOR GENERAL SURVEY

- **Instrument: Combustible Gas Indicator (CGI)**

  Hazard Monitored: Combustible gases and vapors.

  Application: Measures the concentration of a combustible gas or vapor.
  Detection Method: A filament, usually made of platinum, is heated by burning the combustible gas of vapor. The increase in heat is measured. Gases and vapors are ionized in a flame. A current is produced in proportion to the number of carbon atoms present.
  General Care/Maintenance: Recharge or replace battery. Calibrate immediately before use.
  Typical Operating Time: Can be used for as long as the battery lasts, or for the recommended interval between calibrations, whichever is less.

- **Instrument: Flame Ionization Detector (FID) with Gas Chromatography Option. Example: Foxboro OVA.**

  Hazard Monitored: Many organic gases and vapors.
  Application: In survey mode, detects the concentration of many organic gases and vapors. In gas chromatography (GC) mode identifies and measures specific compounds. In survey mode, all the organic compounds are ionized and detected at the same time. In GC mode, volatile species are separated.
  General Care/Maintenance: Recharge or replace battery. Monitor fuel and/or combustion air supply gauges. Perform routine maintenance as described in the manual. Check for leaks.
  Typical Operating Time: 8 hours, 3 hours with strip chart recorder.

- **Instrument: Portable Infrared (IR) Spectrophotometer**

  Hazard Monitored: Many gases and vapors.

  Application: Measures concentration of many gases and vapors in air. Designed to quantify one or two component mixtures.

  Detection Method: Passes different frequencies of IR through the sample. The frequencies absorbed are specific for each compound.

  General Care/Maintenance: As specified by manufacturer.

7.0 FREQUENCY AND TYPES OF AIR MONITORING/SAMPLING - continued

TABLE 7.1 (Continued)

- **Instrument: Ultraviolet (UV) Photoionization Detector (PID)**

  Example: HNU.

  Hazard Monitored: Many organic and some inorganic gases and vapors.
  Application: Detects total concentration of many organic and some inorganic gases and vapors. Some identification of compounds are possible if more than one probe is measured.
  Detection Method: Ionizes molecules using UV radiation; produces a current that is proportional to the number of ions.
  General Care/Maintenance: Recharge or replace battery. Regularly clean lamp window. Regularly clean and maintain the instrument and accessories.
  Typical Operating Time: 10 hours. 5 hours with strip chart recorder.

- **Instrument: Direct Reading Colorimetric Indicator Tube**

  Hazard Measured: Specific gases and vapors.

  Application: Measures concentration of specific gases and vapors.

  Detection Method: The compound reacts with the indicator chemical in the tube, producing a stain whose length or color change is proportional to the compound's concentration.
  General Care/Maintenance: Do not use a previously opened tube even if the indicator chemical is not stained. Check pump for leaks before and after use. Refrigerate before use to maintain a shelf life of about 2 years. Check expiration date of tubes. Calibrate pump volume at least quarterly. Avoid rough handling, which may cause channeling.

- **Instrument: Oxygen Meter**

  Hazard Monitored: Oxygen (0_2)

  Application: Measures the percentage of 0_2 in the air.

  Detection Method: Uses an electrochemical sensor to measure the partial pressure of 0_2 in the air, and converts that reading to 0_2 concentration.

  General Care/Maintenance: Replace detector cell according to manufacturer's recommendations. Recharge or replace batteries prior to expiration of the specified interval. If the ambient air is more than 0.5% CO_2, replace the detector cell frequently.

7.0 FREQUENCY AND TYPES OF AIR MONITORING/SAMPLING – continued

TABLE 7.1 (Continued)

Typical Operating Time: 8-12 hours.

- **Instrument: Real Time Aerosol Monitor**

  Hazard Monitored: Particulates

  Application: Measures total particulates in air.

  Detection Method: Uses an internal light source. The particulates defract the light beam and the amount of diffraction is converted into a concentration (mg/m_3).

