REMEDIAL INVESTIGATION AND FEASIBILITY STUDY WORK PLAN

WORK PLAN

REMEDIAL INVESTIGATION/FEASIBILITY STUDY
FOR THE
CUBA MUNICIPAL WASTE DISPOSAL SITE
VILLAGE OF CUBA
ALLEGANY COUNTY, NEW YORK

(SITE REGISTRY NO. 9-02-012)

PREPARED FOR
NEW YORK STATE DEPARTMENT
OF ENVIRONMENTAL CONSERVATION

BY
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WOODBURY, NEW YORK

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REMEDIAL INVESTIGATION/FEASIBILITY STUDY WORK PLAN
CUBA MUNICIPAL WASTE DISPOSAL SITE

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1.0 INTRODUCTION

As part of New York State's program to investigate and remediate hazardous waste sites, the New York State Department of Environmental Conservation (NYSDEC) has entered into a contract with the firm of Dvirka and Bartilucci Consulting Engineers of Woodbury, New York to undertake a remedial investigation and feasibility study (RI/FS) for the Cuba Municipal Waste Disposal Site located in the Village of Cuba, Allegany County, New York. The registry number for this New York State Superfund site is 9-02-012. The RI/FS for this site is being performed with funds allocated under the New York State Superfund Program.

The purpose of the overall RI/FS process for this project is to perform a focused remedial investigation (RI) to determine the nature and extent of contaminated groundwater and surface leachate seeps at the site and the risk to human health and the environment, and to perform a focused feasibility study (FS) which will identify, evaluate and recommend a cost-effective, environmentally sound, long-term remedial action. Predesign information for presumptive closure of the landfill will be obtained as part of the RI. As presently defined, this RI/FS is scheduled for completion in approximately 18 months.

This document, entitled "Remedial Investigation and Feasibility Work Plan for the Cuba Municipal Waste Disposal Site," presents the detailed activities comprising the components of an RI/FS prepared in accordance with the Federal Comprehensive Emergency Response Compensation and Liability Act (CERCLA), Superfund Amendments and Reauthorization Act (SARA) and the NYSDEC Superfund Program, including NYSDEC Technical and Administrative Guidance Memoranda, "Guidelines for Remedial Investigation/Feasibility Studies."

In addition, this document contains a site-specific, comprehensive Field Operation and Investigation Plan, Quality Assurance/Quality Control (QA/QC) Plan, and Health and Safety Plan necessary to carry out all phases of the field portion of the remedial investigation for the Cuba Municipal Waste Disposal site. Each of these subplans are prepared essentially as "stand-alone" documents.

The Work Plan also includes preparation of a qualitative health risk and environmental assessment, determination of applicable or relevant and appropriate standards, criteria and guidelines, identification and evaluation of remedial alternatives, and development of a presumptive remedy plan. In summary, this document includes the rationale for the design of the field program, including the selection of sampling locations, the detailed procedures used to sample various environmental matrices, the chemical constituents of concern and laboratory analytical methodologies, the procedures to assure the technical quality of the samples and analytical data, and the safety procedures to protect worker health, as well as the approach to performance of an assessment of risk to human health and the environment and selection of a plan for remediation of the site.

The field program for the Cuba Municipal Waste Disposal Site will involve test pit excavation and sampling, monitoring well installation, surface and subsurface soil sampling, sediment sampling, groundwater sampling, leachate sampling and air monitoring.

2.0 SUMMARY OF EXISTING INFORMATION

2.1 Site Location, Ownership and Access

The Cuba Municipal Waste Disposal Site is located in the Village of Cuba, Allegany County, New York (see Figure 2-1). The 25-acre site is currently owned by the Village of Cuba and is currently closed.

The northern boundary of the site is currently fenced, however the fence is in various stages of disrepair. Access to the site is from an unpaved road, off of Jackson Hill Road. The access road leads to a cattle gate at the southwest corner of the site.

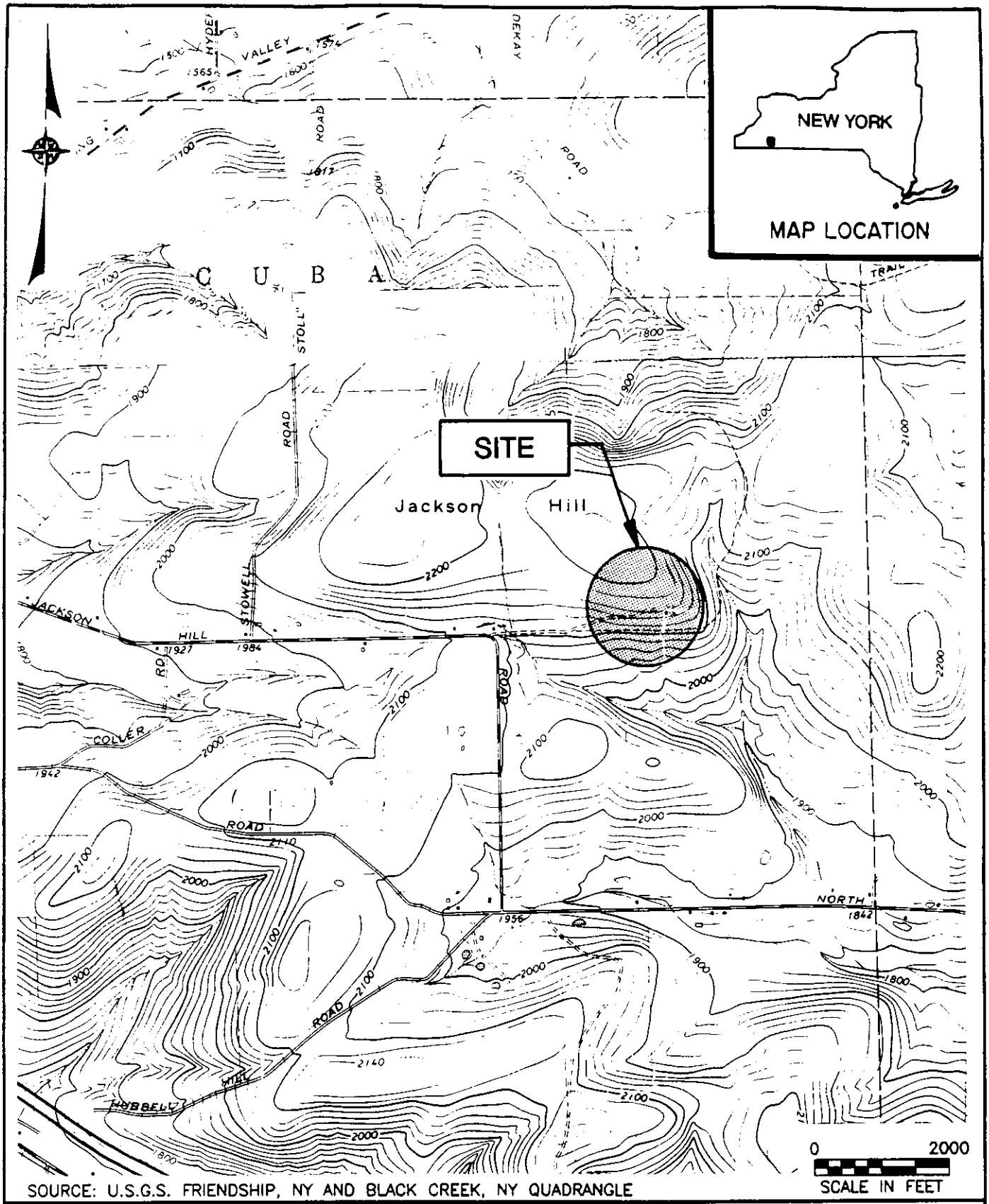
2.2 Site Description

The Cuba Municipal Waste Disposal Site is bordered to the west and north by an access road to the Cuba Cheese property, by a tributary of the North Branch of Van Compen Creek to the east and forested land to the south and east (see Figure 2-2). The site slopes from the north to the south and consists of tall grasses and brush. Some areas contain trees.

The site is currently listed as Class 2 on the New York State Department of Environmental Conservation (NYSDEC) registry of inactive hazardous waste sites. The site was listed because of reported on-site disposal of halogenated solvents, cyanide plating wastes, PCB capacitors and paint sludges.

2.3 Site History

The Village of Cuba has owned the property since November 15, 1967. Prior to 1967, the property was leased from Ida Cleghorn Barber, whose family owned the property since May 1947.



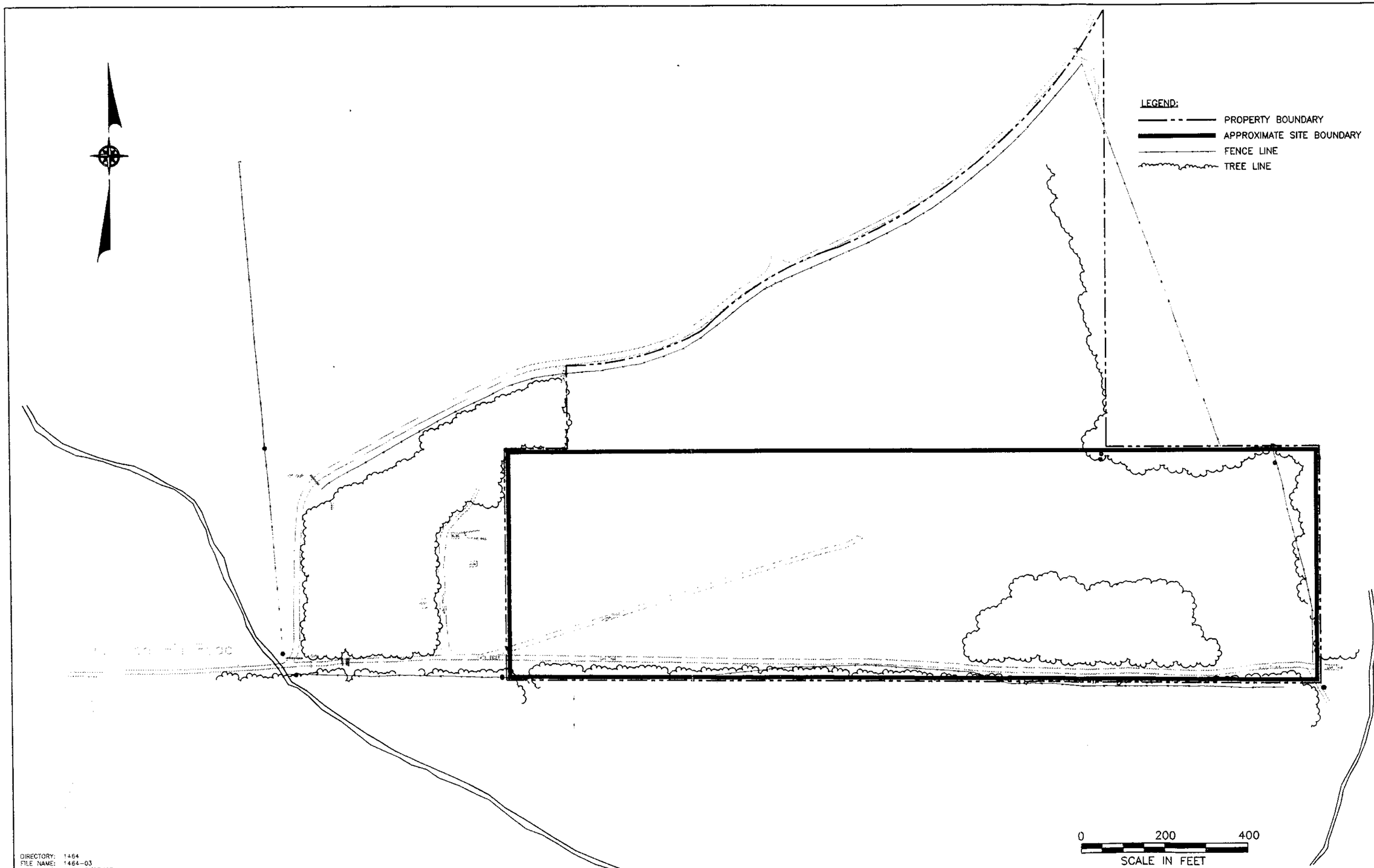
SOURCE: U.S.G.S. FRIENDSHIP, NY AND BLACK CREEK, NY QUADRANGLE

CUBA MUNICIPAL WASTE DISPOSAL SITE
VILLAGE OF CUBA, NEW YORK

SITE LOCATION MAP

Dvirka and Bartilucci
Consulting Engineers
A Division of William F. Cosulich Associates, P.C.

FIGURE 2-1



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CUBA MUNICIPAL WASTE DISPOSAL SITE
VILLAGE OF CUBA, NEW YORK

SITE MAP

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FIGURE 2-2

From the early 1950s until 1981, the Cuba landfill accepted household, commercial and industrial waste, including industrial waste from the Acme Electric Corporation. Acme Electric identified several listed hazardous wastes generated by the facility and disposed at the landfill between 1952 and 1981. These wastes included spent halogenated solvents used in degreasing operations, plating bath sludges from the bottom of plating bath solutions from electroplating operations, spent stripping and cleaning bath solutions from electroplating operations, PCB capacitors and paint sludges. The paint sludges reportedly consisted of polyester, polyurethane, alkyd, acrylic, epoxy and vinyl based paints with a small percentage of various pigments. No records of the quantities disposed are available.

In addition to the material reportedly disposed of by Acme, the Village of Cuba wastewater treatment plant reportedly used the site for disposal of 200 tons of dried sludge per year between 1965 and 1983. The sludge reportedly contained cadmium, chromium, iron, cyanide, aluminum and zinc.

The wastes were deposited in trenches approximately 10 to 15 feet wide by 4 to 10 feet deep and several hundred feet long. Filled trenches were covered by 6 inches to 24 inches of clay fill. Bedrock has been determined to be approximately 4 to 10 feet below ground surface, therefore in some areas the wastes may have been deposited directly on bedrock.

The facility was issued a sanitary landfill permit in 1979 by NYSDEC and was inspected on a regular basis by NYSDEC until the Village completed an approved closure plan in 1987.

In October 1990, URS Consultants, Inc. prepared a Phase I/Preliminary Site Assessment (PSA) for NYSDEC to determine if the site should be reclassified or delisted. The PSA included a file review, data search and site inspection. Based upon the results of the PSA, the report indicated that there is insufficient information to reclassify the site. The report recommended that additional investigation, including installation of monitoring wells, groundwater sampling, surface water sampling, soil sampling and a geophysical survey, be conducted in order to determine if the site should be reclassified or delisted.

In January 1994, Engineering Science, Inc. prepared a Phase II/PSA report for NYSDEC to conduct field studies to determine if the site should be reclassified or delisted. As part of the PSA, "Engineering Science, Inc. installed four monitoring wells and collected three surface water, three sediment, two leachate, four surface soil, four composite subsurface soil and three groundwater samples. The results of the investigation indicated the presence of volatile organic compounds above Class GA groundwater standards, and as a result, it was recommended to reclassify the site as a Class 2 site. The results of the sampling and analysis are presented below.

2.4 Previous Investigations

In May 1980, Edwards and Moncreiff Engineers, consultants for the Village of Cuba, collected two leachate samples and one surface water sample. The surface water sample was collected from a tributary to Oily Creek southwest of the landfill. The samples were analyzed for ammonia, chemical oxygen demand (COD), nitrate, total kjeldahl nitrogen (TKN) and metals. Leachate samples detected chromium and manganese at maximum concentrations of 250 and 2500 ug/l, respectively. Manganese was the only metal detected in the surface water sample at 50 ug/l.

In October 1988, NYSDEC collected two leachate samples for organics and metals analysis. The analysis indicated the presence of organics, including 1-chloroethane, 1,2 dichloroethane, 2-methylphenol, 4-methylphenol and 4-chloro-3-methylphenol, and metals including, aluminum, barium, chromium, copper, magnesium, manganese, vanadium and zinc.

Site inspections conducted by the NYSDEC, New York State Department of Health, and the Allegany County Soil and Water Conservation District have noted leachate seeps on a fairly regular basis. Corrective measures to correct the leachate seeps have included clay plugs in excavated trenches, diversion trenches for surface water runoff upgradient of the site and the construction of a leachate collection pond. Leachate seepage still occurs along the southern boundary of the site.

Several tap water samples were collected by Allegany Department of Health between 1990 and 1993. None of the samples from the wells located downgradient of the site indicated the presence of volatile organic compounds.

As described above, in 1993 Engineering Science, Inc. collected several environmental samples during their Preliminary Site Assessment. The following presents the results of the sampling.

Surface Water Samples

One upgradient and one downgradient surface water sample was collected from a tributary to the North Branch of Van Campen Creek. One sample was also collected from the on-site leachate collection pond. Each of the samples were analyzed for Target Compound List (TCL) organics and Target Analyte List (TAL) metals and cyanide.

Carbon disulfide and toluene were the only volatile organic compounds (VOCs) detected in the surface water samples that were not attributed to laboratory contamination. The levels detected were less than the Class D surface water standards. No semi-volatile organics compounds (SVOCs) or pesticides/PCBs were detected in the samples.

Surface Water Sediment Samples

Three sediment samples were collected in conjunction with the surface water samples. Each of the samples were also analyzed for TCL and TAL constituents. The results of the analysis indicated that no VOCs were detected that were not attributed to laboratory contamination. 4-Methylphenol was the only SVOC detected at a level of 370 ug/kg. Due to the presence of 4-methylphenol in the 1988 leachate samples collected by URS, this constituent was attributed to the landfill. A low level of delta-BHC, 0.29 ug/kg, was detected in one of the sediment samples and all three of the samples exhibited the presence of arochlor 1260 at levels

less than 20 ug/kg. None of the inorganics detected in the sediment samples were attributed to the landfill due to the presence of the same inorganics at comparable levels in the upgradient sample.

Leachate Samples

Leachate samples were collected from two locations at the southwestern border of the site. Each of the samples were analyzed for TCL and TAL constituents.

Low levels, less than 10 ug/l , of dichlorethene, dichloroethane, trichloroethene and vinyl chloride were detected in at least one of the leachate samples. Chloroethane was detected in one of the samples at 48 ug/l. No SVOCs or PCBs were detected in the samples. Low levels, less than 0.1 ug/l, of delta-BHC and gamma chlordane were detected in one of the samples. Levels of copper, iron, zinc and cyanide were detected at levels above the Class D surface water standards in one or both of the samples.

Surface Soil Samples

Four surface soil samples were collected from areas believed to be impacted by landfill operations. Each surface soil sample was analyzed for EP Toxicity metals. One surface soil sample was also analyzed for TCL and TAL constituents.

No VOCs, SVOCs or pesticides were detected in the one surface soil sample. Arochlor 1260 was detected at 39 ug/kg. Inorganic constituents were compared to naturally occurring range of inorganics in soil and none of the levels detected in the surface soil sample were determined to exceed the range of naturally occurring levels.

None of the surface soil samples exceeded the EP Toxicity limits for metals.

Subsurface Soil

Four subsurface soil samples were collected during construction of the monitoring wells. Continuous split spoon soil samples were collected from each boring and one composite sample was collected for chemical analysis. Each of the samples were analyzed for TCL and TAL constituents. One duplicate sample was collected from MW-4. One sample was also collected from three of the wells for grain size analysis.

Toluene was detected at low levels, less than 5 ug/kg, in both the sample and the duplicate collected from MW-4. Trichloroethene was also detected in the duplicate sample at 2 ug/kg. The remaining VOCs detected were attributed to laboratory contamination.

Low levels, less than 30 ug/kg, of di-n-butyl phthalate were detected in the subsurface soil in MW-4 and the duplicate. These levels were attributed to plastic garbage bags disposed of at the landfill. No other SVOCs, that were not attributed to laboratory contamination, were detected in the subsurface soil samples.

No pesticides or PCBs were detected in the subsurface soil samples. Cyanide was the only constituent detected above naturally occurring levels at 1.9 mg/kg in MW-4.

Groundwater Samples

Three groundwater samples were collected from the existing monitoring wells. MW-2 was dry at the time of sampling, and therefore, no sample was collected.

The sample collected from MW-1 did not exhibit the presence of any VOCs above NYSDEC Class GA groundwater standards and guidelines. Results of the analysis from MW-3 and MW-4 indicated the presence of elevated levels of 1,1 dichloroethene, 1,2 dichloroethane (total), 1,1,1 trichloroethene and total xylenes above NYSDEC Class GA groundwater standards and guidelines in both of the wells. Benzene was also detected above the standard in MW-3. In

addition to the above compounds, vinyl chloride, chloroethane, toluene and ethyl benzene were also detected above the standards in MW-4. 2-Methylphenol, 4-methylphenol and 2,4-dimethylphenol were detected above the standards in MW-4 and were the only SVOCs detected above the standards. Heptachlor was the only pesticide detected above the standards in MW-3. Elevated levels of iron and manganese were detected in each of the wells sampled. MW-1 exhibited the presence of elevated levels of lead and zinc. MW-4 exhibited the presence of elevated levels of chromium, magnesium and zinc.

As discussed above, based upon the results of the environmental sampling, Engineering Science, Inc. determined that there was a significant threat due to disposal of hazardous wastes on-site.

3.0 SCOPE OF REMEDIAL INVESTIGATION/FEASIBILITY STUDY

3.1 Objectives and Approach

The objective of the Cuba Municipal Waste Disposal Site Remedial Investigation/ Feasibility Study (RI/FS) is to: evaluate off-site impacts due to contaminated groundwater and surface leachate resulting from hazardous waste disposal in the landfill, identify sources(s) of groundwater and leachate contamination if possible and perform predesign investigation in order to obtain information for closure of the landfill.

The approach to the remedial investigation/feasibility study for the Cuba Municipal Waste Disposal Site is to conduct a single-phase, focused RI/FS that identifies and implements a Presumptive Remedy for the site. A qualitative risk/exposure assessment will also be prepared as part of the RI. The focused feasibility study will identify and screen remedial technologies/ alternatives with emphasis on selection of a cap for the site as a presumptive remedy.

3.2 Focused Remedial Investigation

3.2.1 Field Investigation

The field investigation for the Cuba Municipal Waste Disposal Site will include the following:

- Aerial photograph interpretation;
- Interviews;
- Surface soil sampling;
- Leachate sampling;
- Sediment sampling;

- Soil boring/monitoring well installation;
- Groundwater sampling;
- Test pit program;
- Ambient air monitoring; and
- Surveying and mapping.