  General Care/Maintenance: Recharge batteries. Replace desiccant when necessary.

  Typical Operating Time: 8-12 hours.

- **Instrument: Monitox**

  Hazard Monitored: Gases and Vapors

  Application: Measures specific gases and vapors

  Detection Method: Electrochemical sensor relatively specific for the chemical species in question.

  General Care/Maintenance: Moisten sponge before use; check the function switch; change the battery when needed.

- **Instrument: Gamma Radiation Survey Instrument**

  Hazard Monitored: Gamma Radiation

  Application: Environmental radiation monitor

  Detection Method: Scintillation detector

  General Care/Maintenance: Must be calibrated annually at a specialized facility.

  Typical Operating Time: Can be used for as long as the battery lasts, or for the recommended interval between calibrations, whichever is less.

7.0 FREQUENCY AND TYPES OF AIR MONITORING/SAMPLING - continued

After site mitigation activities have commenced, the selective monitoring of high-risk workers, i.e., those who are closest to the source of contaminant generation, is essential. Personal monitoring samples should be collected in the breathing zone and, if workers are wearing respiratory protective equipment, outside the facepiece.

Those employees working closest with the source have the highest likelihood of being exposed to concentrations which exceed established exposure limits. Representative sampling approaches emphasizing worst case conditions, those employees with the greatest risk of exposure, is acceptable. However the sampling strategy may change if the operation or tasks change on site or if exposures potentially increase.

7.2 Site Air Monitoring and Sampling Program

A. Air Monitoring Instruments

Photoionization Detector ("PID") – Monitoring wells will be screened for VOCs upon opening utilizing a PID.

B. Action Levels

TABLE 7.2
SITE AIR MONITORING AND SAMPLING PROGRAM SUMMARY

Hazard Monitored	Action Level	Action
Organic gases and vapors	Action level depends on PEL/REL/ TLV for each contaminant. Action Level is 1/2 the current standards. See Table 3.1.	Activities in the vicinity of the area where action levels are exceeded will be discontinued until the concentrations of all organic gases and vapors fall below their respective action levels. If the concentration(s) of an organic gas(es) and vapor(s) continues to exceed its respective action level(s), then the level of protection will be upgraded to include appropriate respiratory protection.

Notes: LEL = Lower Explosive Limit
PEL = Occupational Safety and Health Administration (OSHA) Permissible Exposure Limit
REL = National Institute of Occupational Safety and Health (NIOSH) Recommended Exposure Limit
TLV = American Conference of Governmental Industrial Hygienists (ACGIH) Threshold Limit Value

7.0 FREQUENCY AND TYPES OF AIR MONITORING/SAMPLING – continued

C. Reporting Format

- Air Monitoring Log

7.3 Site Ambient Air Sampling

A. Sampling Criteria

A site ambient air sampling program will be considered if the following criteria are met:

1. Meteorological conditions –

   Winds sufficient to cause dispersion.

2. Health and safety observations -

   Vapor and/or particulate levels are two to three times above background.

3. Site specific activities –

   Site activity increases airborne contaminant(s) exposure potential.

8.0 SITE CONTROL MEASURES

The following section defines measures and procedures for maintaining site control. Site control is an essential component in the implementation of the site health and safety program.

8.1 Buddy System

During all Level B activities or when some conditions present a risk to personnel, the implementation of a buddy system is mandatory. A buddy system requires at least two (2) people to work as a team; each looking out for each other. Level B operations generally require three people. Table 8.1 lists those tasks which require a buddy system and any additional site control requirements.

TABLE 8.1
PERSONNEL REQUIREMENTS

Task	Control Measures
Soil and groundwater Sampling	Line of sight, buddy system

8.2 Site Communications Plan

Successful communications between field teams and contact with personnel in the support zone is essential. The following communications systems will be available during activities at the Subject.