A summary of the field investigation program is provided in Table 3-1. The sampling locations are provided on Figure 3-1. A summary of the sampling program is provided in Table 3-2. A portion of the field investigation identified above and presented on Tables 3-1 and 3-2 is part of the predesign investigation. Information obtained from the predesign investigation will be incorporated into the predesign report further defined in Section 3.3. Further description of sampling procedures, decontamination procedures and monitoring well installation procedures are provided in Section 5.0 of the Work Plan.

3.2.2 Habitat Based Assessment

In order to prepare an environmental assessment, a wildlife habitat survey will be conducted on the site. The survey will be conducted in accordance with Step I of the NYSDEC Division of Fish and Wildlife document entitled "Fish and Wildlife Impact Analysis for Inactive Hazardous Waste Sites," June 1991. A Step IIa analysis will be completed. The field survey will identify aquatic and terrestrial species which are directly observed, as well as vegetative cover types, wetlands and surface water bodies, and fish and wildlife which may inhabit these habitats.

3.2.3 Qualitative Risk Assessment

A qualitative human health risk assessment will be prepared based on the results of the remedial investigation.

Table 3-1

CUBA MUNICIPAL WASTE DISPOSAL SITE
REMEDIAL INVESTIGATION/FEASIBILITY STUDY
FIELD INVESTIGATION SUMMARY

Program Element	Description
1. Aerial Photograph Interpretation	Historical aerial photos will be researched and interpreted to identify the historical excavation and filling activities as an aid to identify the location of the waste disposal trenches and reported buried drums.
2. Interviews	Interviews will be conducted with current and past Village employees, former and current Acme employees and other individuals that may have been involved with operations of the landfill to identify the locations and methods of excavation and filling activities, and reported disposal of hazardous waste.
3. Surface Soil Sampling	Ten (10) surface soil samples will be collected on-site in areas of stressed vegetation or randomly to provide information on surface soil quality and analyzed for TCL + 30 parameters.
4. Leachate Sampling	Leachate samples will be collected at approximately 100 foot intervals along the southern edge of the landfill and other on-site locations, if present during the time of sampling. If leachate seeps are observed on the surface, samples will be collected from these seeps. If surface seeps are not observed, samples will be collected from test pits excavated near the locations of previously observed seeps. Twenty (20) leachate samples will be collected and analyzed for TCL + 30 parameters and filtered Na, Ca, K, Mg, Fe, Cl, SO_4 and HCO_3.
5. Sediment Sampling	Four (4) stream sediment samples will be collected from four locations, upgradient and downgradient from the landfill areas and analyzed for TCL + 30 parameters.
6. Soil Boring/Monitoring Well Installation	Ten (10) new monitoring wells will be installed to compliment the existing monitoring well network and to determine the impacts of the landfill on groundwater

Table 3-1 (continued)

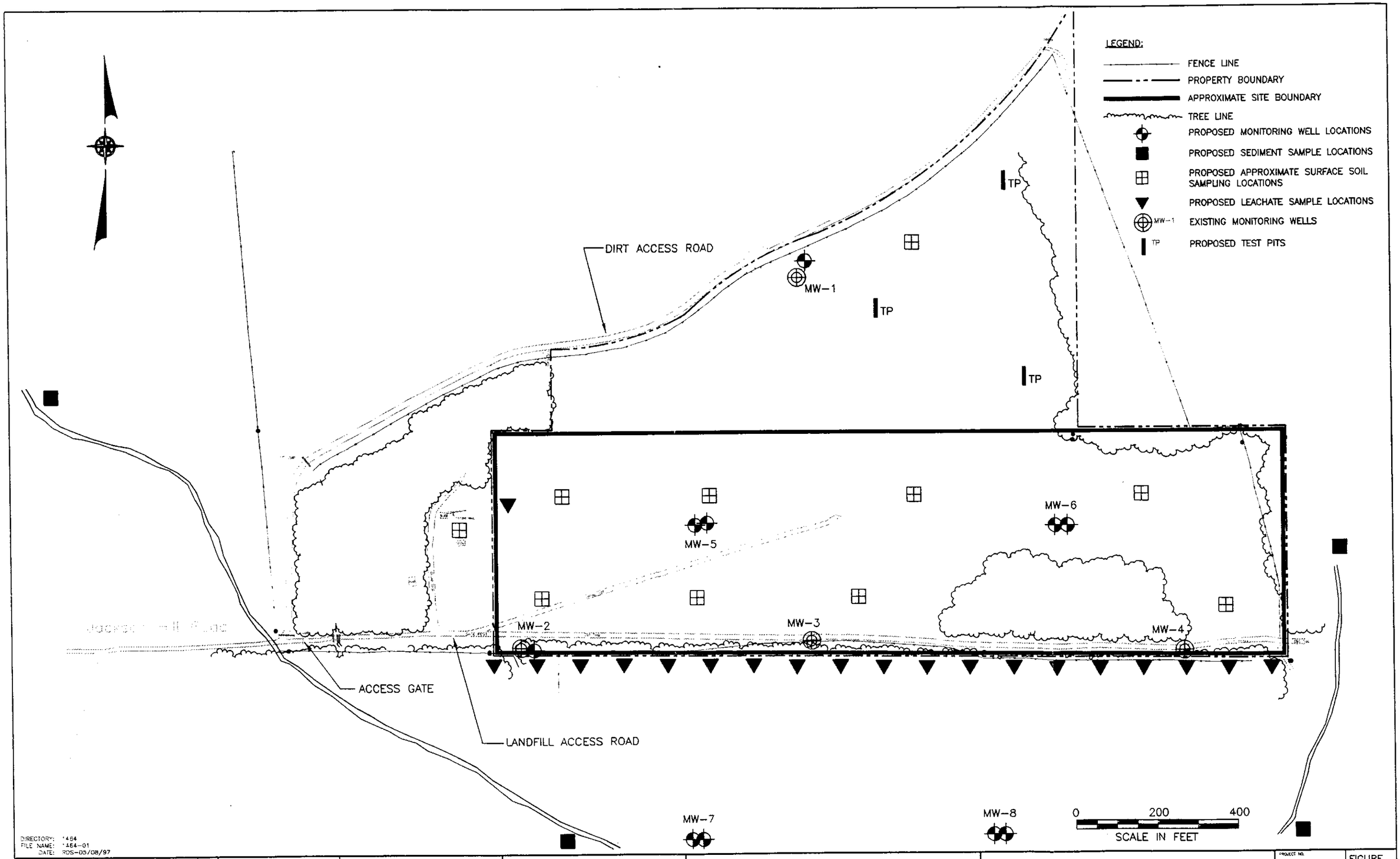
CUBA MUNICIPAL WASTE DISPOSAL SITE
REMEDIAL INVESTIGATION/FEASIBILITY STUDY
FIELD INVESTIGATION SUMMARY

Program Element	Description
	quality (see Figure 3-1 for proposed well locations). One deep (bedrock) well will be installed at location MW-1 to create a cluster to evaluate upgradient groundwater quality. In addition, two well clusters (2 wells each) will be installed in the central area of the site. These wells will consist of an overburden well and a bedrock well. Two additional well clusters will be installed approximately 400 feet downgradient of the landfill. Also, one shallow well will be installed at MW-2 to replace the existing dry well. Based on the existing environmental database for the site, the depth(s) of the wells are assumed to be 25 feet for the shallow (overburden) wells and 75 feet for the deep (bedrock) wells. Split-spoon sampling of the overburden will be performed every 5 feet at each of the locations and logged by a geologist. Two (2) soil samples will be collected from the borings drilled in the central area of the landfill and analyzed for TCL + 30 parameters. Rock core samples will be obtained from three deep borings.
7. Hydraulic Conductivity Testing	Rising and falling hand tests will be performed on each of the existing 3 and 10 newly installed monitoring wells.
8. Groundwater Sampling	Two rounds of groundwater samples (26 total) will be collected from each of the 3 existing monitoring wells and 10 new monitoring wells. Each sample will be analyzed for TCL + 30 and filtered Na, Ca, K, Mg, Fe, Cl, SO_4 and HCO_3 for the initial sampling event. The list of analytes for the second sampling event will be TCL VOCs +10 and TAL metals. Groundwater level measurements in the monitoring wells will be collected at least twice during the remedial investigation.

Table 3-1 (continued)

CUBA MUNICIPAL WASTE DISPOSAL SITE
REMEDIAL INVESTIGATION/FEASIBILITY STUDY
FIELD INVESTIGATION SUMMARY

Program Element	Description
9. Test Pit Program	Three (3) test pits will be excavated in the northwest area of the site to characterize the suitability of soil in this area as borrow material for use as cover material. Six (6) soil samples will be collected for laboratory analysis including Atterberg Limits, recompacted hydraulic conductivity and grain size distribution including sieve and hydrometer analysis. Test pits will also be constructed in conjunction with the leachate sampling as previously discussed.
10. Ambient Air Monitoring	Air monitoring for fugitive dusts and organic vapors will be conducted during all field activities.
11. Surveying and Mapping	All existing and newly installed monitoring wells, waste trenches and limits of the waste will be surveyed by a licensed surveyor and located on the site base map as developed by Seneca Design, P.C. Monitoring well casing elevations will be surveyed to the nearest 0.01 feet vertically.



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CUBA MUNICIPAL WASTE DISPOSAL SITE
VILLAGE OF CUBA, NEW YORK

SAMPLE LOCATION MAP

PROJECT NO.: PROJ-NO
DATE: XXXX
SCALE: DWG-SCALE

FIGURE 3-1

Table 3-2

CUBA MUNICIPAL LANDFILL
REMEDIAL INVESTIGATION/FEASIBILITY STUDY
SAMPLING MATRIX

Program Element	Environmental Media	Sample Type/Depth	Number of Samples	Equipment	Sample Analyses
Surface Soil Sampling	Surface Soil	Grab samples 0-2 inches below ground surface in areas of stressed vegetation or randomly throughout the landfill.	10	Disposable polyethylene scoop.	TCL +30.
Sediment Sampling	Sediment	Grab samples of stream sediment (in depositional areas, if possible).	4	Disposable polyethylene scoop.	TCL + 30.
Soil Borings/ Monitoring Well Installation (8 locations)	Subsurface Soil	Grab, standard split-spoon samples from ground surface to the bottom of the overburden (50 feet).	88*	Decontaminated split-spoon sampler.	Geologic description using the Unified Soil Classification system.
		Up to two (2) samples from the borings/in the center of the landfill for chemical analysis.	2		TCL + 30.
Test Pit Excavation	Subsurface Soil	Grab samples from test pits	6	Disposable polyethylene scoop.	Grain size analysis, recompacted hydraulic conductivity and Atterburg limits

Table 3-2 (continued)

CUBA MUNICIPAL LANDFILL
REMEDIAL INVESTIGATION/FEASIBILITY STUDY
SAMPLING MATRIX

Program Element	Environmental Media	Sample Type/Depth	Number of Samples	Equipment	Sample Analyses
Groundwater Sampling (2 rounds)	Groundwater	At surface of water in well after purging well of 3 to 5 casing volumes of water. Existing wells New wells	 6 28	Disposable polyethylene bailer.	TCL + 30. Filtered Na, Ca, K, Mg, Fe, Cl, SO_4 and HCO_3
Leachate Sampling	Leachate	Grab samples from leachate seeps and from test pits.	20	Laboratory supplied sample bottles and decontaminated long-handle polyethylene scoop if required.	TCL + 30. Filtered Na, Ca, K, Mg, Fe, Cl, SO_4 and HCO_3
Trip Blanks	Aqueous	Laboratory provided distilled water.	10**	Sample supplied by laboratory.	TCL Volatiles.
Matrix Spike/ Matrix Spike Duplicate	Aqueous	Groundwater (split of sample).	2***	Disposable polyethylene bailer.	TCL + 30.
Matrix Spike/ Matrix Spike Duplicate	Sediment/Soil	Sediment (split of sample).	1***	Disposable polyethylene scoop, decontaminated long-handled polyethylene scoop or split spoon sampler.	TCL + 30.

*Geologic descriptions only.
**One trip blank will accompany each shipment of aqueous samples requiring volatile organic analysis.
***One MS/MSD for each media for every 20 samples collected or one every two weeks.

Note: No field blanks will be collected as per New York State Department of Environmental Conservation guidance.

The goals of the baseline human health risk and environmental assessment are to:

- Provide qualitative analysis of potential human health risks under current site conditions, including identification of contaminant migration pathways and potential receptors.

- Identify the qualitative potential impacts to flora and fauna posed by existing contamination at the site; and

- Provide a basis for determining contaminant levels that can remain on-site while providing adequate protection of human health and the environment.

The approach to be used to perform the qualitative health risk and environmental assessment for the Cuba Municipal Waste Disposal Site will be to identify contaminants and concentrations of concern at the site, define the routes of exposure of these contaminants, define migration pathways and identify potential receptors based upon the results of the remedial investigation.

The environmental assessment will consist of a qualitative assessment of potential impacts to flora and fauna at the site caused by the level and extent of contamination identified as a result of the remedial investigation. The habitat evaluation will be prepared in accordance with Step IIa of the NYSDEC document entitled, "Fish and Wildlife Impact Analysis for Inactive Hazardous Waste Sites, June 18, 1991."

A list of indicator chemicals will be developed for the site from the set of validated RI data. Indicator chemicals are generally selected to represent the most toxic, mobile and persistent contaminants at the site, as well as those chemicals which exceed the SCGs and those chemicals which are detected most frequently and at the highest concentrations. Identification of indicator chemicals will enable the health risk and environmental assessment to focus on the contaminants of greatest potential concern to human health and the environment.

Utilizing appropriate data from the remedial investigation, site reconnaissance and previous site investigations, the contaminant sources, migration pathways and human exposure points will be

identified and evaluated. Potential human exposures include ingestion, inhalation and dermal contact with waste, groundwater, leachate seeps and contaminated soil, and vapors and fugitive dust from the Cuba Municipal Waste Disposal Site by individuals having access to the site.

Based upon this evaluation, a preliminary assessment of exposure risk will define the need for an expanded quantitative health risk to be performed, if required.

3.3 Predesign Report

As described in Section 3.2.1, several of the field activities presented in that Section are being conducted to provide information on the site that will allow for preparation of a Predesign Report.

The approach toward remediation of the Cuba Municipal Waste Disposal Site is to accelerate implementation of a presumptive remedy for landfill sites. Guidance for this accelerated remediation approach is provided in NYSDEC Technical Administrative Guidance Memorandum No. 4044 (Accelerated Remedial Actions at Class 2, Non-RCRA Regulated Landfills).

As part of the Predesign Report, a leachate generation/migration plan will be prepared. This plan will include an evaluation of on-site leachate production through utilization of the United States Environmental Protection Agency Hydrologic Evaluation of Landfill Performance (HELP) model. Evaluation of leachate production and leachate quality will determine the need for leachate collection or a means of reducing leachate production through the use of surface water and/or upgradient groundwater diversion.

The Predesign Report will include a conceptual design for site closure including capping, gas control and leachate collection/mitigation. It will also evaluate the on-site borrow area for cover, consolidation of waste and cap design with regard to Part 360 variances.

3.4 Phase II Remedial Investigation

Based upon the results of the Phase I Field Investigation, a Phase II Remedial Investigation may be required.

3.5 Focused Feasibility Study

If groundwater contamination appears to require additional evaluation, a Feasibility Study may be required.

If required a focused feasibility study will include identification and evaluation/screening of remedial technologies, development and evaluation/screening of potential applicable remedial alternatives and a detailed analysis of alternatives. All three phases will be combined in a single report. The focused feasibility study will be prepared in accordance with the following documents:

- Technical and Administrative Guidance Memorandum (TAGM) on Selection of Remedial Actions at Inactive Hazardous waste sites - Revised HWR-90-4030, New York State Department of Environmental Conservation, May 15, 1990.
- Guidance on Conducting Remedial Investigations and Feasibility Studies Under CERCLA Interim Final, EPA-540/E 89/004. OSWER Directive 9355.30-1, U.S. Environmental Protection Agency Office of Emergency and Remedial Response, October 1988.

The FS will identify remedial technologies which could be potential applicable, taking into account site-specific considerations. As such, this phase includes the following steps:

- Identification and characterization of areas and media requiring remediation (based on the results of the RI).
- Development of remedial action objectives specifying the contaminants and media of concern and exposure pathways.
- Development of general response actions for each exposure pathways.

- Identification of potentially applicable remedial action technologies, including a description of the technologies and discussion of applicability to the Site. In this step, technologies which are not viable and cannot be implemented will be eliminated from further consideration.

Development of remedial action objectives includes medium-specific or operable unit-specific goals for protecting human health and the environment. The goals will consider the contaminants and contaminant concentrations (as determined by the remedial investigation) the exposure routes and receptors (as determined by the human health risk and environmental assessment), and the acceptable contaminant or risk levels or range of levels. Acceptable contaminant or risk levels include SCGs, which will be identified and compared to existing conditions on the site in the RI report.

Development of general response actions includes identification of classes of response actions which could be implemented for remediation of waste, soil sediment, leachate and groundwater. Potential general response actions include no action, containment or removal. According to the NYSDEC TAGM, the hierarchy of preferred remedial actions, from most desirable to least desirable, is destruction technologies, separation treatment technologies, solidification/chemical fixation technologies, and control and isolation technologies.

Potentially applicable remedial technologies will be identified and prescreened for each general response action. Selection of technologies will be based on the findings of the RI and risk/environmental assessment, including the types and concentrations of contaminants, as well as other surface and subsurface site specific features, including local geology and hydrogeology. Technologies which are obviously not applicable will be eliminated from further consideration in the screening process. Screening will consider effectiveness and implementability. Remaining tecnolgoieswill be carried forward to the development of remedial alternatives.

The FS will also include a preliminary evaluation of effectiveness and implementability. Effectiveness evaluation will include consideration of the following:

1. Potential effectiveness of process options in handling the estimated areas of volumes of media and meeting the remediation goals identified by the remedial action objectives.

2. Potential impacts to human health and the environment during the construction and implementation phase; and

3. Proven operation and reliability of the process with respect to the contaminants and conditions at the site.

Implementability includes both the technical and administrative feasibility of implementing the alternative. Administrative feasibility will consider institutional factors such as the ability to obtain necessary permits for off-site actions, the ability to comply with certain institutional aspects of the SCGs, the commercial availability and capacity of treatment, storage and disposal services, and the availability of equipment and skilled labor to implement the technology.

The results of the screening process will include a list of technologies or alternatives to be carried forward for detailed evaluation.

The detailed analysis of alternatives will include further refinement and/or modification of alternatives. In summary, detailed analysis will include evaluation of the following factors in accordance with the NYSDEC TAGM 4030:

- Overall protection of human health and the environment;
- Compliance with SCGs;
- Long-term effectiveness and permanence;
- Reduction of toxicity, mobility and volume
- Short-term effectiveness;
- Implementability;
- Cost;
- Regulatory Agency acceptance; and
- Community acceptance

The focused FS report will comprise a comparative analysis of each of these evaluation criteria for each of the alternatives (or technologies) being considered. At the conclusion of this report, a preferred alternative will be recommended which will specify the remedial actions and technologies selected for the site.

4.0 PROJECT MANAGEMENT

4.1 Project Schedule and Key Milestones/Reports

The RI/FS schedule for the Cuba Municipal Waste Disposal Site is provided in Figure 4-1. Key milestones are identified to monitor work progress. The following is the list of milestones proposed for this project:

Milestone 1: Submittal of the Draft Project Management and Site-Specific Work Plan.
Milestone 2: Submittal of the Draft Remedial Investigation Report.
Milestone 3: Submittal of the Draft Predesign Report
Milestone 4: Submittal of Draft Feasibility Study Report

4.2 Project Management, Organization and Key Technical Personnel

Dvirka and Bartilucci Consulting Engineers will be the prime consultant responsible for performance of the remedial investigation/feasibility study. Subcontractors planned to be used for this project include:

- YEC, Inc. (surveying).
- Field Safety Corporation (health and safety).
- Parratt-Wolff, Inc. (soil boring and well installation).
- IEA, Inc. (sample analysis).
- MDS Environmental, Inc. (data validation).

The project organization for this RI/FS, illustrating both management and project responsibility functions for the project team and key personnel, is provided in Figure 4-2.

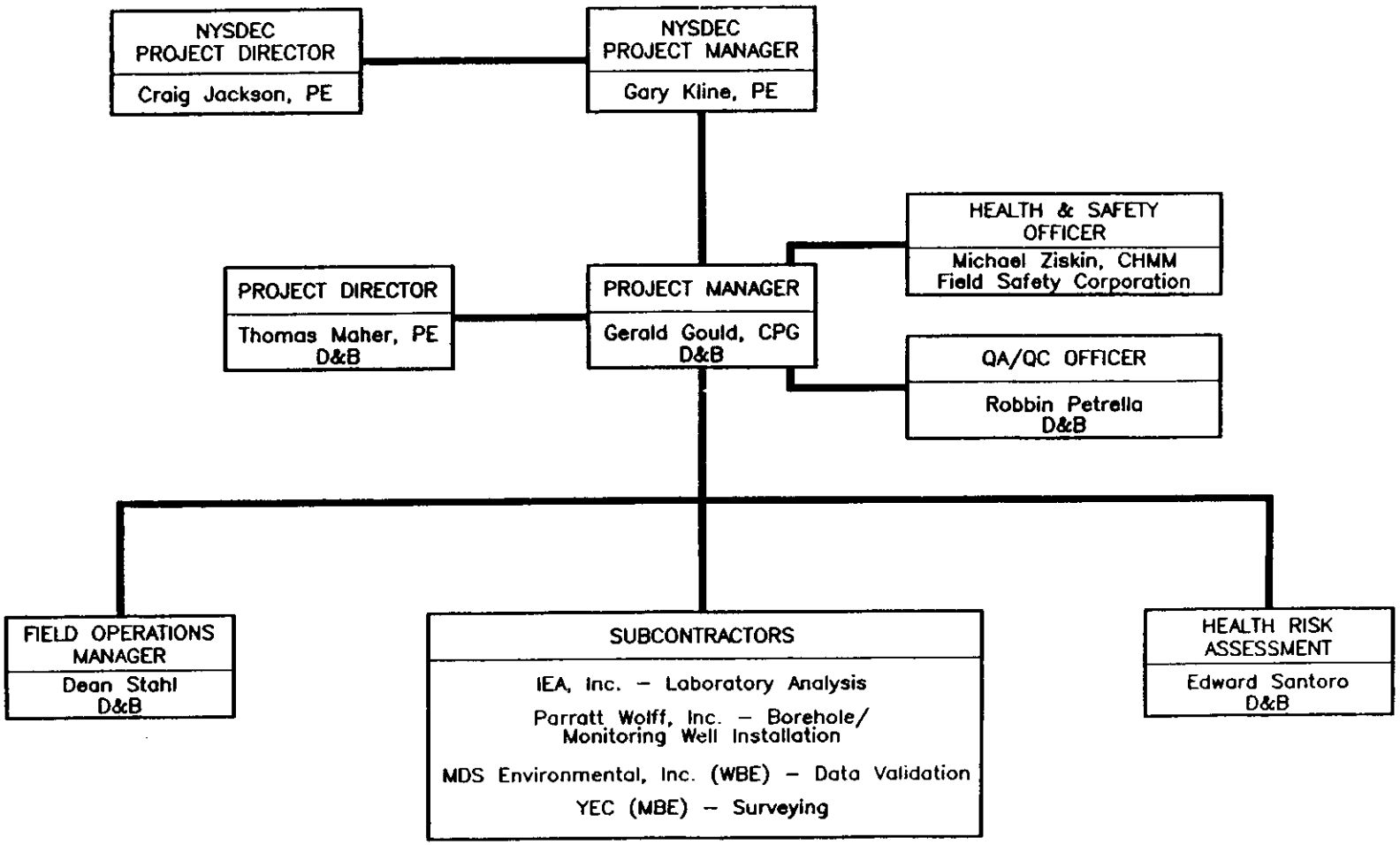
Figure 4-1

Project Schedule

FIGURE 4–2

PROJECT TEAM ORGANIZATION CHART

FOR
CUBA MUNICIPAL WASTE DISPOSAL SITE
REMEDIAL INVESTIGATION/FEASIBILITY STUDY
CUBA, NEW YORK



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Dvirka and Bartilucci
Consulting Engineers
A Division of William F. Cosulich Associates, P.C.