- Hand Signals
- Direct Vocal Communication
- For hand signal communications, the following definitions will apply during activities at the Subject:

TABLE 8.2
HAND SIGNAL DEFINITIONS

Signal	Definition
Hands clutching throat	Out of air/cannot breath
Hands on top of head	Need assistance
Thumbs up	OK/I am all right/I understand
Thumbs down	No/Negative
Arms waving upright	Send backup support
Grip partners wrist	Exit area immediately

8.3 Work Zone Definition

The three general work zones established at the Site are the Exclusion Zone, Contamination Reduction Zone, and Support Zone.

8.0 SITE CONTROL MEASURES - continued

The Exclusion Zone is defined as the area where contamination is either known or likely to be present, or because of activity, will provide a potential to cause harm to personnel. Entry into the Exclusion Zone requires the use of personnel protective equipment.

The Contamination Reduction zone is the area where personnel conduct personal and equipment decontamination. It is essentially a buffer zone between contaminated areas and clean areas. Activities to be conducted in this zone will require personal protection as defined in the decontamination plan.

The Support Zone is situated in clean areas where the chance to encounter hazardous materials or conditions is minimal. Personal protection equipment is therefore not required.

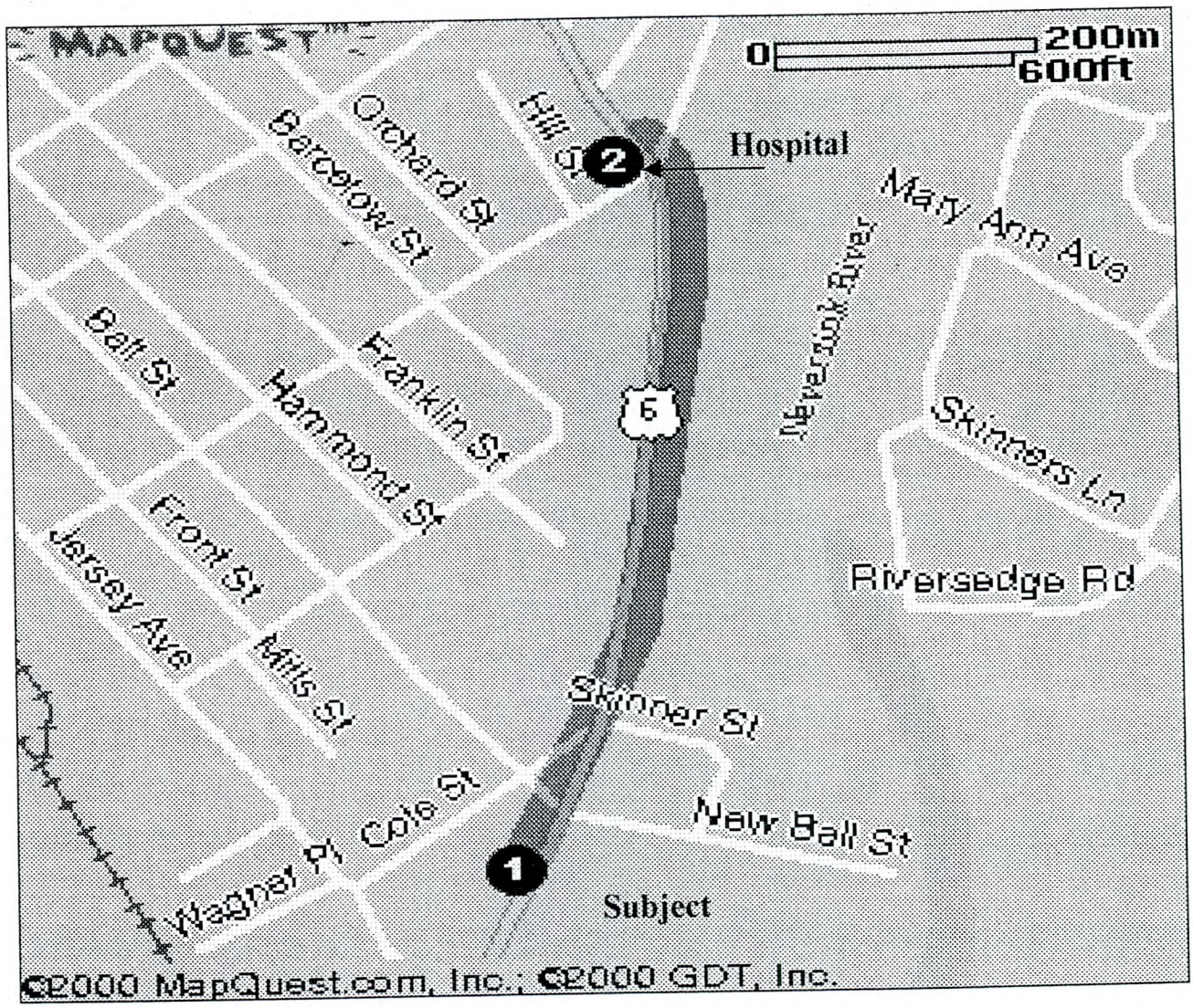
8.4 Nearest Medical Assistance

Figure 8.1 shows a map of the route to the nearest hospital, which can provide emergency care for individuals who may experience an injury or exposure on site. The route to the hospital should be verified by the HSO, and should be familiar to all site personnel.

8.0 SITE CONTROL MEASURES – continued

FIGURE 8.1

NEAREST HOSPITAL ROUTE



Directions

1. Make right out of Subject, head north on East Main St. approximately 0.5 mile

8.0 SITE CONTROL MEASURES - continued

8.5 Safe Work Practices

Table 8.3 provides a list of standing orders for the Exclusion Zone.
Table 8.4 provides a list of standing orders for the Contamination Reduction Zone.

8.6 Emergency Alarm Procedures

The warning signals described in section 10.4 "Evacuation Routes and Procedures," will be deployed in the event of an emergency. Communication signals will also be used according to section 8.2.

TABLE 8.3
STANDING ORDERS FOR EXCLUSION ZONE

- No smoking, eating, or drinking in this zone.
- No horse play.
- No matches or lighters in this zone.
- Check-in on entrance to this zone.
- Check-out on exit from this zone.
- Implement the communications system.
- Line of sight must be in position.
- Wear the appropriate level of protection as defined in the Safety Plan.

TABLE 8.4
STANDING ORDERS FOR CONTAMINATION REDUCTION ZONE

- No smoking, eating, or drinking in this zone.
- No horse play.
- No matches or lighters in this zone.
- Wear the appropriate level of protection.

9.0 DECONTAMINATION PLAN

Table 5.2 lists the tasks and specific levels of protection required for each task. Consistent with the levels of protection required, the Decontamination Table(s) provides a step by step representation of the personnel decontamination process. These procedures should be modified to suit site conditions and protective ensembles in use.

9.1 Standard Operating Procedures

Decontamination involves the orderly controlled removal of contaminants. Standard decontamination sequences are presented in the Decontamination Table. All site personnel should minimize contact with contaminants in order to minimize the need for extensive decon.

9.2 Levels of Decontamination Protection Required for Personnel

The levels of protection required for personnel assisting with decontamination will be Level D. The Site Safety Officer is responsible for monitoring decontamination procedures and determining their effectiveness.

9.3 Equipment Decontamination

Sampling equipment will be decontaminated in accordance with procedures as defined in the Workplan (see Section 8.3 of Remedial Action Workplan)

9.4 Disposition of Decontamination Wastes

(See Section 8.3 of Remedial Action Workplan)).

TABLE 9.1	
LEVEL D DECONTAMINATION STEPS	
Step 1	Remove outer garments (i.e., coveralls)
Step 2	Remove gloves
Step 3	Wash hands and face

10.0 EMERGENCY RESPONSE/CONTINGENCY PLAN

This section describes contingencies and emergency planning procedures to be implemented at the Subject. This plan is compatible with local, state and federal disaster and emergency management plans, as appropriate.