5.0 FIELD OPERATION AND INVESTIGATION PLAN

5.1 Site Management Plan

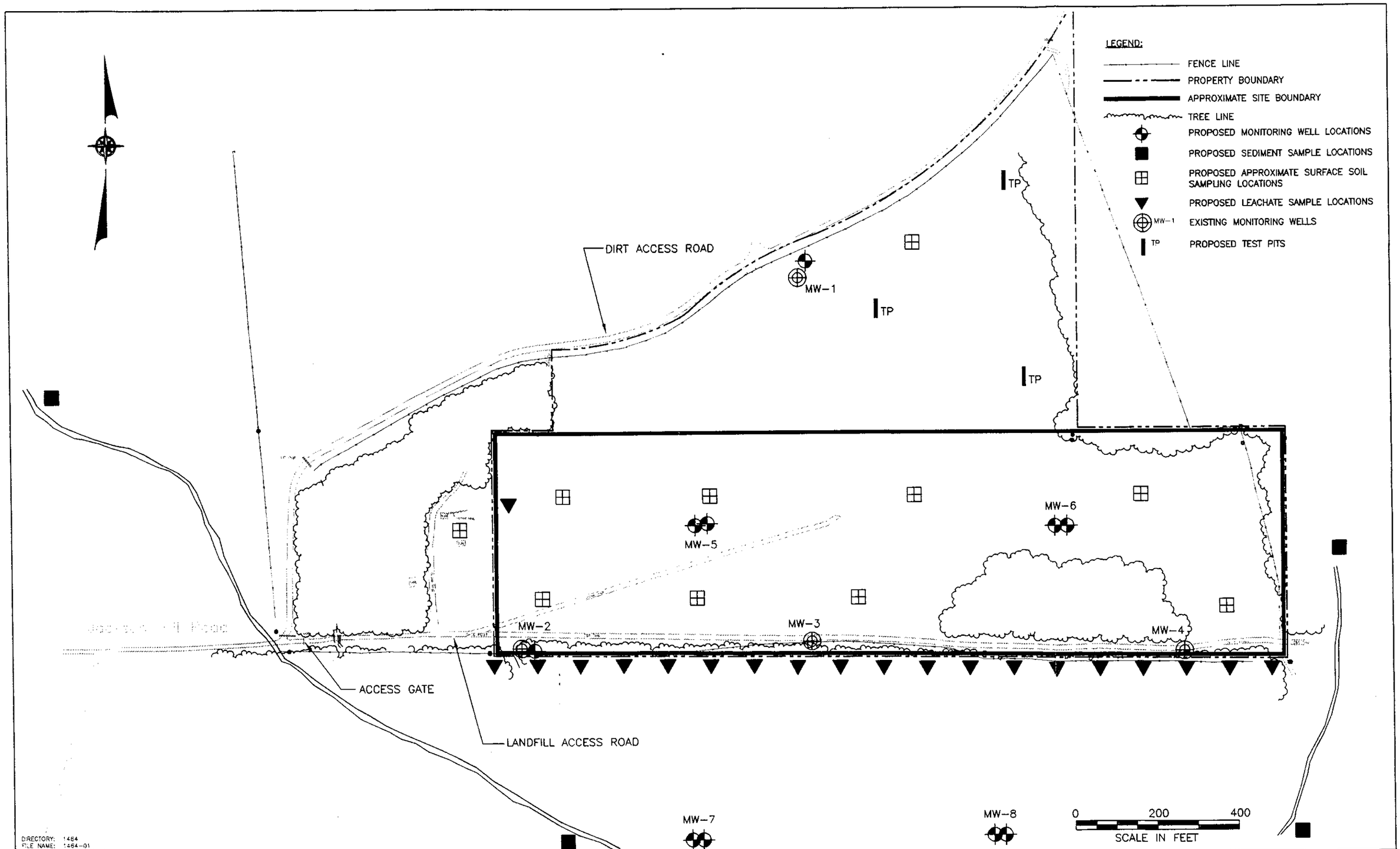
5.1.1 Site Access and Security

The Cuba Municipal Waste Disposal Site is located in a rural area north of the Village of Cuba. The site is accessed via a dirt road that intersects Jackson Hill Road (see Figure 5-1). Access to the dirt road is restricted only by weather conditions. The road is not maintained in the winter, and therefore access is controlled by the amount of snow on the ground. The road is apparently used by farmers to access hay fields north of the landfill site. The site access road is controlled by a cattle gate. The gate is locked and the Village of Cuba has keys. The landfill access road is also unpaved and is unpassable to two wheel drive traffic at certain times due to deep ruts and wet, muddy conditions.

The landfill site is bounded on the north by farm fencing that is in various stages of disrepair. Although there are no signs of unauthorized site entry, the fence is insufficient to prevent access to the site. The east, west, and south property lines are bounded by hardwood forest. Several trails pass into the forest along the southern boundary. There are no barriers to the site at the southern boundary.

All equipment, materials and supplies to be used in the field investigation will be stored temporarily on site during the field investigation. Each night equipment will be secured in or near support vehicles and excavations will be covered or surrounded with barriers. If necessary equipment and supplies will be removed from the site at nights or on weekends.

A temporary decontamination pad will be installed on site at the beginning of the field investigation. Wash water from steam cleaning will be allowed to drain onto the site. At the completion of drilling and test pits, the decontamination pad will be dismantled and removed from the site.



DIRECTORY: 1464
FILE NAME: 1464-01
DATE: RDS-05/08/97

NO.	DATE	REVISION	AT

PROJECT ENGINEER: | DRAWN BY:
DESIGNED BY: | CHECKED BY:

DVIRKA AND BARTILUCCI
CONSULTING ENGINEERS
A DIVISION OF WILLIAM F. COSULICH ASSOCIATES, P.C.

CUBA MUNICIPAL WASTE DISPOSAL SITE
VILLAGE OF CUBA, NEW YORK

SAMPLE LOCATION MAP

PROJECT NO.: PROJ-NO
DATE: XXXX
SCALE: DWG-SCALE

FIGURE 5-1

5.1.2 Field Office

Due to the remote nature of the landfill site and the relatively short duration of field activities on site, there will be no field office on site. Project meetings will be held on site when necessary, and deliveries, telephone and fax communications will occur through a local hotel or other means as may be necessary to maintain day to day project communications.

5.1.3 Organization and responsibilities

Dvirka and Bartilucci Consulting Engineers (D&B) will have prime responsibility for managing the remedial investigation field program. Subcontractors to D&B that will be involved in the field investigation are listed in Section 4.2. Duties of the subcontractors are also listed in Section 4.2.

5.2 Field Activities Plan

The following is a description of the field activities to be conducted at the Village of Cuba Municipal Waste Disposal site. These sections provide the scope of work to be performed under each task. Specific procedures for sampling protocols, where applicable, are described in the Quality Assurance/Quality Control Plan in Section 6.0.

5.2.1 Aerial Photograph Interpretation

Historical aerial photographs will be researched and interpreted in an attempt to identify the history and sequence of landfilling at the site. Information from air photos from several different years will be reviewed. Particular attention will be paid to areas of disturbed soil that may indicate landfilling on or near the site. Air photos will be used to help locate specific areas of the site that may warrant special attention during the investigation. The air photos will also be used to identify the limits of waste and possibly assess the depth of waste on site.

5.2.2 Interviews

Village of Cuba officials will be contacted to obtain a list of individuals who may be knowledgeable about activities at the landfill throughout its history. These individuals may include former landfill operators, village superintendents, Acme Electric Corporation employees, landfill neighbors or others who may have knowledge of the landfill. The individuals will be contacted and interviewed, if willing, as to their knowledge of the site.

Information gained from these interviews will be used to help determine the practices of landfilling and sequence of site use. This information will help to focus the field investigation on areas that may require special attention and to anticipate the overall nature of solid waste at the sight.

5.2.3 Surface Soil Sampling

A total of ten surface soil samples will be collected from areas of the site suspected to overlie refuse to assess the presence of contaminants and possible environmental exposures through human, plant or animal contact. Samples will be collected from areas of stressed vegetation, exposed refuse or areas of local subsidence, if present. Additional samples may be collected at random locations. Surface soil samples will only be collected on the 24 acre portion of the Village of Cuba property used for landfilling. Samples will be collected at a depth of 0-2 inches using a sterile polystyrene scoop or sterile wooden tongue depressor. Tentative sample locations are presented in Figure 5-1. Sample locations may be revised based on the findings of aerial photography, interviews and field conditions. Revised sampling locations will be subject to NYSDEC approval at the time of sampling. All soil samples will be analyzed for TCL + 30 parameters.

5.2.4 Leachate Sampling

Leachate samples will be collected from as many as 20 locations at the site. Leachate sampling will be concentrated along the southern boundary of the landfill property where seeps have been previously reported and observed during the site inspection. In areas where leachate is observed flowing from seeps at ground surface, a small hole will be excavated at the seep using a shovel. The excavation will be large enough to comfortably fit the largest sampling container to be used in sample collection. The hole will be allowed to fill with leachate, and then sampled by submerging the appropriate sample containers in the liquid filled hole.

If leachate seep locations are dry during the field investigation, test pits will be excavated using a backhoe or similar machinery, in an attempt to induce flow from the seeps for sample collection. Leachate samples from test pits will be attempted at intervals of approximately 100 feet along the southern landfill boundary or at the occurrence of surface ponding of water. On-site samples may be collected at the reported lagoon on site and other areas determined by aerial photography, interviews, site reconnaissance and field conditions. The locations of leachate samples are presented in Figure 5-1. Leachate samples will be analyzed for TCL + 30 to assess potential contaminants and filtered Ca, NA, K, Mg, Fe, Cl, SO_4 and HCO_3 to characterize and compare groundwater samples.

5.2.5 Sediment Sampling

Four sediment samples will be collected from the bottoms of intermittent streams flowing through or adjacent to the site. The presence of surface water flow is not required for sediment sampling, however, attempts will be made to identify sample locations that are likely to influence or be influenced by site surface water runoff, including depositional areas. Samples will be taken from upgradient and downgradient locations as shown on Figure 5-1. Samples will be collected from the stream bed using a disposable polyethylene scoop or long handled polyethylene scoop. Sediment samples will be analyzed for TCL + 30 compounds.

5.2.6 Monitoring Wells

Ten new monitoring wells will be installed to compliment the existing monitoring well network. Monitoring wells will consist of well clusters including one shallow well that will screen the water table and one deep well that will be screened in weathered bedrock to evaluate deep groundwater conditions.

All borehole construction and monitoring well installations will be logged and documented by a geologist. Notes will be kept in both bound field books and on Boring Logs and Monitoring Well Construction Logs (see Section 6.10). The Boring Logs will include the depths of stratigraphic changes, description of all samples, details of drilling techniques, listing of soil samples collected for laboratory analyses, and measurements made with PIDs or FIDs. Well construction specifications will be provided in the Monitoring well Construction Logs. The Modified Burmeister Classification System will be used to describe soil samples recovered from the borings. A Daily Field Activity Report (see Section 6.10) will be completed whenever there are drilling activities (or any other field activities) undertaken as part of the investigation.

5.2.6.1 - Monitoring Well Locations

Well clusters will be located in upgradient, on site and downgradient locations. Figure 5-1 Depicts the locations of proposed and existing monitoring wells at the Cuba Municipal Waste Disposal Site. Upgradient wells will include one deep well located adjacent to the existing shallow well labeled MW-1 in the north central portion of the site. Two well clusters MW-5D,S and MW-6D,S will be located on the interior portion of the site. These wells will provide information regarding on-site contributions of contaminants to groundwater.

Downgradient monitoring wells currently exist at the southern landfill boundary, and are labeled MW-2, MW-3, and MW-4. One monitoring well (MW-2S) will be installed adjacent to existing well MW-2, which is reportedly dry. Monitoring wells MW-3 and MW-4 are existing shallow wells and will remain part of the monitoring program in the remedial investigation.

become available for the necessary sample analyses. Specific monitoring well sampling procedures are listed in Section 6.7.7.

5.2.9 Test Pits

Three test pits will be excavated in the northwest area of the site to characterize the suitability of soil in this area as borrow material for use as cover material. Six soil samples (two from each test pit) will be collected for laboratory analysis including Atterberg limits, recompacted hydraulic conductivity and grain size distribution including sieve and hydrometer analysis. Grain size analyses will be performed in accordance with ASTM D422-63.

Samples will be obtained from the backhoe bucket immediately after retrieval. Personnel will not enter the pit to collect samples.

The protocol for test pit excavation, sampling and backfill will be the following:

- Sod and top soil from the surface of the test pit, approximately 2 to 3 feet in depth, will be removed and temporarily stored on one side of the test pit..
- Deeper excavated soil will be placed on the side of the pit in a separate location from the sod and topsoil.
- If the water table or buried waste are encountered during test pit construction, the excavation will be terminated.
- A log of excavation and sample collection will be maintained by a qualified geologist.
- The excavation will be filled in the reverse order of soil removal so as to maximize the preservation of the natural hydrogeologic properties of the subsurface materials.
- Final cover will use the soil initially removed and placed separately. If this is not sufficient, clean soil from the surrounding area will be placed on top of the pit.

In general, only the backhoe bucket, which will come into contact with contaminated soil, will require decontamination.

5.2.10 Ambient Air Monitoring

Air monitoring for fugitive dusts and organic vapors will be conducted during all field activities. Fugitive dusts will be monitored using an MIE miniram portable dust indicator and organic vapors will be screened using a PID or FID. Explosive gases will be monitored using a combustible gas indicator.

5.2.11 Surveying and Mapping

All sampling and monitoring well locations will be surveyed by a New York State licensed surveyor for horizontal and vertical control. Vertical and horizontal control of the monitoring well casing will allow for calculation of groundwater elevations for the development of groundwater contour maps. The ground surface, protective casing and measuring point in the inner casing will be surveyed.

Vertical and horizontal control of the soil borings and monitoring wells allow for the preparation of geologic and hydrogeologic cross sections. Additional on- and off-site sampling points, such as surface soil and leachate sampling locations, will be surveyed, if necessary.

5.1.2 Field Office

Due to the remote nature of the landfill site and the relatively short duration of field activities on site, there will be no field office on site. Project meetings will be held on site when necessary, and deliveries, telephone and fax communications will occur through a local hotel or other means as may be necessary to maintain day to day project communications.

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5.2.1 Aerial Photograph Interpretation

Historical aerial photographs will be researched and interpreted in an attempt to identify the history and sequence of landfilling at the site. Information from air photos from several different years will be reviewed. Particular attention will be paid to areas of disturbed soil that may indicate landfilling on or near the site. Air photos will be used to help locate specific areas of the site that may warrant special attention during the investigation. The air photos will also be used to identify the limits of waste and possibly assess the depth of waste on site.

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Village of Cuba officials will be contacted to obtain a list of individuals who may be knowledgeable about activities at the landfill throughout its history. These individuals may include former landfill operators, village superintendents, Acme Electric Corporation employees, landfill neighbors or others who may have knowledge of the landfill. The individuals will be contacted and interviewed, if willing, as to their knowledge of the site.

Information gained from these interviews will be used to help determine the practices of landfilling and sequence of site use. This information will help to focus the field investigation on areas that may require special attention and to anticipate the overall nature of solid waste at the sight.

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A total of ten surface soil samples will be collected from areas of the site suspected to overlie refuse to assess the presence of contaminants and possible environmental exposures through human, plant or animal contact. Samples will be collected from areas of stressed vegetation, exposed refuse or areas of local subsidence, if present. Additional samples may be collected at random locations. Surface soil samples will only be collected on the 24 acre portion of the Village of Cuba property used for landfilling. Samples will be collected at a depth of 0-2 inches using a sterile polystyrene scoop or sterile wooden tongue depressor. Tentative sample locations are presented in Figure 5-1. Sample locations may be revised based on the findings of aerial photography, interviews and field conditions. Revised sampling locations will be subject to NYSDEC approval at the time of sampling. All soil samples will be analyzed for TCL + 30 parameters.

5.2.4 Leachate Sampling

Leachate samples will be collected from as many as 20 locations at the site. Leachate sampling will be concentrated along the southern boundary of the landfill property where seeps have been previously reported and observed during the site inspection. In areas where leachate is observed flowing from seeps at ground surface, a small hole will be excavated at the seep using a shovel. The excavation will be large enough to comfortably fit the largest sampling container to be used in sample collection. The hole will be allowed to fill with leachate, and then sampled by submerging the appropriate sample containers in the liquid filled hole.

If leachate seep locations are dry during the field investigation, test pits will be excavated using a backhoe or similar machinery, in an attempt to induce flow from the seeps for sample collection. Leachate samples from test pits will be attempted at intervals of approximately 100 feet along the southern landfill boundary or at the occurrence of surface ponding of water. On-site samples may be collected at the reported lagoon on site and other areas determined by aerial photography, interviews, site reconnaissance and field conditions. The locations of leachate samples are presented in Figure 5-1. Leachate samples will be analyzed for TCL + 30 to assess potential contaminants and filtered Ca, NA, K, Mg, Fe, Cl, SO_4 and HCO_3 to characterize and compare groundwater samples.

5.2.5 Sediment Sampling

Four sediment samples will be collected from the bottoms of intermittent streams flowing through or adjacent to the site. The presence of surface water flow is not required for sediment sampling, however, attempts will be made to identify sample locations that are likely to influence or be influenced by site surface water runoff, including depositional areas. Samples will be taken from upgradient and downgradient locations as shown on Figure 5-1. Samples will be collected from the stream bed using a disposable polyethylene scoop or long handled polyethylene scoop. Sediment samples will be analyzed for TCL + 30 compounds.

5.2.6 Monitoring Wells

Ten new monitoring wells will be installed to compliment the existing monitoring well network. Monitoring wells will consist of well clusters including one shallow well that will screen the water table and one deep well that will be screened in weathered bedrock to evaluate deep groundwater conditions.

All borehole construction and monitoring well installations will be logged and documented by a geologist. Notes will be kept in both bound field books and on Boring Logs and Monitoring Well Construction Logs (see Section 6.10). The Boring Logs will include the depths of stratigraphic changes, description of all samples, details of drilling techniques, listing of soil samples collected for laboratory analyses, and measurements made with PIDs or FIDs. Well construction specifications will be provided in the Monitoring well Construction Logs. The Modified Burmeister Classification System will be used to describe soil samples recovered from the borings. A Daily Field Activity Report (see Section 6.10) will be completed whenever there are drilling activities (or any other field activities) undertaken as part of the investigation.

5.2.6.1 - Monitoring Well Locations

Well clusters will be located in upgradient, on site and downgradient locations. Figure 5-1 Depicts the locations of proposed and existing monitoring wells at the Cuba Municipal Waste Disposal Site. Upgradient wells will include one deep well located adjacent to the existing shallow well labeled MW-1 in the north central portion of the site. Two well clusters MW-5D,S and MW-6D,S will be located on the interior portion of the site. These wells will provide information regarding on-site contributions of contaminants to groundwater.

Downgradient monitoring wells currently exist at the southern landfill boundary, and are labeled MW-2, MW-3, and MW-4. One monitoring well (MW-2S) will be installed adjacent to existing well MW-2, which is reportedly dry. Monitoring wells MW-3 and MW-4 are existing shallow wells and will remain part of the monitoring program in the remedial investigation.

Two off-site down gradient well clusters will be located approximately 150 feet south of MW-2, MW-3 and MW-4. These wells will be located approximately equidistant between the existing wells. For example, cluster MW-8D,S will be located between MW-2 and MW-3. Similarly MW-9D,S will be located between MW-3 and MW-4.

5.2.6.2 - Deep Monitoring Well Borings

Deep monitoring well borings will be drilled to a depth of approximately 75 feet below ground surface. The monitoring wells will be installed by advancing soil borings using 4.25 inch inside diameter hollow stem augers or 4 inch inside diameter flush joint casing to the top of bedrock. Bedrock is anticipated to be approximately 25 feet below ground surface. During construction of each borehole, split spoon samples will be obtained at a minimum at 5 foot intervals beginning at the ground surface to the top of bedrock to provide stratigraphic information on the site, as well as information on soil quality. The depth of the boring will be determined by the occurrence of the water in bedrock for the deep wells.

Soil samples obtained from decontaminated split spoons will be observed and logged for geologic characteristics, odors and staining, and screened with a PID or FID. The data obtained from this screening will be used to characterize site stratigraphy and to select soil samples for chemical analysis.

Cuttings generated from the construction of the boreholes will be handled in accordance with NYSDEC TAGM No. 4032 "Disposal of Drill Cuttings" dated November 1989. In general, this TAGM allows for on-site disposal of cuttings as long as certain criteria as to location and cover of cuttings is met.