10.1 Pre-Emergency Planning

During the site briefing held periodically/daily, all employees will be trained in and reminded of provisions of the emergency response plan, communication systems, and evacuation routes. Table 10.1 identifies potential hazards associated with site activities, along with the available emergency prevention/control equipment and its location. The plan will be reviewed and revised, if necessary, on a regular basis by the HSO. This will ensure that the plan is adequate and consistent with prevailing site conditions.

TABLE 10.1
EMERGENCY RECOGNITION/CONTROL MEASURES

HAZARD	PREVENTION/CONTROL	LOCATION
Fire/Explosion	Fire Extinguisher	IVI Vehicle
Spill	Sorbent Materials	IVI Vehicle
Air Release	Evacuation Routes	Not Applicable

10.2 Personnel Roles and Lines of Authority

The Site Supervisor has primary responsibility for responding to and correcting emergency situations. This includes taking appropriate measure to ensure the safety of site personnel and the public. Possible actions may involve evacuation of personnel from the site area, and evacuation of adjacent residents. He/she is additionally responsible for ensuring that corrective measures have been implemented, appropriate authorities notified and follow-up reports completed. The HSO may be called upon to act on the behalf of the site supervisor, and will direct responses to any medical emergency. The individual contractor organizations are responsible for assisting the project manager in his/her mission within the parameters of their scope of work.

10.0 EMERGENCY RESPONSE/CONTINGENCY PLAN - continued

The Site Supervisor is: David R. Lent, C.P.G.

10.3 Emergency Recognition/Prevention

Table 3.1 provides a listing of chemical and physical hazards on-site. Additional potential hazards associated with site activities are listed in Table 10.1, along with the available emergency prevention/control equipment and its location. Personnel will be familiar with techniques of hazard recognition from preassignment training and site specific briefings. The HSO is responsible for ensuring that prevention devices and equipment are available to personnel.

10.4 Evacuation Routes/Procedures

In the event of an emergency which necessitates an evacuation of the site, the following alarm procedures will be implemented:

- Insure that a predetermined location is identified off-site in case of an emergency, so that all personnel can be accounted for.

- Personnel will be expected to proceed to the closest exit with your buddy, and mobilize to the safe distance area associated with the evacuation route. Personnel will remain at that area until the re-entry alarm is sounded or an authorized individual provides further instructions.

10.5 Emergency Contact/Notification System

The following list provides names and telephone numbers for emergency contact personnel. In the event of a medical emergency, personnel will take direction from the HSO and notify the appropriate emergency organization(s). In the event of a fire or spill, the site supervisor will notify the appropriate local, state and federal agencies.

TABLE 10.2
List of Emergency Contacts

Organization	Contact	Telephone
Police	Port Jervis Police Department	(845) 856-5101
Fire	Port Jervis Fire Department	(845) 858-4066
Hospital 1	Mercy Hospital	(845) 858-5634
Hospital 2	Horton Memorial Medical Center	(845) 343-2424
EPA Emergency Response Team		908-321-6660
State Authority	NYSDEC	(845) 256-3000
National Response Center		800-424-8802
Center for Disease Control		404-488-4100
Chemtrec		800-424-9555

10.0 EMERGENCY RESPONSE/CONTINGENCY PLAN - continued

10.6 Emergency Medical Treatment Procedures

Any person who becomes ill or injured in the exclusion zone must be decontaminated to the maximum extent possible. If the injury or illness is minor, full decontamination should be completed and first aid administered prior to transport. If the patient's condition is serious, at least partial decontamination should be completed (i.e., complete disrobing of the victim and redressing in clean coveralls or wrapping in a blanket.) First aid should be administered while awaiting an ambulance or paramedics. All injuries and illnesses must immediately be reported to the project manager.

Any person being transported to a clinic or hospital for treatment should take with them information on the chemical (s) they have been exposed to at the site. This information is included in Table 3.1.

Any vehicle used to transport contaminated personnel will be treated and cleaned as necessary.

10.7 Fire or Explosion

In the event of a fire or explosion, the local fire department should be summoned immediately. Upon their arrival, the project manager or designated alternate will advise the fire commander of the location, nature, and identification of the hazardous materials on site.

If it is safe to do so, site personnel may:

- Use fire fighting equipment available on site to control or extinguish the fire; and,
- Remove or isolate flammable or other hazardous materials, which may contribute to the fire.

10.8 Spill or Leaks

In the event of a spill or a leak, site personnel will:

- Inform their supervisor immediately:
- Locate the source of the spillage and stop the flow if it can be done safely; and,
- Begin containment and recovery of the spilled materials.

10.0 EMERGENCY RESPONSE/CONTINGENCY PLAN - continued

10.9 Emergency Equipment/Facilities

The following emergency equipment/facilities will be utilized on-site.

TABLE 10.3	
LIST OF EMERGENCY EQUIPMENT/FACILITIES	
List of Emergency Equipment/Facilities	**Storage Location**
First Aid Kit	IVI Vehicle
Fire Extinguisher	IVI Vehicle
Spill Kits	IVI Vehicle
Berm Materials	IVI Vehicle
Eye Wash	IVI Vehicle

11.0 CONFINED SPACE ENTRY PROCEDURES

A confined space provides the potential for unusually high concentrations of contaminants, explosive atmospheres, limited visibility, and restricted movement. This section will establish requirements for safe entry into, continued work in, and safe exit from confined spaces. Additional information regarding confined space entry can be found in 29 CFR 1926.21, 29 CFR 1910 and NIOSH 80-106.

11.1 Definitions

Confined Space: A space or work area not designed or intended for normal human occupancy, having limited means of egress and poor natural ventilation; and/or any structure, including buildings or rooms, which have limited means of egress.

Confined Space Entry Permit (CSEP): A document to be initiated by the supervisor of personnel who are to enter into or work in a confined space. The confined Space Entry Permit (CSEP) will be completed by the personnel involved in the entry and approved by the HSO before personnel will be permitted to enter the confined space. The CSEP shall be valid only for the performance of the work identified and for the location and time specified. The beginning of a new shift with change of personnel will require the issuance of a new CSEP.

Confined Space Observer: An individual assigned to monitor the activities of personnel working within a confined space. The confined space observer monitors and provides external assistance to those inside the confined space. The confined space observer summons rescue personnel in the event of an emergency and assists the rescue team.

11.2 General Provisions

- When possible, confined spaces should be identified with a posted sign, which reads: Caution – Confined Space.
- Only personnel trained and knowledgeable of the requirements of these Confined Space Entry Procedures will be authorized to enter a confined space or be a confined space observer.
- A Confined Space Entry Permit (CSEP) must be issued prior to the performance of any work within a confined space. The CSEP will become a part of the permanent and official record of the site.
- Natural ventilation shall be provided for the confined space prior to initial entry and for the duration of the CSEP. Positive/forced mechanical ventilation may be required. However, care should be taken to not spread contamination outside of the enclosed area.
- If flammable liquids may be contained within the confined space, explosion proof equipment will be used. All equipment shall be positively grounded.