Continuous rock core will be collected in three of the five deep wells. Wells MW-1D, MW-5D, and MW-7D will be cored. Rock coring will be conducted using an HX core barrel which will leave a hole diameter of 4 inches. Only potable water will be allowed in the hole.

Rock core samples will be collected in 5 foot runs starting at the top of competent bedrock and extending to depths of at least 15 feet below the top of rock. Rock Quality Designation (RQD) will be determined for each core by dividing the total length of the core by the total length of recovered segments greater than 4 inches in length, exclusive of any mechanical (drilling induced) fractures. RQD is useful in quantifying the degree of fracturing for a given segment of a rock formation. Rock cores will be collected for logging purposes only and will not undergo chemical analysis.

Monitoring wells MW-6D and MW-8D will be drilled using a 3-7/8 inch roller bit using mud rotary drilling techniques. The borings will be advanced to a depth determined in the field based upon the results of cored borings. Logging of bedrock drilling will include observations regarding drilling rate, drill water recovery, sudden drops in drill tools and lithology of drill cuttings.

Deep monitoring wells will be completed in the shallowest, relatively permeable zone in bedrock. This zone may include weathered bedrock found at the overburden-bedrock interface. Bedrock monitoring wells will be completed with screens, sand packs and bentonite seals (see Section 5.2.6.5) in order to maximize discreet groundwater sampling and prevent the possibility of cross-contamination of groundwater between fractures or voids in the bedrock, or overlying overburden materials.

5.2.6.3 - Shallow Monitoring Well Borings

Shallow borings constructed for monitoring wells adjacent to deep monitoring wells, will not be sampled or logged. Well depth is anticipated to be approximately 25 feet and will be determined by the observed occurrence of the water table as noted on the logs of adjacent deep borings. The bottom of the shallow well borings will be at least 5 feet below the depth of the water table as logged in the adjacent deep boring. Samples may be collected at the screened interval to confirm the observations of the deep hole. MW- 2S will be logged at five foot intervals to establish criteria for comparison with logs from previous investigations.

5.2.6.4 - Subsurface Soil Samples

Two subsurface soil samples will be collected for laboratory analysis from the two on-site monitoring well clusters. Bedrock beneath the landfill portion of the site is expected to be between four and fourteen feet below ground surface. One sample will be collected from MW-5S and one sample collected from MW-6S.

Subsurface soil samples selected for chemical analysis will be collected from within the unsaturated zone unless contamination at the water table interface is evident, in which case, samples of soil in the saturated zone may be collected. Samples will be obtained using a decontaminated split spoon sampler during soil boring construction and transferred into the container with a sterile polystyrene scoop or wooden tongue depressor. Soil samples, collected for chemical analysis, will be analyzed for TCL + 30.

5.2.6.5 - Monitoring Well Construction

Overburden monitoring wells will be constructed of decontaminated two inch inside diameter, Schedule 40, 0.010 inch slot PVC well screen and threaded, flush joint PVC casing. The overburden water table monitoring well screens will generally be 10 feet long. The screen will be installed with 5 feet below the water table in order to intercept the water table under varying seasonal groundwater elevations. However, at this site, where there are suspected large variations in seasonal or annual water table elevations, 15 foot screens may be necessary. Screen lengths will be determined in the field based upon field evaluation of the soil samples for moisture content and mottling.

The well screen and riser pipe will be lowered into the hollow stem auger or temporary casing and set at the desired depth. Sand pack will be placed into the annular space to a minimum height of 2 feet above the top of the well screen using a tremie pipe or other suitable method. Upon completion of the placement of the sand pack, a minimum 2 foot thick bentonite

pellet, chip or slurry seal will be emplaced in the annular space using a tremie pipe. Bentonite pellets or bentonite chips, if used, will be hydrated with potable water and allowed to swell for a minimum of 1/2 hour before introducing the cement-bentonite grout in the remaining annular space. The cement-bentonite grout will be pressure pumped into the annular space by the tremie method.

The monitoring wells will be completed with approximately 2-1/2 feet of 2 inch, inside diameter riser above ground surface and protective steel casing with minimum diameter of 4 inches. The protective casing will be at least 5 feet in length and secured into the borehole using concrete sand or gravel mix. The surface seal will be completed with a 3 foot diameter formed concrete pad and will be constructed to drain surface water away from the well. The protective casing will have a locking cap and be marked with the monitoring well identification. Generalized well construction diagrams for overburden (shallow) and bedrock (deep) wells are shown in Figures 5-2 and 5-3, respectively.

5.2.6.6 - Monitoring Well Development

Monitoring wells will be developed by pumping and surging using bailers, 12 volt electric submersible pumps or similar techniques. Well development will continue until the turbidity of the groundwater achieves a reading of 50 NTUs (nephelometric turbidity units) or less, or until NYSDEC approves cessation of development. Well development will be supplemented by measurements of field parameters, including temperature, pH and specific conductance. Development will continue until the field parameters stabilize for a minimum of three consecutive readings of 10 percent variability or less, or as approved by the NYSDEC. Well development water will be recharged on-site. All equipment used for the development of monitoring wells will be dedicated to individual wells or decontaminated prior to use and between wells.

5.2.6.7 - Groundwater Level Measurement

Groundwater level measurements will be obtained from each of the wells installed as part of the remedial investigation, as well as existing wells. Groundwater level measurements of all wells will be made using a Solinst 150' electronic water level indicator or similar instrument within an eight hour period of uniform weather conditions. Additionally, water levels will be obtained from surface water bodies that are suspected of influencing groundwater flow on or near the site by installing a fixed measuring point such as a staff gauge or permanent mark, on a fixed surface and measuring the depth to the surface of the water body. The measuring points will be surveyed for location and elevation.

All water level measurements will be made using a fixed reference point at each measurement location. Down hole instruments will be decontaminated between each measurement location (see Section 6.8). The static water level will be measured to the nearest 0.01 foot. Groundwater level data will be used to construct groundwater potentiometric surface maps and to determine local horizontal flow direction, as well as vertical gradients.

5.2.7 In-Situ Hydraulic Conductivity Testing

In-situ hydraulic conductivity testing provides useful information regarding the groundwater flow characteristics in the geologic units of concern. Hydraulic conductivity testing will be performed on monitoring wells installed as part of the remedial investigation to define groundwater flow rate and the potential for migration of groundwater contaminants.

In-situ hydraulic conductivity testing (slug tests) will be conducted on all monitoring wells as part of the remedial investigation. Slug test data will be collected using falling and rising heads at each well. Hydraulic conductivity calculations will be made using the Bouwer and Rice or other similar method for analyzing slug test data.

Slug testing involves measuring the rate at which water in a monitoring well returns to its initial level after an instantaneous injection or withdrawal of a known volume of water. Water displacement will be achieved using a solid aluminum rod measuring 6 feet in length and 1 inch in diameter. Changes in water level over time will be recorded using a Hermit 1000 C electronic data logger and a 10 psi pressure transducer. All down hole equipment will be decontaminated between wells. The data will be recorded using an electronic data logger and pressure transducer.

5.2.8 Groundwater Sampling

Two rounds of groundwater sampling will be conducted during the field investigation. The first round will occur following the installation of monitoring wells and is anticipated to occur in late spring or early summer. The second round of sampling will occur in the fall during seasonally dry periods. During round one, all groundwater samples will be analyzed for TCL + 30 and filtered major ions including Ca, K, Na, Fe, Mg, Cl, SO4 and HCO3. The number of samples analyzed in round two may decrease based upon round one results. Chemical analyses for round two sampling will include only VOCs , metals and filtered major ions.

Disposable polyethylene bailers with disposable polypropylene rope will be used for purging and sampling of shallow wells. Deep wells or wells that require large volumes (i.e. greater than 30 gallons) of water to be removed may be purged and sampled using decontaminated, downhole pumps and decontaminated or disposable tubing. The wells will be purged until a minimum of three to five bore volumes have been removed or until the well is dry, whichever occurs first. The number of bore volumes purged will be a function of the pH, temperature and conductivity, and will continue until stabilization of these parameters is achieved. Purge water will be recharged on-site.

Once the well has been sufficiently purged, sampling will begin. If groundwater recovery is very slow, it may be necessary to wait several hours, or overnight, for sufficient volume to

become available for the necessary sample analyses. Specific monitoring well sampling procedures are listed in Section 6.7.7.

5.2.9 Test Pits

Three test pits will be excavated in the northwest area of the site to characterize the suitability of soil in this area as borrow material for use as cover material. Six soil samples (two from each test pit) will be collected for laboratory analysis including Atterberg limits, recompacted hydraulic conductivity and grain size distribution including sieve and hydrometer analysis. Grain size analyses will be performed in accordance with ASTM D422-63.

Samples will be obtained from the backhoe bucket immediately after retrieval. Personnel will not enter the pit to collect samples.

The protocol for test pit excavation, sampling and backfill will be the following:

- Sod and top soil from the surface of the test pit, approximately 2 to 3 feet in depth, will be removed and temporarily stored on one side of the test pit..
- Deeper excavated soil will be placed on the side of the pit in a separate location from the sod and topsoil.
- If the water table or buried waste are encountered during test pit construction, the excavation will be terminated.
- A log of excavation and sample collection will be maintained by a qualified geologist.
- The excavation will be filled in the reverse order of soil removal so as to maximize the preservation of the natural hydrogeologic properties of the subsurface materials.
- Final cover will use the soil initially removed and placed separately. If this is not sufficient, clean soil from the surrounding area will be placed on top of the pit.

In general, only the backhoe bucket, which will come into contact with contaminated soil, will require decontamination.

5.2.10 Ambient Air Monitoring

Air monitoring for fugitive dusts and organic vapors will be conducted during all field activities. Fugitive dusts will be monitored using an MIE miniram portable dust indicator and organic vapors will be screened using a PID or FID. Explosive gases will be monitored using a combustible gas indicator.

5.2.11 Surveying and Mapping

All sampling and monitoring well locations will be surveyed by a New York State licensed surveyor for horizontal and vertical control. Vertical and horizontal control of the monitoring well casing will allow for calculation of groundwater elevations for the development of groundwater contour maps. The ground surface, protective casing and measuring point in the inner casing will be surveyed.

Vertical and horizontal control of the soil borings and monitoring wells allow for the preparation of geologic and hydrogeologic cross sections. Additional on- and off-site sampling points, such as surface soil and leachate sampling locations, will be surveyed, if necessary.

6.0 QUALITY ASSURANCE/QUALITY CONTROL PLAN

6.1 Project Identification

Project Name:	Cuba Municipal Waste Disposal Site Remedial Investigation and Feasibility Study
Project Requested by:	New York State Department of Environmental Conservation (NYSDEC)
Project Manager:	Gary Kline (NYSDEC) Gerald Gould (D&B Consulting Engineers)
Quality Assurance Officer:	Robbin Petrella (D&B Consulting Engineers)
Field Operations Manager:	Dean Stahl (D&B Consulting Engineers)

6.2 Objective and Scope

The objective of the Cuba Municipal Waste Disposal Site Remedial Investigation/ Feasibility Study (RI/FS) is to evaluate off-site impacts due to contaminated groundwater and surface leachate resulting from hazardous waste disposal in the landfill, identify source(s) of groundwater and leachate contamination, if possible, and perform predesign investigation in order to obtain information for closure of the landfill.

The purpose of this Quality Assurance/Quality Control (QA/QC) Plan is to develop and describe the detailed sample collection and analytical procedures that will ensure high quality, valid data for use in the RI/FS.

6.3 Data Usage

The data generated from the field sampling program will be used to monitor for health and safety of workers at the site and the health and safety of persons off-site. As described above, it will also be utilized to evaluate off-site impacts due to groundwater and leachate contamination, prepare

a qualitative risk/exposure and environmental assessment and to select a cap design for closure of the landfill.

6.4 Sampling Program Design and Rationale

The following presents a general discussion of the sampling to be conducted during the remedial investigation.

- Surface Soil: Ten biased samples will be collected on-site in areas of stressed vegetation.

- Subsurface Soil: Four subsurface soil samples will be collected from the test borings constructed on-site. One sample will be collected from each of the borings.

- Sediment: Four stream sediment samples will be collected from four locations upgradient and downgradient from the landfill.

- Leachate: Twenty leachate samples will be collected along the southern edge of the landfill and other on-site locations, if present during sampling. If surface seeps are not present then samples will be collected from test pits excavated near locations of previously observed seeps.

- Groundwater: Two rounds of groundwater samples will be collected. Each round will consist of one sample from each of 10 newly installed wells and 3 existing wells adjacent to and on the landfill.

For a detailed discussion of the sampling program, and selection of sample matrices and locations, see the Field Sampling Plan (Section 5.0).

6.5 Analytical Parameters

Sample analysis for the surface soil, subsurface soil, sediment, leachate and groundwater samples collected will consist of all or part of the Target Compound List (TCL) +30 substances and Target Analyte List (TAL) parameters identified in the 1995 NYSDEC Analytical Services Protocol (ASP). The first round of groundwater and leachate samples will also be analyzed for filtered

(dissolved) metals (Ca, Na, K, Mg, Fe), dissolved chloride, dissolved sulfate and bicarbonate (HCO_3).

Table 6-1 presents a summary of the parameters/sample fractions to be analyzed together with the sample location, type of sample, sample matrix, number of samples, frequency of sample collection, type of sample container, method of sample preservation, holding time and analytical method.

6.6 Data Quality Requirements and Assessment

Data quality requirements and assessments are provided in the 1995 NYSDEC ASP, which includes the detection limit for each parameter and sample matrix. Note that quantification limits, estimated accuracy, accuracy protocol, estimate precision and precision protocol are determined by the laboratory and will be in conformance with the requirements of the 1995 NYSDEC ASP, where applicable. Table 6-2 presents a summary of the data quality requirements.

In addition to meeting the requirements provided in the 1995 NYSDEC ASP, the data must also be useful in evaluating the nature and extent of contamination. Data obtained during the remedial investigation will be compared to specific Standards, Criteria and Guidelines (SCGs). The SCGS to be utilized include:

Matrix	SCG
Surface and Subsurface Soil	NYSDEC Technical and Administrative Guideline Memorandum (TAGM) HWR-94-4046 for the Determination of Soil Cleanup Objectives and Cleanup Levels, dated January 1994.
Sediment	NYSDEC Division of Fish and Wildlife Technical Guidance for Screening Contaminated Sediment dated November 1993.
Groundwater	Division of Water Technical and Operational Guidance Series (TOGs) (1.1.1) - Ambient Water Quality Standards and Guidance Values, dated October 1993.

Table 6-1

CUBA MUNICIPAL WASTE DISPOSAL SITE REMEDIAL INVESTIGATION AND FEASIBILITY STUDY
SUMMARY OF MONITORING PARAMETERS

Sample Location	Sample Type	Sample Matrix	Sample Fraction	Number of Samples	Frequency	Container Type/Size/No.	Sample Preservation	Maximum Holding Time*	Analytical Method
Surface Soil (on-site in areas of stressed vegetation)	Grab	Surficial Soil	Volatile Organics	10	1	Glass, amber/ 4 oz/2 ICHEM 200 series or equivalent	Cool to 4°C	10 days for analysis	10/95 NYSDEC ASP Method 95-1
	Grab	Surficial Soil	Base Neutral and Acid Extractable Organics	10	1	Glass, amber/ 150 mL/1 ICHEM 200 series or equivalent	Cool to 4°C	10 days for extraction, 40 days after extraction for analysis	10/95 NYSDEC ASP Method 95-2
	Grab	Surficial Soil	Pesticides/PCBs	10	1	Glass, amber/ 150 mL/1 ICHEM 200 series or equivalent	Cool to 4°C	10 days for extraction, 40 days after extraction for analysis	10/95 NYSDEC ASP Method 95-3
	Grab	Surficial Soil	Metals	10	1	Glass, amber/ 150 mL/1 ICHEM 200 series or equivalent	Cool to 4°C	26 days for Hg analysis, 6 months for analysis of others	10/95 NYSDEC ASP CLP Inorganics
	Grab	Surficial Soil	Cyanide	10	1	Glass, amber/ 150 mL/1 ICHEM 200 series or equivalent	Cool to 4°C	12 days for analysis	10/95 NYSDEC ASP Method 335.2

*Holding times as listed for each method in Volume 1 of the 10/95 NYSDEC ASP and based upon VTSR (Verified Time of Sample Receipt).

Table 6-1 (continued)

CUBA MUNICIPAL WASTE DISPOSAL SITE REMEDIAL INVESTIGATION AND FEASIBILITY STUDY SUMMARY OF MONITORING PARAMETERS

Sample Location	Sample Type	Sample Matrix	Sample Fraction	Number of Samples	Frequency	Container Type/Size/No.	Sample Preservation	Maximum Holding Time*	Analytical Method
Soil Borings (on and off-site)	Grab	Borehole Soil	Volatile Organics	2	1	Glass, clear/ 4 oz./2 ICHEM 200 series or equivalent	Cool to 4°C	10 days for analysis	10/95 NYSDEC ASP Method 95-1
	Grab	Borehole Soil	Base Neutral and Acid Extractable Organics	2	1	Glass, amber/ 150 mL/1 ICHEM 200 series or equivalent	Cool to 4°C	10 days for extraction, 40 days after extraction for analysis	10/95 NYSDEC ASP Method 95-2
	Grab	Borehole Soil	Pesticides/PCBs	2	1	Glass, amber/ 150 mL/1 ICHEM 200 series or equivalent	Cool to 4°C	10 days for extraction, 40 days after extraction for analysis	10/95 NYSDEC ASP Method 95-3
	Grab	Borehole Soil	Metals	2	1	Glass, amber/ 150 mL/1 ICHEM 200 series or equivalent	Cool to 4°C	26 days for Hg analysis, 6 months for analysis of others	10/95 NYSDEC ASP CLP Inorganics
	Grab	Borehole Soil	Cyanide	2	1	Glass, amber/ 150 mL/1 ICHEM 200 series or equivalent	Cool to 4°C	12 days for analysis	10/95 NYSDEC ASP Method 335.2

*Holding times as listed for each method in Volume 1 of the 10/95 NYSDEC ASP and based upon VTSR (Verified Time of Sample Receipt)

Table 6-1 (continued)

CUBA MUNICIPAL WASTE DISPOSAL SITE REMEDIAL INVESTIGATION AND FEASIBILITY STUDY SUMMARY OF MONITORING PARAMETERS

Sample Location	Sample Type	Sample Matrix	Sample Fraction	Number of Samples	Frequency	Container Type/Size/No.	Sample Preservation	Maximum Holding Time*	Analytical Method
Sediment (North branch of Van Campen Creek)	Grab	Sediment	Volatile Organics	4	1	Glass, clear/ 4 oz./2 ICHEM 200 series or equivalent	Cool to 4°C	10 days for analysis	10/95 NYSDEC ASP Method 95-1
	Grab	Sediment	Base Neutral and Acid Extractable Organics	4	1	Glass, amber/ 150 mL/1 ICHEM 200 series or equivalent	Cool to 4°C	10 days for extraction, 40 days after extraction for analysis	10/95 NYSDEC ASP Method 95-2
	Grab	Sediment	Pesticides/PCBs	4	1	Glass, amber/ 150 mL/1 ICHEM 200 series or equivalent	Cool to 4°C	10 days for extraction, 40 days after extraction for analysis	10/95 NYSDEC ASP Method 95-3
	Grab	Sediment	Metals	4	1	Glass, amber/ 150 mL/1 ICHEM 200 series or equivalent	Cool to 4°C	26 days for Hg analysis, 6 months for analysis of others	10/95 NYSDEC ASP CLP Inorganics
	Grab	Sediment	Cyanide	4	1	Glass, amber/ 150 mL/1 ICHEM 200 series or equivalent	Cool to 4°C	12 days for analysis	10/95 NYSDEC ASP Method 335.2

*Holding times as listed for each method in Volume 1 of the 10/95 NYSDEC ASP and based upon VTSR (Verified Time of Sample Receipt)

Table 6-1 (continued)

CUBA MUNICIPAL WASTE DISPOSAL SITE REMEDIAL INVESTIGATION AND FEASIBILITY STUDY
SUMMARY OF MONITORING PARAMETERS

Sample Location	Sample Type	Sample Matrix	Sample Fraction	Number of Samples	Frequency	Container Type/Size/No.	Sample Preservation	Maximum Holding Time*	Analytical Method
Leachate Seeps (Southern edge of landfill or other on-site locations)	Grab	Leachate	Volatile Organics	20	1	Glass, clear/ 40 mL/3 ICHEM 300 series or equivalent	Cool to 4°C**	7 days for analysis	10/95 NYSDEC ASP Method 95-1
	Grab	Leachate	Base Neutral and Acid Extractable Organics	20	1	Glass, amber/ 1L/2 ICHEM 300 series or equivalent	Cool to 4°C	5 days for extraction, 40 days after extraction for analysis	10/95 NYSDEC ASP Method 95-2
	Grab	Leachate	Pesticides/PCBs	20	1	Glass, amber/ 1L/2 ICHEM 300 series or equivalent	Cool to 4°C	5 days for extraction, 40 days after extraction for analysis	10/95 NYSDEC ASP Method 95-3
	Grab	Leachate	Metals	20	1	Plastic/1L/1 ICHEM 300 series or equivalent	HNO_3 to pH <2 Cool to 4°C	26 days for Hg analysis, 6 months for analysis of others	10/95 NYSDEC ASP CLP Inorganics
	Grab	Leachate	Cyanide	20	1	Plastic/1L/1 ICHEM 300 series or equivalent	NaOH to pH >12 Cool to 4°C	12 days for analysis	10/95 NYSDEC ASP Method 335.2
	Grab	Leachate	Dissolved Metals*** (Ca,Na,K,Mg,Fe)	20	1	Plastic/1L/1 ICHEM 300 series or equivalent	HNO_3 to pH < 2 Cool to 4°C	6 months for analysis	10/95 NYSDEC ASP CLP Inorganics

*Holding times as listed for each method in Volume 1 of the 10/95 NYSDEC ASP and based upon VTSR (Verified Time of Sample Receipt)
**Samples are not to be preserved to a pH <2.
***Samples will be filtered in the field.

Table 6-1 (continued)

CUBA MUNICIPAL WASTE DISPOSAL SITE REMEDIAL INVESTIGATION AND FEASIBILITY STUDY SUMMARY OF MONITORING PARAMETERS

Sample Location	Sample Type	Sample Matrix	Sample Fraction	Number of Samples	Frequency	Container Type/Size/No.	Sample Preservation	Maximum Holding Time*	Analytical Method
Leachate Seeps (con't)	Grab	Leachate	Dissolved Chloride***	20	1	Plastic/1 pt/1 ICHEM 300 series or equivalent	Cool to 4°C	26 days for analysis	10/95 NYSDEC ASP Method 325.3
	Grab	Leachate	Dissolved Sulfate***	20	1	Plastic/1pt/1 ICHEM 300 series or equivalent	Cool to 4°C	26 days for analysis	10/95 NYSDEC ASP Method 375.4
	Grab	Leachate	Dissolved Bicarbonate***	20	1	Plastic/1 pt/1 ICHEM 300 series or equivalent	Cool to 4°C	12 days for analysis	10/95 NYSDEC ASP Method 310.1

*Holding times as listed for each method in Volume 1 of the 10/95 NYSDEC ASP and based upon VTSR (Verified Time of Sample Receipt)
**Samples are not to be preserved to a pH <2.
***Samples will be filtered in the field.

Table 6-1 (continued)

CUBA MUNICIPAL WASTE DISPOSAL SITE REMEDIAL INVESTIGATION AND FEASIBILITY STUDY
SUMMARY OF MONITORING PARAMETERS

Sample Location	Sample Type	Sample Matrix	Sample Fraction	Number of Samples	Frequency	Container Type/Size/No.	Sample Preservation	Maximum Holding Time*	Analytical Method
Monitoring Wells (Fourteen new wells, three existing wells)	Grab	Groundwater	Volatile Organics	13	2	Glass, clear/ 40 mL/3 ICHEM 300 series or equivalent	Cool to 4°C**	7 days for analysis	10/95 NYSDEC ASP Method 95-1
	Grab	Groundwater	Base Neutral and Acid Extractable Organics	13	1	Glass, amber/ 1L/2 ICHEM 300 series or equivalent	Cool to 4°C	5 days for extraction, 40 days after extraction for analysis	10/95 NYSDEC ASP Method 95-2
	Grab	Groundwater	Pesticides/PCBs	13	1	Glass, amber/ 1L/2 ICHEM 300 series or equivalent	Cool to 4°C	5 days for extraction, 40 days after extraction for analysis	10/95 NYSDEC ASP Method 95-3
	Grab	Groundwater	Metals	13	2	Plastic/1L/1 ICHEM 300 series or equivalent	HNO_3 to pH <2 Cool to 4°C	26 days for Hg analysis, 6 months for analysis of others	10/95 NYSDEC ASP CLP Inorganics
	Grab	Groundwater	Cyanide	13	2	Plastic/1L/1 ICHEM 300 series or equivalent	NaOH to pH >12 Cool to 4°C	12 days for analysis	10/95 NYSDEC ASP Method 335.2
	Grab	Groundwater	Dissolved Metals*** (Ca,Na,K,Mg,Fe)	13	1	Plastic/1L/1 ICHEM 300 series or equivalent	HNO_3 to pH < 2 Cool to 4°C	6 months for analysis	10/95 NYSDEC ASP CLP Inorganics

*Holding times as listed for each method in Volume 1 of the 10/95 NYSDEC ASP and based upon VTSR (Verified Time of Sample Receipt)
**Samples are not to be preserved to a pH <2.
***Samples will be filtered in the field.

Table 6-1 (continued)

CUBA MUNICIPAL WASTE DISPOSAL SITE REMEDIAL INVESTIGATION AND FEASIBILITY STUDY SUMMARY OF MONITORING PARAMETERS

Sample Location	Sample Type	Sample Matrix	Sample Fraction	Number of Samples	Frequency	Container Type/Size/No.	Sample Preservation	Maximum Holding Time*	Analytical Method
Monitoring Wells Wells (Fourteen new wells, three existing wells) cont'd.	Grab	Groundwater	Dissolved Chloride***	13	1	Plastic/1 pt/1 ICHEM 300 series or equivalent	Cool to 4°C	26 days for analysis	10/95 NYSDEC ASP Method 325.3
	Grab	Groundwater	Dissolved Sulfate***	13	1	Plastic/1pt/1 ICHEM 300 series or equivalent	Cool to 4°C	26 days for analysis	10/95 NYSDEC ASP Method 375.4
	Grab	Groundwater	Dissolved Bicarbonate***	13	1	Plastic/1 pt/1 ICHEM 300 series or equivalent	Cool to 4°C	12 days for analysis	10/95 NYSDEC ASP Method 310.1

*Holding times as listed for each method in Volume 1 of the 10/95 NYSDEC ASP and based upon VTSR (Verified Time of Sample Receipt)
**Samples are not to be preserved to a pH <2.
***Samples will be filtered in the field.

Table 6-1 (continued)

CUBA MUNICIPAL WASTE DISPOSAL SITE REMEDIAL INVESTIGATION AND FEASIBILITY STUDY
SUMMARY OF MONITORING PARAMETERS

Sample Location	Sample Type	Sample Matrix	Sample Fraction	Number of Samples	Frequency	Container Type/Size/No.	Sample Preservation	Maximum Holding Time*	Analytical Method
Site/Study Area	Trip Blank	Water	Volatile Organics	5**	2	Glass, clear/ 40 mL/1 ICHEM 300 series or equivalent	Cool to 4°C***	7days for analysis	10/95 NYSDEC ASP Method 95-1

*Holding times as listed for each method in Volume 1 of the 10/95 NYSDEC ASP and based upon VTSR (Verified Time of Sample Receipt).
**One trip blank will accompany each shipment of aqueous samples requiring volatile organic analysis.
***Samples are not to be preserved to pH <2.

Table 6-1 (continued)

CUBA MUNICIPAL WASTE DISPOSAL SITE REMEDIAL INVESTIGATION AND FEASIBILITY STUDY
SUMMARY OF MONITORING PARAMETERS

Sample Location	Sample Type	Sample Matrix	Sample Fraction	Number of Samples	Frequency	Container Type/Size/No.	Sample Preservation	Maximum Holding Time*	Analytical Method
Site/Study Area	Matrix Spike and Matrix Spike Duplicate	Groundwater	Volatile Organics	1**	2	Glass, clear/ 40 mL/3 ICHEM 300 series or equivalent	Cool to 4°C***	7 days for analysis	10/95 NYSDEC ASP Method 95-1
	Matrix Spike and Matrix Spike Duplicate	Groundwater	Base Neutral and Acid Extractable Organics	1**	1	Glass, amber/ 1L/2 ICHEM 300 series or equivalent	Cool to 4°C	5 days for extraction, 40 days after extraction for analysis	10/95 NYSDEC ASP Method 95-2
	Matrix Spike and Matrix Spike Duplicate	Groundwater	Pesticides/PCBs	1**	1	Glass, amber/ 1L/2 ICHEM 300 series or equivalent	Cool to 4°C	5 days for extraction, 40 days after extraction for analysis	10/95 NYSDEC ASP Method 95-3
	Matrix Spike and Matrix Spike Duplicate	Groundwater	Metals	1**	2	Plastic/1L/1 ICHEM 300 series or equivalent	HNO_3 to pH <2 Cool to 4°C	26 days for Hg analysis, 6 months for analysis of others	10/95 NYSDEC ASP CLP Inorganics
	Matrix Spike and Matrix Spike Duplicate	Groundwater	Cyanide	1**	2	Plastic/1L/1 ICHEM 300 series or equivalent	NaOH to pH >12 Cool to 4°C	12 days for analysis	10/95 NYSDEC ASP Method 335.2
	Matrix Spike and Matrix	Groundwater	Dissolved Metals**** (Ca,Na,K,Mg,Fe)	1**	1	Plastic/1L/1 ICHEM 300 Series or equivalent	HNO_3 to pH <2 Cool to 4°C	6 months for analysis	10/95 NYSDEC ASP CLP Inorganics

*Holding times as listed for each method in Volume 1 of the 10/95 NYSDEC ASP and based upon VTSR (Verified Time of Sample Receipt).
**One set of MS/MSD for each round of sampling based upon 13 groundwater samples collected per round. The first round will consist of all parameters with the second round only analyzed for VOCs, metals and cyanide.
***Samples are not to be preserved to pH <2.
****Samples to be field filtered.

Table 6-1 (continued)

CUBA MUNICIPAL WASTE DISPOSAL SITE REMEDIAL INVESTIGATION AND FEASIBILITY STUDY
SUMMARY OF MONITORING PARAMETERS

Sample Location	Sample Type	Sample Matrix	Sample Fraction	Number of Samples	Frequency	Container Type/Size/No.	Sample Preservation	Maximum Holding Time*	Analytical Method
Site/Study Area	Matrix Spike and Matrix Spike Duplicate	Groundwater	Dissolved Chloride****	1**	1	Plastic/1 pt/1 ICHEM 300 series or equivalent	Cool to 4°C	26 days for analysis	10/95 NYSDEC ASP Method 325.3
		Groundwater	Dissolved Sulfate****	1**	1	Plastic/1 pt/1 ICHEM 300 series or equivalent	Cool to 4°C	26 days for analysis	10/95 NYSDEC ASP Method 375.4
		Groundwater	Dissolved Bicarbonate****	1**	1	Plastic/1 pt/1 ICHEM 300 series or equivalent	Cool to 4°C	12 days for analysis	10/95 NYSDEC ASP Method 310.1

*Holding times as listed for each method in Volume 1 of the 10/95 NYSDEC ASP and based upon VTSR (Verified Time of Sample Receipt).
**One set of MS/MSD for each round of sampling based upon 13 groundwater samples collected per round. The first round will consist of all parameters with the second round only analyzed for VOCs, metals and cyanide.
*** Samples are not to be preserved to pH <2.
****Samples to be field filtered.

Table 6-1 (continued)

CUBA MUNICIPAL WASTE DISPOSAL SITE REMEDIAL INVESTIGATION AND FEASIBILITY STUDY
SUMMARY OF MONITORING PARAMETERS

Sample Location	Sample Type	Sample Matrix	Sample Fraction	Number of Samples	Frequency	Container Type/Size/No.	Sample Preservation	Maximum Holding Time*	Analytical Method
Site/Study Area	Matrix Spike and Matrix Spike Duplicate	Leachate	Volatile Organics	1**	1	Glass, clear/ 40 mL/3 ICHEM 300 series or equivalent	Cool to 4°C***	7 days for analysis	10/95 NYSDEC ASP Method 95-1
	Matrix Spike and Matrix Spike Duplicate	Leachate	Base Neutral and Acid Extractable Organics	1**	1	Glass, amber/ 1L/2 ICHEM 300 series or equivalent	Cool to 4°C	5 days for extraction, 40 days after extraction for analysis	10/95 NYSDEC ASP Method 95-2
	Matrix Spike and Matrix Spike Duplicate	Leachate	Pesticides/PCBs	1**	1	Glass, amber/ 1L/2 ICHEM 300 series or equivalent	Cool to 4°C	5 days for extraction, 40 days after extraction for analysis	10/95 NYSDEC ASP Method 95-3
	Matrix Spike and Matrix Spike Duplicate	Leachate	Metals	1**	1	Plastic/1L/1 ICHEM 300 series or equivalent	HNO_3 to pH <2 Cool to 4°C	26 days for Hg analysis, 6 months for analysis of others	10/95 NYSDEC ASP CLP Inorganics
	Matrix Spike and Matrix Spike Duplicate	Leachate	Cyanide	1**	1	Plastic/1L/1 ICHEM 300 series or equivalent	NaOH to pH >12 Cool to 4°C	12 days for analysis	10/95 NYSDEC ASP Method 335.2
	Matrix Spike and Matrix	Leachate	Dissolved Metals**** (Ca,Na,K,Mg,Fe)	1**	1	Plastic/1L/1 ICHEM 300 series or equivalent	HNO_3 to pH <2 Cool to 4°C	6 months for analysis	10/95 NYSDEC ASP CLP Inorganics

*Holding times as listed for each method in Volume 1 of the 10/95 NYSDEC ASP and based upon VTSR (Verified Time of Sample Receipt).
**One set of MS/MSD based upon the collection of twenty leachate samples.
***Samples are not to be preserved to pH <2.
****Samples to be field filtered.

Table 6-1 (continued)

CUBA MUNICIPAL WASTE DISPOSAL SITE REMEDIAL INVESTIGATION AND FEASIBILITY STUDY SUMMARY OF MONITORING PARAMETERS

Sample Location	Sample Type	Sample Matrix	Sample Fraction	Number of Samples	Frequency	Container Type/Size/No.	Sample Preservation	Maximum Holding Time*	Analytical Method
Site/Study Area	Matrix Spike/ Matrix Spike Duplicate	Leachate	Dissolved Chloride****	1**	1	Plastic/1 pt/1 ICHEM 300 series or equivalent	Cool to 4°C	26 days for analysis	10/95 NYSDEC ASP Method 325.3
		Leachate	Dissolved Sulfate****	1**	1	Plastic/1 pt/1 ICHEM 300 series or equivalent	Cool to 4°C	26 days for analysis	10/95 NYSDEC ASP Method 375.4
		Leachate	Dissolved Bicarbonate****	1**	1	Plastic/1 pt/1 ICHEM 300 series or equivalent	Cool to 4°C	12 days for analysis	10/95 NYSDEC ASP Method 310.1

*Holding times as listed for each method in Volume 1 of the 10/95 NYSDEC ASP and based upon VTSR (Verified Time of Sample Receipt).
**One set of MS/MSD based upon the collection of twenty leachate samples.
*** Samples are not to be preserved to pH <2.
****Samples to be field filtered.

Table 6-1 (continued)

CUBA MUNICIPAL WASTE DISPOSAL SITE REMEDIAL INVESTIGATION AND FEASIBILITY STUDY
SUMMARY OF MONITORING PARAMETERS

Sample Location	Sample Type	Sample Matrix	Sample Fraction	Number of Samples	Frequency	Container Type/Size/No.	Sample Preservation	Maximum Holding Time*	Analytical Method
Site/Study Area	Matrix Spike and Matrix Spike Duplicate	Borehole Soil/ Surface Soil	Volatile Organics	1**	1	Glass, clear/ 4oz./2 ICHEM 200 series or equivalent	Cool to 4°C	10 days for analysis	10/95 NYSDEC ASP Method 95-1
	Matrix Spike and Matrix Spike Duplicate	Borehole Soil/ Surface Soil	Base Neutral and Acid Extractable Organics	1**	1	Glass, amber/ 150 mL/1 ICHEM 200 series or equivalent	Cool to 4°C	10 days for extraction, 40 days after extraction for analysis	10/95 NYSDEC ASP Method 95-2
	Matrix Spike and Matrix Spike Duplicate	Borehole Soil/ Surface Soil	Pesticides/PCBs	1**	1	Glass, amber/ 150 mL/1 ICHEM 200 series or equivalent	Cool to 4°C	10 days for extraction, 40 days after extraction for analysis	10/95 NYSDEC ASP Method 95-3
	Matrix Spike and Matrix Spike Duplicate	Borehole Soil/ Surface Soil	Metals	1**	1	Glass, amber/ 150 mL/1 ICHEM 200 series or equivalent	Cool to 4°C	26 days for Hg analysis, 6 months for analysis of others	10/95 NYSDEC ASP CLP Inorganics
	Matrix Spike and Matrix Spike Duplicate	Borehole Soil/ Surface Soil	Cyanide	1**	1	Glass, amber/ 150 mL/1 ICHEM 200 series or equivalent	Cool to 4°C	12 days for analysis	10/95 NYSDEC ASP Method 335.2

*Holding times as listed for each method in Volume 1 of the 10/95 NYSDEC ASP and based upon VTSR (Verified Time of Sample Receipt).
**One set of MS/MSD based on a maximum of two soil boring samples and ten surface soil sample.

Table 6-2

CUBA MUNICIPAL WASTE DISPOSAL SITE REMEDIAL INVESTIGATION AND FEASIBILITY STUDY DATA QUALITY REQUIREMENTS

Parameter	Sample Matrix	CRDL* (ug/l)	Estimated Accuracy	Accuracy Protocol	Estimated Precision	Precision Protocol
Volatile Organics	Liquid Solid	5-10 5-10	0.87 - 2.48 ug/l	Vol. IB, Chapter 4, Method 8240, Table 7	0.11 - 4.00 ug/l	Vol. IB, Chapter 4, Method 8240, Table 7
Base Neutrals	Liquid Solid	10-50 330-1600	0.29 - 1.23 ug/l	Vol. IB, Chapter 4, Method 8270, Table 7	0.13 - 1.05 ug/l	Vol. IB, Chapter 4, Method 8270, Table 7
Acid Extractables	Liquid Solid	10-50 330-1600	0.29 - 1.23 ug/l	Vol. IB, Chapter 4, Method 8270, Table 7	0.13 - 1.055 ug/l	Vol. IB, Chapter 4, Method 8270, Table 7
Pesticides/PCBs	Liquid Solid	0.5-1.0 8.0-160	0.69 - 10.79 ug/l	Vol. IB, Chapter 4, Method 8080, Table 4	0.16 - 3.50 ug/l	Vol. IB, Chapter 4, Method 8080, Table 4
Metals (except cyanide)	Liquid Solid	0.2-5000 0.2-5000	--	Vol. IA, Chapter 3, Method 6010**, Table 4	--	Vol. IA, Chapter 3, Method 6010**, Table 4
Cyanide	Liquid Solid	10 10	85% - 102% of recovery	Vol. IC, Chapter 5, Method 9010	±0.02 mg/l	Vol. IC, Chapter 5, Method 9010

*Contract Required Detection Limits

**and SW-846 Methods for:

	Method
Mercury	7470

Table 6-2 (continued)

CUBA MUNICIPAL WASTE DISPOSAL SITE REMEDIAL INVESTIGATION AND FEASIBILITY STUDY
DATA QUALITY REQUIREMENTS
OBJECTIVES FOR PRECISION, ACCURACY, AND COMPLETENESS

Matrix/Parameter	Precision (%)	Accuracy (%)
Soils		
VOCs[a]	See Table 6-2a	See Table 6-2a
Extractables[a]	See Table 6-2b	See Table 6-2b
Pesticides/PCBs	See Table 6-2c	See Table 6-2c
Metals[b]	± 25	75-125
Groundwater		
VOCs[a]	See Table 6-2a	See Table 6-2a
Extractables[a]	See Table 6-2b	See Table 6-2b
Pesticides/PCBs	See Table 6-2c	See Table 6-2c
Metals[b]	± 25%	75-125

NOTES:

(a) Accuracy will be determined as percent recovery of surrogate spike compounds and matrix spike compounds. Surrogate and matrix spike compounds for VOCs, extractables, and pesticides/PCBs are listed in Tables 6-2a, 6-2b and 6-2c, respectively. Precision will be estimated as the relative standard deviation of the percent recoveries per matrix.

(b) Accuracy will be determined as percent recovery of matrix spikes when appropriate or the percent recovery of a QC sample if spiking is inappropriate. Precision will be determined as relative percent difference of matrix spike duplicate samples, or duplicate samples if spiking is inappropriate.

(c) Precision will be determined as the average percent difference for replicate samples. Accuracy will be determined as the percent recovery of matrix spike samples or laboratory control samples, as appropriate.

Source: NYSDEC ASP

Table 6-2b

CUBA MUNICIPAL WASTE DISPOSAL SITE REMEDIAL INVESTIGATION AND FEASIBILITY STUDY
DATA QUALITY REQUIREMENTS
OBJECTIVES FOR PRECISION AND ACCURACY
OF EXTRACTABLE COMPOUNDS
BASED UPON RECOVERY OF SURROGATE AND
MATRIX SPIKE COMPOUNDS*

Surrogate Compounds	Matrix	Precision	Accuracy %
d5-Nitrobenzene	Water	≤ 20	35-114
	Solid	≤ 25	23-120
2-Fluorobiphenyl	Water	≤ 20	43-116
	Solid	≤ 25	30-115
d14-Terphenyl	Water	≤ 20	33-141
	Solid	≤ 25	18-137
d5-Phenol	Water	≤ 20	10-110
	Solid	≤ 25	24-113
2-Fluorophenol	Water	≤ 20	21-110
	Solid	≤ 25	25-121
2,4,6-Tribromophenol	Water	≤ 20	10-123
	Solid	≤ 25	19-122
2-Chlorophenol-d4 (Advisory)	Water	≤ 20	33-110
	Solid	≤ 25	20-130
1,2-Dichlorobenzene-d4 (Advisory)	Water	≤ 20	16-110
	Solid	≤ 25	20-130

Table 6-2b (continued)

CUBA MUNICIPAL WASTE DISPOSAL SITE REMEDIAL INVESTIGATION AND FEASIBILITY STUDY
DATA QUALITY REQUIREMENTS
OBJECTIVES FOR PRECISION AND ACCURACY
OF EXTRACTABLE COMPOUNDS
BASED UPON RECOVERY OF SURROGATE AND
MATRIX SPIKE COMPOUNDS*

	Matrix	Precision	Accuracy %
Matrix Spike Compounds (continued)			
4-Chloro-3-methylphenol	Water	≤ 20	23-97
	Solid	≤ 25	26-103
4-Nitrophenol	Water	≤ 20	10-80
	Solid	≤ 25	11-114

* Accuracy will be determined as percent recovery of these compounds. Precision will be estimated as the relative standard deviation of the percent recoveries per matrix.

Source: NYSDEC ASP

Table 6-2c

CUBA MUNICIPAL WASTE DISPOSAL SITE REMEDIAL INVESTIGATION AND FEASIBILITY STUDY
ADVISORY RECOVERY LIMITS
SURROGATE AND MATRIX SPIKE COMPOUNDS
FOR PESTICIDES/PCBs*

	Advisory Recovery Limits (%)	
	Water	Soil/Sediment
Surrogate Compound		
Decachlorobiphenyl	60-150	60-150
Tetrachloro-m-xylene	60-150	60-150
Matrix Spike Compound		
Lindane	56-123	46-127
Heptachlor	40-131	35-130
Aldrin	40-120	34-132
Dieldrin	52-126	31-134
Endrin	56-121	42-139
4,4'-DDT	38-127	23-134

*Samples do not have to be reanalyzed if these recovery limits are not met.