11.0 CONFINED SPACE ENTRY PROCEDURES – continued

- The contents of any confined space shall, where necessary, be removed prior to entry. All sources of ignition must be removed prior to entry.
- Hand tools used in confined spaces shall be in good repair, explosion proof and spark proof, and selected according to intended use. Where possible, pneumatic power tools are to be used.
- Hand-held lights and other illumination utilized in confined spaces shall be equipped with guards to prevent contact with the bulb, and must be explosion proof.
- Compressed gas cylinders, except cylinders used for self-contained breathing apparatus, shall not be taken into confined spaces. Gas hoses shall be removed from the space and the supply turned off at the cylinder valve when personnel exit from the confined space.
- If a confined space requires respiratory equipment or where rescue may be difficult, safety belts, body harnesses, and lifelines will be used. The outside observer shall be provided with the same equipment as those working within the confined space.
- A ladder is required in all confined spaces deeper than the employee's shoulders. The ladder shall be secured and not removed until all employees have exited the space.
- Only self-contained breathing apparatus or NIOSH approved airline respirators equipped with a 5-minute emergency air supply (egress bottle) shall be used in untested confined spaces or in any confined space with conditions determined immediately dangerous to life and health.
- Where air-moving equipment is used to provide ventilation, chemicals shall be removed from the vicinity to prevent introduction into the confined space.
- Vehicles shall not be left running near confined space work or near air-moving equipment being used for confined space ventilation.
- Smoking in confined spaces will be prohibited at all times.
- Any deviation from these Confined Space Entry Procedures requires the prior permission of the Site Supervisor.

11.3 Procedure for Confined Space Entry

The HSO and Entry Team shall:

- Evaluate the job to be done and identify the potential hazards before a job in a confined space is scheduled.
- Ensure that all process piping, mechanical and electrical equipment, etc., have been disconnected, purged, blanked-off or locked and tagged as necessary.
- If possible, ensure removal of any standing fluids that may produce toxic or air displacing gases, vapors, or dust.
- Initiate a Confined Space Entry Permit (CSEP) in concurrence with the project manager or designated alternative.

11.0 CONFINED SPACE ENTRY PROCEDURES – continued

- Ensure that any hot work (welding, burning, open flames, or spark producing operation) that is to be performed in the confined space has been approved by the project manager and is indicated on the CSEP.
- Ensure that the space is ventilated before starting work in the confined space and for the duration of the time that the work is to be performed in the space.
- Ensure that the personnel who enter the confined space and the confined space observer helper are familiar with the contents and requirements of this instruction.
- Ensure remote atmospheric testing of the confined space prior to employee entry and before validation/revalidation of a CSEP to ensure the following:

  1. Oxygen content between 19.5% - 23.0%
  2. No concentration of combustible gas in the space. Sampling will be done throughout the confined space and, specifically, at the lowest point in the space.
  3. The absence of other atmospheric contaminants if the space has contained toxic, corrosive, or irritant material.
  4. If remote testing is not possible, Level B PPE is required as referenced in Section 3.

- Designate whether hot or cold work will be allowed. If all remote tests performed above are satisfactory, complete the CSEP listing any safety precautions, protective equipment, or other requirements.
- Ensure that a copy of the CSEP is posted at the work site, a copy is filed with the project supervisor, and a copy is furnished to the project manager. The CSEP shall be considered void if work in the confined space does not start within one hour after the remote tests above are performed or if significant changes within the confined space atmosphere or job scope occurs. The CSEP posted at the work site shall be removed at the completion of the job or the end of the shift, whichever is first.

11.4 Confined Space Observer

- While personnel are inside the confined space, a confined space observer will monitor the activities and provide external assistance to those in the space. The observer will have no duties, which may take his attention away from the work or require him to leave the vicinity of the confined space at anytime while personnel are in the space.
- The confined space observer shall maintain at least voice contact with all personnel in the confined space. Visual contact is preferred, if possible.
- The observer shall be instructed by his supervisor in the method for contacting rescue personnel in the event of an emergency.

11.0 CONFINED SPACE ENTRY PROCEDURES – continued

- If irregularities within the space are detected by the observer, personnel within the space will be ordered to exit.
- In the event of an emergency, the observer must NEVER enter the confined space prior to contacting and receiving assistance from a helper. Prior to this time, he should attempt to remove personnel with the lifeline and to perform all other rescue functions from outside the space.
- A helper shall be designated to provide assistance to the confined space observer in case the observer must enter the confined space to retrieve personnel.

12.0 SPILL CONTAINMENT PROGRAM

The procedures defined in this section comprise the spill containment program in place for activities at the Site.

- All drums and containers used during the clean-up shall meet the appropriate DOT, OSHA, and EPA regulations for the waste that they will contain.
- Drums and containers shall be inspected and their integrity assured prior to being moved. Drums or containers that cannot be inspected before being moved because of storage conditions, shall be positioned in an accessible location and inspected prior to further handling.
- Operations on site will be organized so as to minimize the amount of drum or container movement.
- Employees involved in the drum or container operations shall be warned of the hazards associated with the containers.
- Where spills, leaks, or ruptures may occur, adequate quantities of spill containment equipment (absorbent, pillows, etc.) will be stationed in the immediate area. The spill containment program must be sufficient to contain and isolate the entire volume of hazardous substances being transferred.
- Drums or containers that cannot be moved without failure, shall be emptied into a sound container.
- Fire extinguishing equipment meeting 29 CFR part 1910 Subpart 1 shall be on hand and ready for use to control fires.

13.0 HAZARD COMMUNICATION

In order to comply with 29 CFR 1910.1200, Hazard Communication, the following written Hazard Communication Program has been established. All employees will be briefed on this program, and have a written copy for review.

A. CONTAINER LABELING

All containers received on site will be inspected to ensure the following: (1) all containers will be clearly labeled as to the contents; (2) the appropriate hazard warnings will be noted; and (3) the name and address of the manufacturer will be listed.

All secondary containers will be labeled with either an extra copy of the original manufacturer's label or with generic labels, which have a block for identity and blocks for the hazard warning.

B. MATERIAL SAFETY DATA SHEETS (MSDSs)

Copies of MSDSs for all hazardous chemicals known or suspected to be on-site will be maintained in the work area. MSDSs will be available to all employees for review during each work shift.

C. EMPLOYEE TRAINING AND INFORMATION

Prior to starting work, each employee will attend a health and safety orientation and will receive information and training on the following: (1) an overview of the requirements contained in the Hazard Communication Standard, 29 CFR 1910.1200; (2) chemicals present in their workplace operations; (3) location and availability of a written hazard program; (4) physical and health effects of the hazardous chemicals; (5) methods and observation techniques used to determine the presence or release of hazardous chemicals; (6) how to lessen or prevent exposure to these hazardous chemicals through usage of control/work practices and personal protective equipment; (7) emergency procedures to follow if they are exposed to these chemicals; (8) how to read labels and review MSDSs to obtain appropriate hazard information; (9) location of MSDS file and location of hazardous chemical list.

14.0 REFERENCES

1. *Aldrich Chemical Book*, RTECS
2. *American Conference of Governmental Industrial Hygienists (ACGIH) Threshold Limit Values*
3. *Chemical Protective Clothing Performance Index Book*, Forsburg
4. *Dangerous Properties of Industrial Materials*, SAX and Lewis
5. *Emergency Response Guide Book*, DOT P 5800.5, 1990
6. *EPA 40 CFR 311 Health and Safety Regulations*
7. *EPA/Office of Emergency and Remedial Response/Environmental Response Team Standard Operating Safety Guide*
8. *Extremely Hazardous Substances*, EPA, Noyes
9. *Guide to Occupational Exposure Values* – 1992
10. *Guidelines for the Selection of Chemical Protective Clothing*, Little
11. *Handbook of Toxic and Hazardous Chemicals and Carcinogens*, Sittig, np (Noyes)
12. *Hazardous Chemicals Data Book*, G. Weiss, ndc (Noyes)
13. *Hazardous Chemicals Desk Reference*
14. *NIOSH/OSHA/USCG/EPA Occupational Health and Safety Guidelines*
15. *OHMTADS Database*
16. *OSHA 29 CFR 1910.120 Health and Safety Regulations*
17. *The Merck Index, an Encyclopedia of Chemicals, Drugs, and Biologicals*, Merck & Co., Inc.
18. *Threshold Limit Values and Biological Exposure Indices, ACGIH*, 1991-1992
19. *V.S.L.G. Chris Manual*

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