Source: NYSDEC ASP

Table 6-3

SUMMARY OF CUBA MUNICIPAL WASTE DISPOSAL SITE RI/FS SAMPLING PROGRAM

Environmental Media	Sample Location	Sample Point	Number of Samples	Sample Depth	Equipment	Rationale	Sample Analysis
Soil	On-site in areas of stressed vegetation	Surface	10	0-2" below surface	Disposable sterile polystyrene scoop and/or wooden tongue depressor	To determine surface soil contamination	TCL +30 and TAL parameters (10/95 NYSDEC ASP)
Soil	On-site in the central area of the landfill	Soil boreholes	2	Depth dependent on field screening.	Auger, split spoon and wooden tongue depressor	To determine subsurface soil contamination	TCL +30 and TAL parameters (10/95 NYSDEC ASP).
Sediment	North branch of Van Campen Creek	Stream sediment	4	0-2" below stream floor	Disposable sterile polystyrene scoop	To determine sediment contamination	TCL+30 and TAL parameters(10/95 NYSDEC ASP)
Leachate	On-site	Leachate seeps and/or test pits	20	At surface of leachate	Laboratory supplied sample containers	To determine leachate contamination	TCL+30 and TAL parameters (10/95 NYSDEC ASP) and filtered Ca, Na, K, Mg, Fe, Cl, S04 and HCOs
Groundwater	On- and off-site monitoring wells	13 monitoring wells (2 rounds)	26	At surface of water in well	Disposable polyethylene bailer (after purge of three to five well volumes)	To determine groundwater contamination	First Round: TCL +30 and TAL parameters (10/95 NYSDEC ASP) and filtered Ca, Na, K, Mg, Fe, Cl, S04 and HCO3. Second Round: TCL VOC +10 and TAL parameters (10/95 NYSDEC ASP)

device (i.e., decontaminated scoop or sterile wooden tongue depressor) will be utilized to transfer the sample into the sample container. The sample should reflect and contain a good representation of the matrix it was taken from.

The sample will be transferred into the sample container as quickly as possible, with no mixing, to ensure that the volatile fraction is not lost.

The materials involved in groundwater sampling are critical to the collection of high quality monitoring information, particularly where the analyses of volatile, pH sensitive or reduced chemical constituents are of interest. Sterile disposable polyethylene bailers will be utilized for this project.

There will be several steps taken after the transfer of the soil or water sample into the sample container that are necessary to properly complete collection activities. Once the sample is transferred into the appropriate container, the container will be capped and, if necessary, the outside of the container will be wiped with a clean paper towel to remove excess sampling material. The container will not be submerged in water in an effort to clean it. Rather, if necessary, a clean paper towel moistened with distilled/deionized water will be used.

The sample container will then be properly labeled. Information such as sample number, location, collection time and sample description will be recorded in the field log book. Associated forms (e.g., Chain of Custody forms) will then be completed and will stay with the sample. The samples will be packaged in a manner that will allow the appropriate storage temperature (4°C) to be maintained during shipment to the laboratory. Samples will be delivered to the laboratory within 48 hours of collection.

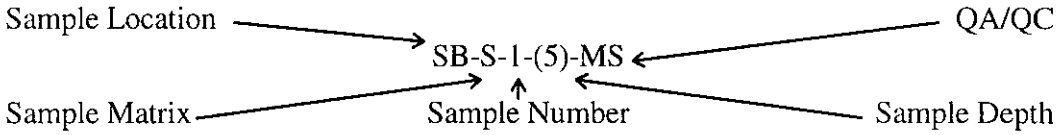
6.7.1 Sample Identification

All samples collected during the field investigation at the Cuba Municipal Waste Disposal Site will be labeled with a sample identification code. The code will identify the sample location,

sample matrix and series numbers for sample locations with more than one sample. Samples will be labeled according to the following system:

- Sample Location:
  - Surface Soil "SS"
  - Soil Boring "SB"
  - Sediment "SD"
  - Leachate "L"
  - Monitoring Well "MW"
- Sample Matrix:
  - Soil "S""
  - Water "W"
  - Leachate "L"
- Sample Number:
  - For circumstances where more than one sample of the same type and/or from the same location will be collected, a consecutive sample number will be assigned.
- Quality Assurance/ Quality Control (QA/QC):
  - Matrix Spike "MS"
  - Matrix spike duplicate "MSD"
  - Trip Blank "TB"

Based upon the above sample identification procedures, an example of a sample label may be:



6.7.2 Sample Handling, Packaging and Shipping

All analytical samples will be placed in the appropriate sample containers as specified in the 1995 NYSDEC Analytical Services Protocol (ASP). The holding time criteria identified in Volume I for the individual methods of the ASP will be followed, as specified in Table 6-1.

Prior to packaging any samples for shipment, the sample containers will be checked for proper identification and compared to the field log book for accuracy. The samples will then be

wrapped with a cushioning material and placed in a cooler (or laboratory shuttle) with a sufficient amount of bagged ice or "blue ice" packs in order to keep the samples at 4°C until arrival at the laboratory.

All necessary documentation required to accompany the sample during shipment will be placed in a sealed plastic bag and taped to the underside of the cooler lid. The cooler will then be sealed with fiber (duct) tape, and custody seals will be placed in such a manner that any opening of the cooler prior to arrival at the laboratory can be detected.

All samples will be shipped to ensure laboratory receipt within 48 hours of sample collection in accordance with NYSDEC requirements. The laboratory will be notified prior to the shipment of the samples.

6.7.3 Soil (Surface)

1. Be certain that the sample location is noted on Location Sketch (see Section 6.10).

2. Be certain that the sampling equipment (scoop) has been decontaminated, if necessary, utilizing the procedures outlined in Section 6.8.

3. Remove laboratory precleaned sample containers from sample cooler, label container with an indelible marker, fill out Sample Information Record and Chain of Custody Form (see Section 6.10).

4. At the desired location, clear surface debris (e.g., grass, rocks, twigs). Collect an adequate portion of soil from a depth of 0-2 inches using a decontaminated/sterile scoop and/or sterile wooden tongue depressor. Transfer the sample directly into the sample container.

5. Return the sample container to the cooler.

6. If reusable, decontaminate the sampling equipment according to the procedures described in Section 6.8.

6.7.4 Soil (Borehole)

For all samples, a drill rig will be employed to advance a borehole to the desired depth. All downhole devices will be thoroughly decontaminated. Once the desired depth is reached, a decontaminated sampling device (e.g., split spoon) will be advanced by the drill rig. Upon retrieval, the split spoon will be opened, its contents logged, and then immediately transferred into a sample container using a decontaminated spoon or sterile wooden tongue depressor.

1. Be certain that the sample location is noted on Location Sketch (see Section 6.10).

2. Be certain that the sampling equipment (split spoon) has been decontaminated utilizing the procedures outlined in Section 6.8.

3. Remove laboratory precleaned sample containers from sample cooler, label bottle with an indelible marker, fill out Sample Information Record and Chain of Custody Form (see Section 6.10).

4. Auger into the soil to the desired depth and drive the split spoon sampler.

5. Retrieve the split spoon and immediately after opening the split spoon, obtain an organic vapor measurement and fill out Boring Log Form (see Section 6.22).

6. Remove a sample aliquot from the split spoon using the sterile scoop and/or tongue depressor, place into the open sample container and replace the container cover.

7. Return the sample container to the cooler.

8. If reusable, decontaminate the sampling equipment according to the procedures described in Section 6.8.

6.7.5 Surface Water Sediment (River/Stream)

1. Be certain that the sample location is noted on Location Sketch (see Section 6.10) and obtain a photograph of the location.

2. Unless using disposable equipment, be certain that the sampling equipment (polyethylene scoop) has been decontaminated utilizing the procedures outlined in Section 6.8.

3. Remove laboratory precleaned sample containers from sample cooler, label container with an indelible marker, fill out Sample Information Record and Chain of Custody Form (see Section 6.10).

4. Wear disposable gloves and boots if it is necessary to enter the water.

5. Enter the water downstream of the sample location with minimum disturbance of the sediment. Sample sediment at the most downstream location and move sequentially upstream.

6. Insert scoop slowly 0-6 inches into the sediment and remove sample.

7. With a sterile polyethylene scoop or tongue depressor, if necessary, transfer the sample into the open sample container taking care not to spill sample on the outside of the container or overfill container and replace cover on the sample container.

8. Return sample container to cooler.

9. If necessary, decontaminate the sampling equipment according to the procedures outlined in Section 6.8.

10. All disposable personal protective equipment and disposable sampling equipment will be assumed to be nonhazardous and disposed of off-site.

6.7.6 Leachate

1. Be certain that sample location is noted on Location Sketch (see Section 6.10).

2. Remove the laboratory precleaned sample container from the sample cooler, label containers with an indelible marker, fill out Sample Information Record and Chain of Custody Form (see Section 6.10).

3. Collect sample using disposable scoop or laboratory supplied containers.

4. Gently pour the sample into the sample container, if not sampled directly, taking care not to spill the sample on outside of container or overfill container, and replace cover on the sample container. For volatile organic samples, make sure that there are no air bubbles in the sample vial after it has been capped. This is done by filling the vial such that there is a meniscus on top. Carefully slide the septum, teflon side down, onto the top of the vial and cap the vial. Check for bubbles by turning the vial upside down and tapping it lightly. If the bubbles appear, reopen the vial, remove septum and add more sample (or resample). Replace septum, recap and check for bubbles. Continue until vial is bubble-free.

5. Return sample container to sample cooler.

6. All disposable personal protective equipment and disposable sampling equipment will be assumed to be nonhazardous and disposed of off-site.

6.7.7 Groundwater (Monitoring Well)

1. Be certain that the sample location is noted on Location Sketch (see Section 6.10).

2. Measure the depth of water using a decontaminated water level indicator and compute the volume of standing water in the well.

3. Remove three to five times the volume of standing water from the well until field measurements (pH, conductivity, temperature, and turbidity) stabilize, or until the well is dry, whichever occurs first, with a submersible pump. (Turbidity must be less than 50 NTUs prior to collection of a sample for metals analysis. Greater than 50 NTUs may require filtering of the sample or waiting a maximum of 24 hours for the turbidity to decrease.)

4. Remove the laboratory precleaned sample containers from sample cooler, label container with an indelible marker, fill out Sample Information Record and Chain of Custody Form (see Section 6.10).

5. Obtain a sample by using the disposable polyethylene bailer. The order to which the samples are collected is: VOA, SVOC, Pesticide/PCB, metals, cyanide and dissolved parameters.

6. If the turbidity exceeds 50 NTUs, then the well should be sampled for all constituents except metals. The well can rest for a maximum of 24 hours until a turbidity reading is less than 50 NTUs, once less than 50 NTUs, the metals sample can be collected.

7. If it is determined in consultation with the NYSDEC that filtering of the sample is necessary (i.e. through direction from NYSDEC or after waiting a maximum of 24 hours), first collect an unfiltered sample in a sample container, replace the cover on the sample container and label the sample. Next, pour an appropriate amount of the remaining sample from the bailer into a second sample container through a filter medium (0.45 microns) to remove particulates from suspension. Replace the cover on the sample container and label the sample. The turbidity of both the filtered and unfiltered sample will be recorded at the time of collection.

8. Gently pour the sample into the sample container taking care not to spill on outside of bottle or overfill container and replace cover on the sample container. Samples for volatile organic analyses, will have no air space in the sample vial prior to sealing. This is done by filling the vial such that there is a meniscus on top. Carefully, slide the septum, teflon side down, onto the top of the vial and cap the vial. Check for bubbles

by turning the vial upside down and tapping it lightly. If bubbles appear, reopen the vial, remove the septum and add more sample (or resample). Replace the septum, recap and check for bubbles. Continue until vial is bubble-free.

9. To collect sample for the dissolved parameters pour an appropriate amount of the sample through a filter medium (0.45 micron) into specified sample containers.

10. Return sample container to sample cooler.

11. Dispose of bailer.

12. Place disposable personal protective equipment into a 55-gallon drum in the fenced area.

6.8 Decontamination Procedures

All field sampling equipment should be sterile and dedicated to a particular sampling point. In instances where this is not possible, a field cleaning (decontamination) procedure will be used in order to reduce the chances of cross-contamination between sample locations. A decontamination station will be established for all field activities. This will be an area located away from the source of contamination so as not to adversely impact the decontamination procedure, but close enough to the sampling area to keep equipment handling to a minimum.

6.8.1 Field Decontamination Procedures

All nondisposable equipment will be decontaminated at appropriate intervals (e.g., prior to initial use, prior to moving to a new sampling location and prior to leaving the site). Different decontamination procedures are used for various types of equipment that perform the field activities as discussed below. When using field decontamination, it is advisable to start sampling in the area of the site with the lowest contaminant probability and proceed through to the areas of highest suspected contamination.

6.8.2 Decontamination Procedure for Drilling/Test Trench/Pit Equipment

All equipment such as drill rigs, backhoes and other mobile equipment should receive an initial cleaning prior to use at the site. The equipment will then be decontaminated prior to leaving the site and each time it returns on-site. Unless otherwise specified and approved, all wash/rinse solutions should be collected and contained on-site. The actual fate of this material will be determined after review of analytical data generated from samples and on-site discharge impacts have been evaluated.

After the initial washing, cleaning may be reduced to those areas that are in close proximity to materials being sampled. Drill rig items such as auger flights, drill rods, and drill bits should be cleaned in between sample locations.

All decontamination generated wastes will be contained in 55-gallon drums and stored in the fenced area.

Drilling equipment will be decontaminated in the following manner:

- Scrub all surfaces thoroughly with nonresidual detergent (alconox) and tap water using a brush to remove particulate matter or surface film. This is necessary in order to remove any solids buildup on the back of the rig, auger flights, drill rods, drilling head, etc. Any loose paint chips, paint flakes and rust must also be removed.
- Steam clean (212°F).

Also, following the general cleaning procedures described above, all downhole/drilling items, such as split spoon samplers, or any other item of equipment which will come in direct contact with a sample during drilling will be decontaminated by steam cleaning.

6.8.3 Decontamination Procedure for Sampling Equipment

Teflon, PVC, polyethylene, polystyrene and stainless steel sampling equipment decontamination procedures will be the following:

- Wash thoroughly with nonresidual detergent (alconox) and clean potable tap water using a brush to remove particulate matter or surface film.
- Rinse thoroughly with tap water.
- Rinse thoroughly with distilled water.
- Rinse in a well ventilated area with methanol (pesticide grade) and air dry.
- Rinse thoroughly with distilled water and air dry.
- Wrap completely in clean aluminum foil with dull side against the equipment. For small sampling items, such as scoops, decontamination will take place over a drum specifically used for this purpose.

The first step, a soap and water wash, is to remove all visible particulate matter and residual oils and grease. This is followed by a tap water rinse and a distilled/deionized water rinse to remove the detergent. Next, a high purity solvent rinse is designated for trace organics removal. Methanol has been chosen because it is not an analyte of concern in the Target Compound List (TCL). The solvent must be allowed to evaporate and then a final distilled/deionized water rinse is performed. This rinse removes any residual traces of the solvent. The aluminum wrap protects the equipment and keeps it clean until it is used at another sampling location.

6.8.4 Decontamination Procedure for Well Casing/ Screen and Development/Purging Equipment

Field cleaning of well casing and screen should consist of a manual scrubbing to remove foreign material and steam cleaning, inside and out, until all traces of oil and grease are removed. If precleaned certified well casing and screen can be obtained from the manufacturer this would also be acceptable. This material should then be stored in such a manner so as to preserve it in this

condition. Special attention to threaded joints may be necessary to remove cutting oil or weld burn residues.

Materials and equipment that will be used within the monitoring well casing for the purposes of well development and purging shall also be decontaminated.

The submersible pump will be decontaminated by the following procedures:

1. Place pump in Alconox and water solution and wash the outside of the pump with a scrub brush.
2. Pump approximately five gallons of Alconox and water solution through the pump.
3. Place pump in bucket of clean water and pump out five gallons of water.
4. Wipe down the cable with deionized water and a paper towel.
5. Decontamination water will be contained in DOT-approved 55-gallon drums.

6.9 Laboratory Sample Custody Procedures

A NYSDOH ELAP and CLP certified laboratory meeting the requirements for sample custody procedures, including cleaning and handling sample containers and analytical equipment will be used. The laboratory's Standard Operating Procedures will be available upon request.

6.10 Field Management Documentation

Proper management and documentation of field activities is essential to ensure that all necessary work is conducted in accordance with the sampling plan and QA/QC Plan in an efficient and high quality manner. Field management procedures include following proper chain of custody procedures to track a sample from collection through analysis, noting when and how samples are to be composited (if required), preparing a Location Sketch, completing Sample Information Record Forms, Chain of Custody Forms and Boring, Well and Test Pit Construction Logs, maintaining a

daily Field Log Book, preparing Daily Field Activity Reports, completing Field Change Forms and filling out a Daily Air Monitoring Form. Copies of each of these forms, with the exception of the Air Monitoring Forms, are provided in Section 6.22. Proper completion of these forms and the field log book are necessary to support the consequent actions that may result from the sample analysis. This documentation will support that the evidence was gathered and handled properly.

6.10.1 Location Sketch

Each sampling point shall have its own location sketch (found in Section 2.22) with permanent references, if possible.

6.10.2 Sample Information Record

At each sampling location, the Sample Information Record Form is filled out and maintained including, but not limited to, the following information:

- Site name
- Sample crew
- Sample location
- Field sample identification number
- Date
- Time of sample collection
- Weather conditions
- Temperature
- Sample matrix
- Method of sample collection and any factor that may affect its quality adversely

- Well information (groundwater only)
- Field test results
- Constituents sampled
- Remarks (Sample Compositing Information)

6.10.3 Chain of Custody

The Chain of Custody (COC) is initiated at the laboratory with bottle preparation and shipment to the site. The COC remains with the sample at all times and bears the name of the person assuming responsibility for the samples. This person is tasked with ensuring secure and appropriate handling of the bottles and samples. When the form is complete, it should indicate that there was no lapses in sample accountability.

A sample is considered to be in an individual's custody if any of the following conditions are met:

- It is in the individual's physical possession, or
- It is in the individual's view after being in his or her physical possession, or
- It is secured by the individual so that no one can tamper with it, or
- The individual puts it in a designated and identified secure area.

In general, Chain of Custody Forms are provided by the laboratory contracted to perform the analytical services. At a minimum, the following information shall be provided on these forms:

- Project name and address
- Project number
- Sample identification number

- Date
- Time
- Sample location
- Sample type
- Analysis requested
- Number of containers and volume taken
- Remarks
- Type of waste
- Sampler(s) name(s) and signature(s)
- Spaces for relinquished by/received by signature and date/time.

For this particular study, forms provided by the laboratory will be utilized. A copy of this form is contained in Section 6.22.

The Chain of Custody Form is filled out and signed by the person performing the sampling. The original of the form travels with the sample and is signed and dated each time the sample is relinquished to another party, until it reaches the laboratory or analysis is completed. The field sampler keeps one copy and a copy is retained for the project file. The sample container must also be labeled with an indelible marker with a minimum of the following information:

- Sample number
- Analysis to be performed
- Date of collection
- Compositing information

A copy of the completed form is returned by the laboratory with the analytical results.

6.10.4 Split Samples

Whenever samples are being split with another party, a Receipt for Samples Form must be completed and signed. A copy of this form can be found in Section 6.22. A copy of the COC Form will accompany this form. The present work plan does not provide for split samples.

6.10.5 Field Log Book

Field log books must be bound and should have consecutively numbered, water resistant pages. All pertinent information regarding the site and sampling procedures must be documented. Notations should be made in log book fashion, noting the time and date of all entries. Information recorded in this notebook should include, but not be limited to, the following:

The first page of the log contains the following information:

- Project name and address
- Name, address and phone number of field contact
- Waste generator and address, if different from above
- Type of process (if known), generating waste
- Type of waste
- Suspected waste composition, including concentrations

Daily entries are made for the following information:

- Purpose of sampling

- Location of sampling point
- Number(s) and volume(s) of sample(s) taken
- Description of sampling point and sampling methodology
- Date and time of collection, arrival and departure
- Collector's sample identification number(s)
- Sample distribution and method of storage and transportation
- References, such as sketches of the sampling site or photographs of sample collection
- Field observations, including results of field analyses (e.g., pH, temperature, specific conductance), water levels, drilling logs, and organic vapor and dust readings
- Signature of personnel responsible for completing log entries.

6.10.6 Daily Field Activity Report

At the end of each day of field work, the Field Operations Manager, or designee, completes this form noting personnel on-site and summarizing the work performed that day, equipment, materials and supplies used, results of field analyses, problems and resolutions. This form is then signed and is subject to review. A copy of the Daily Field Activity Report form is contained in Section 6.22.

6.10.7 Field Changes and Corrective Actions

Whenever there is a required or recommended investigation/sampling change or correction, a Field Change Form must be completed by the Field Operations Manager and NYSDEC on-site supervisor, and approved by the D&B Consulting Engineers, Town of Islip and NYSDEC Project Managers.

6.11 Calibration Procedures and Preventive Maintenance

The following information regarding equipment will be maintained at the project site:

1. Equipment calibration and operating procedures which will include provisions for documentation of frequency, conditions, standards and records reflecting the calibration procedures, methods of usage and repair history of the measurement system. Calibration of field equipment will be done daily at the sampling site so that any background contamination can be taken into consideration and the instrument calibrated accordingly.

2. Critical spare parts, necessary tools and manuals will be on hand to facilitate equipment maintenance and repair.

Calibration procedures and preventive maintenance, in accordance with the NYSDEC 1995 ASP, for laboratory equipment is contained in the laboratory's standard operating procedures (SOP) and is available upon request.

6.12 Performance of Field Audits

During field activities, the QA/QC officer will accompany sampling personnel into the field to verify that the site sampling program is being properly implemented and to detect and define problems so that corrective action can be taken. All findings will be documented and provided to the Field Operations Manager. A copy of Dvirka and Bartilucci's Field Audit form is in Section 6.26.

6.13 Control and Disposal of Contaminated Material

During construction and sampling of the monitoring wells and borings installed during the remedial investigation, possibly contaminated waste, soil and water may be generated from drill cuttings, drilling fluids, decontamination water, development water and purge water. Drill cuttings will be handled in accordance with the NYSDEC Technical and Administrative Guidance Memorandum (TAGM) - No. 4032 - Disposal of Drill Cuttings. Specifically, all soil and water

associated with the wells or borings will be disposed of on-site. Decontamination water will also be disposed of on-site.

All soiled protective clothing and disposable sampling equipment (i.e., bailers, tongue depressors) will be contained and disposed off-site.

6.14 Documentation, Data Reduction and Reporting

A NYSDOH ELAP and CLP certified laboratory meeting requirements for documentation, data reduction and reporting will be used. All data will be cataloged according to sampling locations and sample identification nomenclature which is described in Section 6.7.1 of the QA/QC plan.

NYSDEC "Sample Identification and Analytical Requirement Summary" and "Sample Preparation and Analysis Summary" forms (for VOA Analysis, B/N-A Analysis, Pesticides/PCB Analysis and Inorganic Analysis) will be completed and included with each data package. These forms are contained in Section 6.23. The sample tracking forms are required and supplied by the 1995 NYSDEC ASP.

6.15 Data Validation

As described in Section 6.14 above, summary documentation regarding data validation will be completed by the laboratory using NYSDEC forms contained in Section 6.23, and submitted with the data package.

Data validation will be performed in order to define and document analytical data quality in accordance with NYSDEC requirements that project data must be of known and acceptable quality. The validation processes will be conducted in conformance with the USEPA Contract Laboratory Program National Functional Organic Data Review and Inorganic Analyses while ensuring that the QC requirements for the 10/95 NYSDEC ASP have been met.

Because the NYSDEC Analytical Services Protocol is based on the USEPA CLP, the USEPA Functional Guidelines for Evaluating Organics and Inorganics Analyses for the Contract Laboratory Program (CLP) will assist in formulating standard operating procedures (SOPs) for the data validation process. The data validation process will ensure that all analytical requirements specific to this work plan, including the QA/QC Plan are followed. Procedures will address validation of routine analytical services (RAS) results based on the NYSDEC Target Compound List (TCL) for standard sample matrices.

The data validation process will provide an informed assessment of the laboratory's performance based upon contractual requirements and applicable analytical criteria. The report generated as a result of the data validation process will provide a base upon which the usefulness of the data can be evaluated by the end user of the analytical results. The overall level of effort and specific data validation procedure to be used will be equivalent to a "100% validation" of all analytical data in any given data package.

During the review process, it will be determined whether the contractually required laboratory submittals for sample results are supported by sufficient back-up data and QA/QC results to enable the reviewer to conclusively determine the quality of data. Each data package will be checked for completeness and technical adequacy of the data. Upon completion of the review, the reviewers will develop a QA/QC data validation report for each analytical data package.

"Qualified" analytical results for any one field sample are established and presented based on the results of specific QC samples and procedures associated with its sample analysis group or batch. Precision and accuracy criteria (i.e., QC acceptance limits) are used in determining the need for qualifying data. Where test data have been reduced by the laboratory, the method of reduction will be described in the report. Reduction of laboratory measurements and laboratory reporting of analytical parameters shall be verified in accordance with the procedures specified in the NYSDEC program documents for each analytical method (i.e., recreate laboratory calculations and data reporting in accordance with the method specific procedure). The standard operating guideline

manuals and any special analytical methodology required are expected to specify documentation needs and technical criteria and will be taken into consideration in the validation process. Copies of the complete data package and the validation report, including the laboratory results data report sheets, with any qualifiers deemed appropriate by the data reviewer, and a supplementary field QC sample result summary statement, will be submitted to the NYSDEC.

Examples of standard organics and inorganics data validation reporting formats and completeness inventory lists which are proposed for use on this project are contained in Section 6.24. These report forms will be modified as necessary and appropriate for any project specific or NYSDEC requirements.

The following is a description of the two-phased approach to data validation planned to be used in this project. The first phase is called checklisting and the second phase is the analytical quality review, with the former being a subset of the latter.

- Checklisting - The data package is checked for correct submission of the contract required deliverables, correct transcription from the raw data to the required deliverable summary forms and proper calculation of a number of parameters.

- Analytical Quality Review - The data package is closely examined to recreate the analytical process and verify that proper and acceptable analytical techniques have been performed. Additionally, overall data quality and laboratory performance is evaluated by applying the appropriate data quality criteria to the data to reflect conformance with the specified, accepted QA/QC standards and contractual requirements.

At the completion of the data validation, a Summary Data Validation/Usability Report will be prepared and submitted to the NYSDEC.

6.16 Performance and System Audits

A NYSDOH ELAP and CLP certified laboratory which has satisfactorily completed performance audits and performance evaluation samples shall be used.

6.17 Corrective Action

A NYSDOH ELAP and CLP certified laboratory shall meet the requirements for corrective action protocols, including sample "clean up" to attempt to eliminate/mitigate "matrix interference."

The 1995 NYSDEC ASP protocols include both mandatory and optional sample cleanup and extraction methods. GPC cleanup is required for soil samples by the 1995 NYSDEC ASP for semivolatile and pesticide/PCB analyses in order to meet contract required detection limits. Florisil column cleanup is required for the pesticide/PCB fraction of both soil and water samples. There are several optional cleanup and extraction methods noted in the 1995 NYSDEC ASP protocol. These include: Silica gel column cleanup, acid-base partition, steam distillation and sulfuric acid cleanup for PCB analysis.

It should be noted, that if these optional cleanup and extraction methods are requested by NYSDEC, holding time requirements should not be exceeded due to negligence of the laboratory. However, subsequent to selection of the analytical laboratory for this project, a meeting will be scheduled among representatives of the NYSDEC, D&B and the laboratory to discuss these issues and establish procedures to ensure good and timely communications among all parties.

6.18 Trip Blanks (Travel Blanks)

The primary purpose of this type of blank is to detect additional sources of contamination that might potentially influence contaminant values reported in actual samples both quantitatively and qualitatively. The following have been identified as potential sources of contamination:

- Laboratory reagent water
- Sample containers
- Cross contamination in shipment

- Ambient air or contact with analytical instrumentation during preparation and analysis at the laboratory

- Laboratory reagents used in analytical procedures

A trip blank consists of a set of 40 ml sample vials filled at the laboratory with laboratory demonstrated analyte free water. Trip blanks should be handled, transported and analyzed in the same manner as the samples acquired that day, except that the sample containers themselves are not opened in the field. Rather, they just travel with the sample cooler. Trip blanks must accompany samples at a rate of one per shipment. The temperature of the trip blanks must be maintained at 4°C while on-site and during shipment. Trip blanks must return to the laboratory with the same set of bottles they accompanied in the field.

The purpose of a trip blank is to control sample bottle preparation and blank water quality as well as sample handling. Thus, the trip blank travels to the site with the empty sample bottles and back from the site with the collected samples in an effort to simulate sample handling conditions. Contaminated trip blanks may indicate inadequate bottle cleaning or blank water of questionable quality. Trip blanks are implemented only when collecting water samples, and analyzed for volatile organic compounds only.

6.19 Field Blank (Field Rinsate Blank)/Equipment Blank

Based upon discussion with the NYSDEC, field blanks are not required for this project, since disposable bailers and sterile scoops are being utilized for sample collection.

6.20 Matrix Spikes/Matrix Spike Duplicates and Spiked Blanks

Matrix spike samples and blanks are quality control procedures, consistent with 10/95 NYSDEC ASP specifications, used by the laboratory as part of its internal Quality Assurance/Quality Control program. The matrix and matrix spike duplicates are aliquots of a designated sample (water or soil) which are spiked with known quantities of specified compounds.

They are used to evaluate the matrix effect of the sample upon the analytical methodology as well as to determine the precision of the analytical method used. A matrix spike blank is an aliquot of analyte-free water, prepared in the laboratory, and spiked with the same solution used to spike the MS and MSD. The MSB is subjected to the same analytical procedure as the MS/MSD and used to indicate the appropriateness of the spiking solution by calculating the spike compound recoveries. The procedure and frequency regarding the MS, MSD and MSB are defined in the 10/95 NYSDEC ASP. Site specific MS and MSDs should be collected at a frequency of one per 20 samples or every 7 days (one for each sample delivery group), for each sample matrix collected (i.e., water, soil, etc.). The laboratory is required to analyze an MSB at the same frequency as the MS/MSD.

6.21 Method Blanks

A method blank is an aliquot of laboratory water or soil which is spiked with the same internal and surrogate compounds as the samples. Its purpose is to define and determine the level of laboratory background contamination. Frequency, procedure and maximum laboratory containment concentration limits are specified in the 10/95 NYSDEC ASP as follows:

The laboratory shall prepare and analyze one laboratory reagent blank (method blank) for each group of samples of a similar matrix (for water or soil samples), extracted by a similar method (separatory funnel, continuous liquid extraction or sonication) and a similar concentration level (for volatile and semivolatile soil samples only) for the following, whichever is most frequent:

- Each case of field samples received, or
- Each 20 samples in a case, including matrix spikes and reanalyses, or
- Each 7 calendar day period during which field samples in a case were received (said period beginning with the receipt of the first sample in that sample delivery group) or
- Whenever samples are extracted.

Volatile analysis requires one method blank for each 12-hour time period when volatile target compounds are analyzed.

Semivolatile and pesticide method blanks shall be carried through the entire analytical process from extraction to final GC/MS or GC/EC analysis, including all protocol performance/delivery requirements.

6.22 Field Management Forms

DVIRKA AND BARTILUCCI

DAILY FIELD ACTIVITY REPORT

Report Number: _____ Project Number: _____ Date: _____

Field Log Book Page Number: _____

Project: _____

Address: _____

Weather: (AM) _____ Rainfall: (AM) _____ Inches
(PM): _____ (PM) _____ Inches

Temperature: (AM) _____ °F Wind Speed: (AM) _____ MPH Wind Direction: (AM) _____
(PM) _____ °F (PM) _____ MPH (PM) _____

Site Condition: _____

Personnel On Site: Name	Affiliation	Arrival Time	Departure Time

Subcontractor Work Commencement: (AM) _____ (PM) _____

Subcontractor Work Completion: (AM) _____ (PM) _____

DVIRKA
AND
BARTILUCCI

DATE: _____

DAILY FIELD ACTIVITY REPORT

General work performed today by D&B: _____

List specific inspection(s) performed and results (include problems and corrective actions):

List type and location of tests performed and results (include equipment used and monitoring results):

Verbal comments received from subcontractor (include construction and testing problems, and recommendations/resulting action):

Prepared by: _____ Reviewed by: _____

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AND
BARTILUCCI

DATE: _____

DAILY FIELD ACTIVITY REPORT

Work performed today by subcontractor(s) (includes equipment and labor breakdown):

Dvirka and Bartilucci
Consulting Engineers
A Division of William F. Cosulich Associates, P.C.

DAILY DRILLING REPORT

Weather:	Date:
Contractor:	Project Name:
Driller:	Project Number:
Inspector:	Client:
Other Personnel:	
On-Site Equipment:	

Time Log

	AM						PM													Borehole		
Category	6	7	8	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11	12	Total Hours			
Mob/Setup																							
Drilling Soil																							
Drilling Rock																							
Roller Bit Reaming																							
Well Installation																							
Well Development																							
Test Pit Construction																							
Land Clearing																							
Decontamination																							
Standby Time																							
Down Time																							
Health and Safety (Level B)																							

Remarks:

Consumables

Materials	Well/Borehole	Size/Type	Contract Item #	Quantity	Well/Borehole	Size/Type	Contract Item #	Quantity
Well Riser								
Well Screen								
Grout								
Bentonite								
Sand Pack								
Split Spoons								
Rock Coring								
Protecuve Casing								
Locking Cap								
55 Gallon Drums								

Remarks:

Drilling Record

Borehole Number	From Feet	To Feet	Dia. Inches	Method	Notes

Remarks:

Driller Signature:_____ Inspector Signature:_____

▲020/grid.ls

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AND
BARTILUCCI

DRILLING CONTRACTOR

Driller _____

Inspector _____

Rig Type _____

Drilling Method _____

Drive Hammer Weight _____

DRILLING LOG

PROJECT NAME _____

PROJECT # _____

Location/Address _____

BORING NUMBER _____

Sheet _____ of _____

Boring Location _____

GROUNDWATER OBSERVATIONS

Water Level			
Time			
Date			
Casing Depth			

Weather _____

Date/Time Start _____

Date/Time Finish _____

Plot Plan

Sample Depth	Sample Number	SPT	PID/FID Reading	FIELD IDENTIFICATION OF MATERIAL	WELL SCHEMATIC	COMMENTS

SPT = STANDARD PENETRATION TEST

Soil Stratigraphy Summary _____

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TEST PIT LOG

TEST PIT LOCATION SKETCH MAP

N

TEST PIT NO.

PROJECT NO./NAME	LOCATION
EXCAVATOR/EQUIPMENT/OPERATOR	
INSPECTOR/OFFICE	START/FINISH DATE
ELEVATION OF: GROUND SURFACE/BOTTOM OF PIT (FT. ABOVE MSL)	CONDITION OF PIT
REMARKS:	

DEPTH	SAMPLE INTERVAL	OVA SCREEN	DESCRIPTION OF MATERIALS	REMARKS
0				
1				
2				
3				
4				
5				
6				
7				
8				
9				
10				
11				
12				
13				
14				
15				

NJDEPTPL

Dvirka and Bartilucci CONSULTING ENGINEERS

WELL CONSTRUCTION LOG

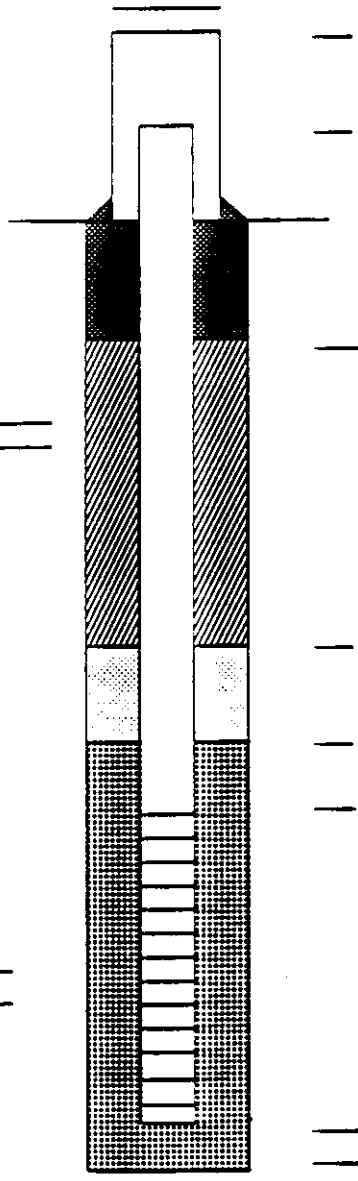
SITE _____ JOB NO. ____ WELL NO. _____

TOTAL DEPTH ____ SURFACE ELEV. _____ TOP RISER ELEV. _____

WATER LEVELS (DEPTH, DATE, TIME) _____ DATE INSTALLED _____

RISER	DIA ___	MATERIAL _____	LENGTH ____	
SCREEN	DIA ___	MATERIAL _____	LENGTH ____	SLOT SIZE _____
PROT CSG	DIA ___	MATERIAL _____	LENGTH ____	

SCHEMATIC



___ Prot. Csg Stickup

___ Riser Stickup

Ground Surface

Surface Seal Type _____

_____

___ Bottom Surface Seal

Grout Type _____

_____

___ Top Seal

Seal Type _____

___ Top Sand Pack

___ Top Screen

Sand Pack Type _____

Size _____

___ Bottom Screen

___ Total Depth of Boring

Dvirka and Bartilucci
CONSULTING ENGINEERS

WELL CONSTRUCTION LOG

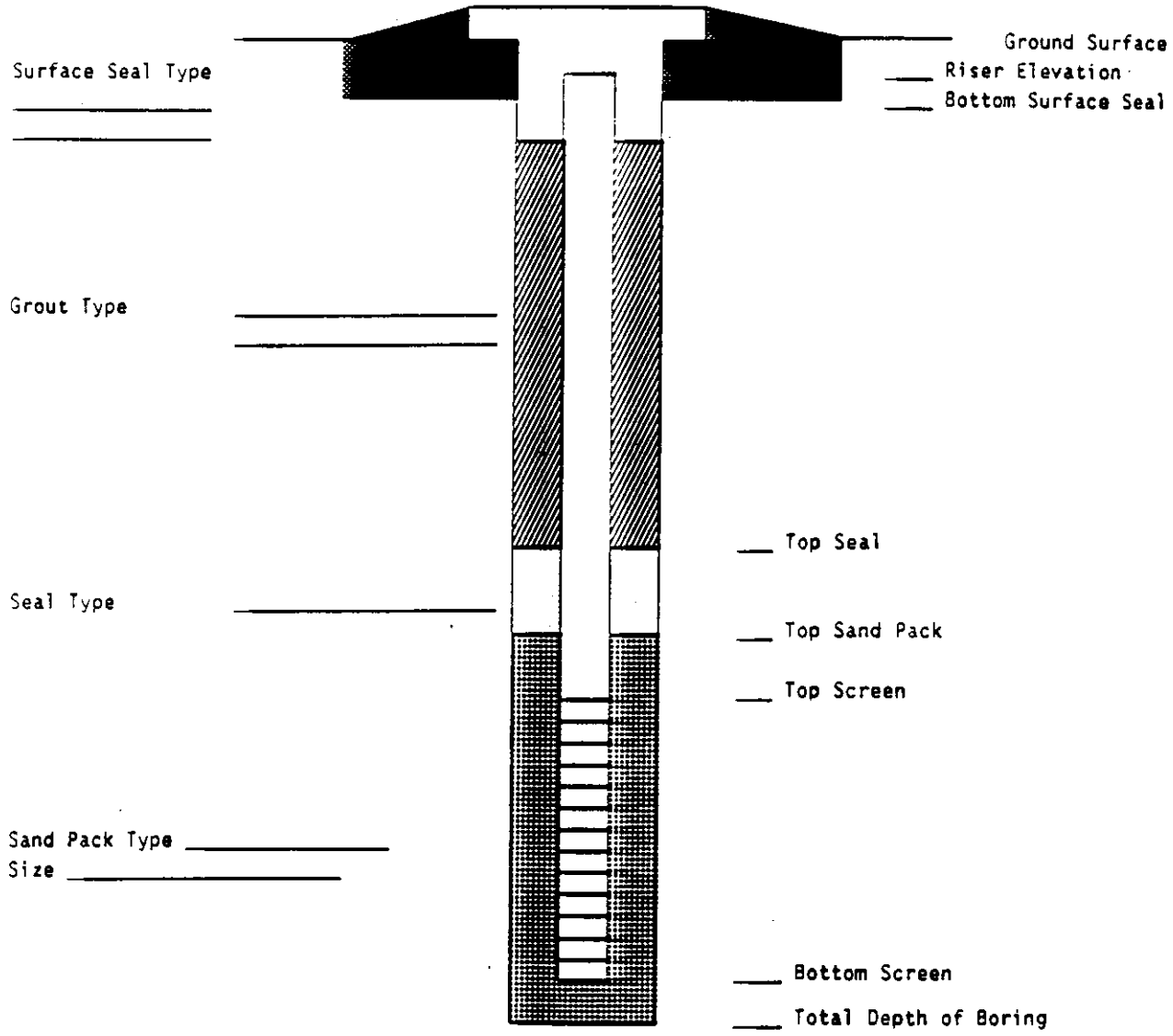
SITE _____ JOB NO. _____ WELL NO. _____

TOTAL DEPTH _____ SURFACE ELEV. _____ TOP RISER ELEV. _____

WATER LEVELS (DEPTH, DATE, TIME) _____ DATE INSTALLED _____

RISER DIA ___ MATERIAL _____ LENGTH _____
SCREEN DIA ___ MATERIAL _____ LENGTH _____ SLOT SIZE _____

SCHEMATIC



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DAILY EQUIPMENT CALIBRATION LOG

Project Name: ______________________ Date: ______________________

Project Number: ______________________ Calibrated By: ______________________

Instrument Name and Model Number	Calibration Method	Time	Readings and Observations

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Receipt for Samples

Project Name: _____ Field Log Book Reference Number: _____

Project Address: _____ Sampled By: _____

Project Number: _____ Split With: _____

SAMPLE NUMBERS	DATE	TIME	C O M P	G R A B	SPLIT SAMPLES	LOG BOOK PAGE NO.	TAG NUMBERS	SAMPLE LOCATION	NO. OF CONTAINERS	REMARKS

Transferred by (Signature)		Received by (Signature)		Telephone
Date	Time	Title	Date	Time

RFS

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LOCATION SKETCH

Project _____ Sample Crew _____

Sample(s) Location(s) _____

Sample(s) and/or Well Number(s) _____

_____

Location of sample points, wells, borings, etc., with reference to three permanent reference points.
Measure all distances, clearly label roads, wells and permanent features.

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SAMPLE INFORMATION RECORD

SITE _____ SAMPLE CREW _____

SAMPLE LOCATION/WELLNO. _____

FIELD SAMPLE I.D. NUMBER _____ DATE _____

TIME _____ WEATHER _____ TEMPERATURE _____

SAMPLE TYPE:

GROUNDWATER _____ SEDIMENT _____

SURFACE WATER/STREAM _____ AIR _____

SOIL _____ OTHER (Describe, i.e., septage, leachate) _____

WELL INFORMATION (fill out for groundwater samples):

DEPTH TO WATER _____ MEASUREMENT METHOD _____

DEPTH OF WELL _____ MEASUREMENT METHOD _____

VOLUME REMOVED _____ REMOVAL METHOD _____

FIELD TEST RESULTS:

COLOR _____ pH _____ ODOR _____

TEMPERATURE (°F) _____ SPECIFIC CONDUCTANCE (umhos/cm) _____

OTHER (OVA, Methane meter, etc.) _____

_____

CONSTITUENTS SAMPLED:

_____ _____ _____ _____

_____ _____ _____ _____

REMARKS: _____

_____

_____

WELL CASING VOLUMES

GAL/FT	**1-1/4" = 0.077**	**2" = 0.16**	**3" = 0.37**	**4" = 0.65**
	1-1/2" = 0.10	**2-1/2" = 0.24**	**3-1/2" = 0.50**	**6" = 1.46**

SIR

DVIRKA
AND
BARTILUCCI

FIELD CHANGE FORM

Project Name: _____

Project Number: _____ Field Change Number: _____

Location: _____ Date: _____

Field Activity Description: _____

Reason for Change: _____

Recommended Disposition: _____

_____ _____

Field Operations Officer (D&B Consulting Engineers) (Signature) Date

Disposition: _____

_____ _____

On-site Supervisor (NYSDEC) (Signature) Date

Distribution: Project Manager (D&B)
Project Manager (NYSDEC)
Field Operations Officer
On-site Supervisor (NYSDEC)

Others as Required: _____

6.23 NYSDEC Sample Identification, Preparation and Analysis Summary Forms

To be included with all lab data and with each workplan

NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION

SAMPLE IDENTIFICATION AND ANALYTICAL REQUIREMENT SUMMARY

Customer Sample Code	Laboratory Sample Code	Analytical Requirements*					
		*VOA GC/MS	*BNA GC/MS	*VOA GC	*PEST PCB	*METALS	*OTHER

*Check Appropriate Boxes

* CLP, Non-CLP (**Please indicate year of protocol**)
* HSL, Priority Pollutant

NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION

SAMPLE PREPARATION AND ANALYSIS SUMMARY
B/N-A
ANALYSES

Laboratory Sample ID	Matrix	Date Collected	Date Rec'd At Lab	Date Extracted	Date Analyzed

NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION

SAMPLE PREPARATION AND ANALYSIS SUMMARY
PESTICIDE/PCB
ANALYSES

Laboratory Sample ID	Matrix	Date Collected	Date Rec'd At Lab	Date Extracted	Date Analyzed

NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION

SAMPLE PREPARATION AND ANALYSIS SUMMARY
VOA
ANALYSES

Laboratory Sample ID	Matrix	Date Collected	Date Rec'd At Lab	Low Level Med. Level	Date Analyzed

NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION
SAMPLE PREPARATION AND ANALYSIS FORM

B/N-A ORGANIC ANALYSES

Sample ID	Matrix	Analytical Protocol	Extraction Method	Auxilary Clean Up	Dil/Conc Factor

NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION

SAMPLE PREPARATION AND ANALYSIS SUMMARY

INORGANIC ANALYSES

Sample ID	Matrix	Metals Requested	Date Rec'd	Date Analyzed

6.24 Data Validation Reporting Forms

TO BE SUPPLIED BY DATA VALIDATOR

6.25 Data Quality Requirements and Assessment Summaries

Superfund Target Compound List (TCL) and Contract Required Quantitation Limits (CRQL)

	Volatiles	CAS Number	Quantitation Limits* Water µg/L	Low Soil µg/Kg	Med Soil µg/Kg	On Column (ng)
1.	Chloromethane	74-87-3	10	10	1200	(50)
2.	Bromomethane	74-83-9	10	10	1200	(50)
3.	Vinyl chloride	75-01-4	10	10	1200	(50)
4.	Chloroethane	75-00-3	10	10	1200	(50)
5.	Methylene chloride	75-09-2	10	10	1200	(50)
6.	Acetone	67-64-1	10	10	1200	(50)
7.	Carbon Disulfide	75-15-0	10	10	1200	(50)
8.	1,1-Dichloroethylene	75-35-4	10	10	1200	(50)
9.	1,1-Dichloroethane	75-35-3	10	10	1200	(50)
10.	1,2-Dichloroethylene(total)	540-59-0	10	10	1200	(50)
11.	Chloroform	67-66-3	10	10	1200	(50)
12.	1,2-Dichloroethane	107-06-2	10	10	1200	(50)
13.	2-Butanone	78-93-3	10	10	1200	(50)
14.	1,1,1-Trichloroethane	71-55-6	10	10	1200	(50)
15.	Carbon tetrachloride	56-23-5	10	10	1200	(50)
16.	Bromodichloromethane	75-27-4	10	10	1200	(50)
17.	1,2-Dichloropropane	78-87-5	10	10	1200	(50)
18.	cis-1,3-Dichloropropene	10061-01-5	10	10	1200	(50)
19.	Trichloroethene	79-01-6	10	10	1200	(50)
20.	Dibromochloromethane	124-48-1	10	10	1200	(50)
21.	1,1,2-Trichloroethane	79-00-5	10	10	1200	(50)
22.	Benzene	71-43-2	10	10	1200	(50)
23.	trans-1,3-Dichloropropene	10061-02-6	10	10	1200	(50)
24.	Bromoform	75-25-2	10	10	1200	(50)
25.	4-Methyl-2-pentanone	108-10-1	10	10	1200	(50)
26.	2-Hexanone	591-78-6	10	10	1200	(50)
27.	Tetrachloroethene	127-18-4	10	10	1200	(50)
28.	Toluene	108-88-3	10	10	1200	(50)
29.	1,1,2,2-Tetrachloroethane	79-34-5	10	10	1200	(50)
30.	Chlorobenzene	108-90-7	10	10	1200	(50)
31.	Ethyl Benzene	100-41-4	10	10	1200	(50)
32.	Styrene	100-42-5	10	10	1200	(50)
33.	Total Xylenes	1330-20-7	10	10	1200	(50)

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

Note that the CRQL values listed on the preceding page may not be those specified in previous Analytical Services Protocols. These values are set at concentrations in the sample equivalent to the concentration of the lowest calibration standard specified in Exhibit D, Part II. Lower quantitation limits may be achievable for water samples by employing the methods in Exhibit D, Part X for Low Concentration Water for Organic Analyses.

VOLATILES

Water Samples

A 5 mL volume of water is purged with an inert gas at ambient temperature. The volatiles are trapped on solid sorbents, and desorbed directly onto the GC/MS. For a sample with compound X at the CRQL of 10 µg/L:

(10 µg/L) (5 mL) (10^{-3} L/mL) = 50 x 10^{-3} ug = 50 ng on the GC column

Low Level Soil/Sediment Samples

A 5 g aliquot of the soil/sediment sample is added to a volume of water in a purge tube, heated, and purged with an inert gas. The volatiles are trapped, and later desorbed directly onto the GC/MS. For a sample with compound X at the CRQL of 10 µg/Kg:

(10 µg/Kg) (5 g) (10^{-3} Kg/g) = 50 x 10^{-3} µg = 50 ng on the GC column

Medium Level Soil/Sediment Samples

A 4 g aliquot of soil/sediment is extracted with 10 mL of methanol, and filtered through glass wool. Only 1 mL of the methanol extract is taken for screening and analysis. Based on the results of a GC/FID screen, an aliquot of the methanol extract is added to 5 mL of reagent water and purged at ambient temperature. The largest aliquot of extract considered in Exhibit D, Part III is 100 uL. For a sample with compound X at the CRQL of 1200 µg/Kg:

(1200 µg/Kg) (4 g) (10^{-3} Kg/g) = 4800 x 10^{-3} µg = 4800 ng

This material is contained in the 10 mL methanol extract:

(4800 ng) / 10 mL = 480 ng/mL

Of which, 100 µL are purged from the reagent water.

(480 ng/mL) (100 µL) (10^{-3} mL/µL) = 480 x 10^{-1} ng = 50 ng on the GC column

Note that for both low and medium soil/sediment samples, while it may affect the purging efficiency, the volume of reagent water used in the purging process does not affect the calculations.

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

	Semivolatiles	CAS Number	Quantitation Limits* Water µg/L	Low Soil µg/Kg	Med Soil µg/Kg	On Column (ng)
34.	Phenol	108-95-2	10	330	10,000	(20)
35.	bis(2-Chloroethyl) ether	111-44-4	10	330	10,000	(20)
36.	2-Chlorophenol	95-57-8	10	330	10,000	(20)
37.	1,3-Dichlorobenzene	541-73-1	10	330	10,000	(20)
38.	1,4-Dichlorobenzene	106-46-7	10	330	10,000	(20)
39.	1,2-Dichlorobenzene	95-50-1	10	330	10,000	(20)
40.	2-Methylphenol	95-48-7	10	330	10,000	(20)
41.	2,2'-oxybis(1-Chloro-propane) #	108-60-1	10	330	10,000	(20)
42.	4-Methylphenol	106-44-5	10	330	10,000	(20)
43.	N-Nitroso-di-n-propylamine	621-64-7	10	330	10,000	(20)
44.	Hexachloroethane	67-72-1	10	330	10,000	(20)
45.	Nitrobenzene	98-95-3	10	330	10,000	(20)
46.	Isophorone	78-59-1	10	330	10,000	(20)
47.	2-Nitrophenol	88-75-5	10	330	10,000	(20)
48.	2,4-Dimethylphenol	105-67-9	10	330	10,000	(20)
49.	bis(2-Chloroethoxy) methane	111-91-1	10	330	10,000	(20)
50.	2,4-Dichlorophenol	120-83-2	10	330	10,000	(20)
51.	1,2,4-Trichlorobenzene	120-82-1	10	330	10,000	(20)
52.	Naphthalene	91-20-3	10	330	10,000	(20)
53.	4-Chloroaniline	106-47-8	10	330	10,000	(20)
54.	Hexachlorobutadiene	87-68-3	10	330	10,000	(20)
55.	4-Chloro-3-methylphenol	59-50-7	10	330	10,000	(20)
56.	2-Methylnaphthalene	91-57-6	10	330	10,000	(20)
57.	Hexachlorocyclopentadiene	77-47-4	10	330	10,000	(20)
58.	2,4,6-Trichlorophenol	88-06-2	10	330	10,000	(20)
59.	2,4,5-Trichlorophenol	95-95-4	25	800	25,000	(50)
60.	2-Chloronaphthalene	91-58-7	10	330	10,000	(20)
61.	2-Nitroaniline	88-74-4	25	800	25,000	(50)
62.	Dimethyl phthalate	131-11-3	10	330	10,000	(20)
63.	Acenaphthylene	208-96-8	10	330	10,000	(20)
64.	2,6-Dinitrotoluene	606-20-2	10	330	10,000	(20)
65.	3-Nitroaniline	99-09-2	25	800	25,000	(50)
66.	Acenaphthene	83-32-9	10	330	10,000	(20)

Previously known by the name bis(2-Chloroisopropyl) ether

Superfund Target Compound List (TCL) and Contract Required Quantitation Limits (CRQL)

	Semivolatiles	CAS Number	Quantitation Limits* Water µg/L	Low Soil µg/Kg	Med Soil µg/Kg	On Column (ng)
67.	2,4-Dinitrophenol	51-28-5	25	800	25,000	(50)
68.	4-Nitrophenol	100-02-7	25	800	25,000	(50)
69.	Dibenzofuran	132-64-9	10	330	10,000	(20)
70.	2,4-Dinitrotoluene	121-14-2	10	330	10,000	(20)
71.	Diethylphthalate	84-66-2	10	330	10,000	(20)
72.	4-Chlorophenyl phenyl ether	7005-72-3	10	330	10,000	(20)
73.	Fluorene	86-73-7	10	330	10,000	(20)
74.	4-Nitroaniline	100-01-6	25	800	25,000	(50)
75.	4,6-Dinitro-2-methylphenol	534-52-1	25	800	25,000	(50)
76.	N-nitrosodiphenylamine	86-30-6	10	330	10,000	(20)
77.	4-Bromophenyl phenyl ether	101-55-3	10	330	10,000	(20)
78.	Hexachlorobenzene	118-74-1	10	330	10,000	(20)
79.	Pentachlorophenol	87-86-5	25	800	25,000	(50)
80.	Phenanthrene	85-01-8	10	330	10,000	(20)
81.	Anthracene	120-12-7	10	330	10,000	(20)
82	Carbazole	86-74-8	10	330	10,000	(20)
83.	Di-n-butyl phthalate	84-74-2	10	330	10,000	(20)
84.	Fluoranthene	206-44-0	10	330	10,000	(20)
85.	Pyrene	129-00-0	10	330	10,000	(20)
86.	Butyl benzyl phthalate	85-68-7	10	330	10,000	(20)
87.	3,3'-Dichlorobenzidine	91-94-1	10	330	10,000	(20)
88.	Benz(a)anthracene	56-55-3	10	330	10,000	(20)
89.	Chrysene	218-01-9	10	330	10,000	(20)
90.	bis(2-Ethylhexyl)phthalate	117-81-7	10	330	10,000	(20)
91.	Di-n-octyl phthalate	117-84-0	10	330	10,000	(20)
92.	Benzo(b)fluoranthene	205-99-2	10	330	10,000	(20)
93.	Benzo(k)fluoranthene	207-08-9	10	330	10,000	(20)
94.	Benzo(a)pyrene	50-32-8	10	330	10,000	(20)
95.	Indeno(1,2,3-cd)pyrene	193-39-5	10	330	10,000	(20)
96.	Dibenz(a,h)anthracene	53-70-3	10	330	10,000	(20)
97.	Benzo(g,h,i)perylene	191-24-2	10	330	10,000	(20)

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

Water Samples

A 1 L volume of water is extracted in a continuous liquid-liquid extractor with methylene chloride at a pH of approximately 2. This extract is reduced in volume to 1.0 mL, and a 2 µL volume is injected onto the GC/MS for analysis. For a sample with compound X at the CRQL of 10 µg/L:

(10 µg/L) (1 L) = 10 µg in the original extract

When the extract is concentrated, this .material is contained in the 1 mL concentrated extract, of which 2 µL are injected into the instrument:

(10 µg/mL) (2 µL) (10^{-3} mL/µL) = 20 x 10^{-3} µg = 20 ng on the GC column

Low Soil Samples

A 30 g soil sample is extracted three times with methylene chloride/acetone at ambient pH, by sonication or Soxhlet. The extract is reduced in volume to 1.0 mL, and a 2 µL volume is injected onto the GC/MS for analysis. For a sample with compound X at the CRQL of 330 µg/Kg:

(330 µg/Kg) (30 g) (10^{-3} Kg/g) = 9900 x 10^{-3} µg = 9.9 µg

When the sample extract is to be subjected to Gel Permeation Chromatography (required) to remove high molecular weight interferences, the volume of the extract is initially reduced to 10 mL. This 10 mL is put through the GPC column, and only 5 mL are collected off the GPC. That 5 mL volume is reduced to 0.5 mL prior to analysis. Therefore:

(9.9 µg/10 mL) (5 mL) = 4.95 µg

This material is contained in the 0.5 mL extract, of which 2 µL are injected into the instrument:

(4.95 µg/0.5 mL) (2 µL) (10^{-3} mL/µL) = (1.98 x 10^{-2} µg) 20 ng on the GC column

Medium Soil Samples

A 1 g soil sample is extracted once with 10 mL of methylene chloride/acetone, which is filtered through glass wool to remove particles of soil. The filtered extract is then subjected to GPC clean up, and only 5 mL of extract are collected after GPC. This extract is reduced in volume to 0.5 mL, of which 2 µL are injected onto the GC/MS. For a sample with compound X at the CRQL of 10,000 µg/Kg:

(10,000 µg/Kg) (1 g) (10^{-3} Kg/g) = 10 µg

(continued)

Semivolatiles, Medium Soil, continued -

This material is contained in the 10 mL extract, of which only 5 mL are collected after GPC:

(10 µg) (5 mL/10 mL) = 5 ug

The volume of this extract is reduced to 0.5 mL, of which 2 µL are injected into the instrument:

(5 µg/0.5 mL) (2 µL) (10^{-3} mL/µL) = 20 x 10^{-3} ug = 20 ng on the GC column

Eight semivolatile compounds are calibrated using only a four point initial calibration, with the lowest standard at 50 ng. Therefore, the CRQL values for these eight compounds are 2.5 times higher for all matrices and levels.

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

	Pesticides/Aroclors	CAS Number	Quantitation Limits* Water µg/L	Soil µg/Kg	On Column (ng)
98.	alpha-BHC	319-84-6	0.05	1.7	5
99.	beta-BHC	319-85-7	0.05	1.7	5
100.	delta-BHC	319-86-8	0.05	1.7	5
101.	gamma-BHC (Lindane)	58-89-9	0.05	1.7	5
102.	Heptachlor	76-44-8	0.05	1.7	5
103.	Aldrin	309-00-2	0.05	1.7	5
104.	Heptachlor epoxide	1024-57-3	0.05	1.7	5
105.	Endosulfan I	959-98-8	0.05	1.7	5
106.	Dieldrin	60-57-1	0.10	3.3	10
107.	4,4'-DDE	72-55-9	0.10	3.3	10
108.	Endrin	72-20-8	0.10	3.3	10
109.	Endosulfan II	33213-65-9	0.10	3.3	10
110.	4,4'-DDD	72-54-8	0.10	3.3	10
111.	Endosulfan sulfate	1031-07-8	0.10	3.3	10
112.	4,4'-DDT	50-29-3	0.10	3.3	10
113.	Methoxychlor	72-43-5	0.50	17.0	50
114.	Endrin ketone	53494-70-5	0.10	3.3	10
115.	Endrin aldehyde	7421-36-3	0.10	3.3	10
116.	alpha-Chlordane	5103-71-9	0.05	1.7	5
117.	gamma-Chlordane	5103-74-2	0.05	1.7	5
118.	Toxaphene	8001-35-2	5.0	170.0	500
119.	AROCLOR-1016	12674-11-2	1.0	33.0	100
120.	AROCLOR-1221	11104-28-2	1.0	67.0	200
121.	AROCLOR-1232	11141-16-5	1.0	33.0	100
122.	AROCLOR-1242	53469-21-9	1.0	33.0	100
123.	AROCLOR-1248	12672-29-6	1.0	33.0	100
124.	AROCLOR-1254	11097-69-1	1.0	33.0	100
125.	AROCLOR-1260	11096-82-5	1.0	33.0	100

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

Water Samples

A 1 L volume of water is extracted three times with methylene chloride or by a continuous liquid-liquid extractor. This extract is reduced in volume to approximately 3 - 5 mL, and diluted up to 10.0 mL with clean solvent. When Gel Permeation Chromatography is performed, only 5 of the 10 mL of extract are collected after GPC.

Regardless of whether GPC is performed, either 1.0 or 2.0 mL of the 10.0 mL of the original extracts are taken through the remaining clean up steps (Florisil and sulfur removal). The volume taken through Florisil cleanup and the final volume of the extract after the clean up steps depends on the requirements of the autosampler. If the autosampler can handle 1.0 mL final extract volumes, this is the volume taken through Florisil and the final volume. If the autosampler cannot reliably handle 1.0 mL volumes, the volume is 2.0 mL. When using an autosampler, the injection volume may be 1.0 or 2.0 µL. Manual injections must use a 2.0 µL injection volume.

For a sample with compound X at the CRQL of 0.05 µg/L and an autosampler requiring a 1.0 mL volume:

(0.05 µg/L) (1 L) = 0.05 µg in the original extract

This material is contained in the 10.0 mL of extract:

(0.05 µg)/ (10.0 mL) = 0.005 µg/mL

Of which, only 1.0 mL is carried through the remaining clean up steps. For a final extract volume of 1.0 mL and a 1 µL injection volume:

(0.005 µg/L) (1 µL) (10^{-3} mL/µL) = 5 x 10^{-6} µg = 5 pg on the GC column

Soil Samples

There is no differentiation between the preparation of low and medium soil samples in this method for the analysis of pesticides/Aroclors. A 30 g soil sample is extracted three times with methylene chloride/acetone by sonication or Soxhlet extraction. The extract is reduced in volume to 10.0 mL and subjected to Gel Permeation Chromatography. After GPC, only 5.0 mL of extract are collected. However, as with the water sample described above, either 1.0 or 2.0 mL of that extract are subjected to the other clean up steps, so no loss of sensitivity results from the use of GPC. From this point on, the soil sample extract is handled in the same fashion as the extract of a water sample. For a sample with compound X at the CRQL of 1.7 µg/Kg:

(1.7 µg/Kg) (30 g) (10^{-3} Kg/g) = 51 x 10^{-3} µg = 51 ng in the original extract

This material is contained in the 10.0 mL of extract:

(51 ng)/10 mL = 5.1 ng/mL
(continued)

of which, only 1.0 or 2.0 mL are carried through the remaining cleanup steps For a final extract volume of 1.0 mL and a 1 µL injection volume:

(5.1 ng/mL)(1 µL)(10^{-3} mL/µL) = 5.1 x 10^{-3} ng = 5 pg on the GC column.

For either water or soil samples, if the autosampler used requires a 2.0 mL final volume, the concentration in the 10.0 mL of extract above remains the same.

Using a 2 µL injection volume, twice the total number of picograms are injected onto the GC column. However, because the injection volume must be the same for samples and standards, twice as much material is injected onto the column during calibration, and thus the amount of compound X injected from the sample extract is equivalent to the amount of compound X injected from the calibration standard, regardless of injection volume.

If a single injection is used for two GC columns attached to a single injection part, it may be necessary to use an injection volume greater than 2 µL.

SECTION II

SUPERFUND-CLP INORGANICS

Superfund Target Compound List (TCL) and Contract Required Quantitation Limit

Parameter	Contract Required Quantitation Level (µg/L)
1. Aluminum	200
2. Antimony	60
3. Arsenic	10
4. Barium	200
5. Beryllium	5
6. Cadmium	5
7. Calcium	5000
8. Chromium	10
9. Cobalt	50
10. Copper	25
11. Iron	100
12. Lead	3
13. Magnesium	5000
14. Manganese	15
15. Mercury	0.2
16. Nickel	40
17. Potassium	5000
18. Selenium	5
19. Silver	10
20. Sodium	5000
21. Thallium	10
22. Vanadium	50
23. Zinc	20
24. Cyanide	10

1: Any analytical method specified in Exhibit D, CLP-Inorganics may be utilized as long as the documented instrument or method detection limits meet the Contract Required Quantitation Level (CRQL) requirements. Higher quantitation levels may only be used in the following circumstance:

If the sample concentration exceeds five times the quantitation limit of the instrument or method in use, the value may be reported even though the instrument or method detection limit may not equal the Contract Required Quantitation Limit. This is illustrated in the example below:

For lead:
Method in use = ICP
Instrument Detection Limit (IDL) = 40
Sample concentration = 220
Contract Required Quantitation Level (CRQL) = 3

The value of 220 may be reported even though instrument detection limit is greater than Contract Required Quantitation Limit. The instrument or method detection limit must be documented as described in Exhibit E.

2: These CRQLs are the instrument detection limits obtained in pure water that must be met using the procedure in Exhibit E. The quantitation limits for samples may be considerably higher depending on the sample matrix.

Regulatory Promulgated Parameters

In addition to the preceding lists, the Laboratory may be asked to analyze for any or all of the conventional water quality parameters as listed in 40CFR Part 136 or for the hazardous waste parameters listed in 40CFR Part 260 through 270.

Quantitation limits to be achieved for these analyses are specified.

6.26 Field Audit Form

DVIRKA
AND
BARTILUCCI

FIELD AUDIT FORM

Site: _____ Date: _____

Persons On-site: _____ QA/QC Officer Conducting Audit:

_____ _____

_____ Project:

_____ _____

1. Is safety equipment in use (hardhats, respirators, gloves etc.): YES NO

2. Is a decontamination station, equipment and supplies on site and in working order:

Methanol	YES	NO
Alconox	YES	NO
D.I. Water	YES	NO
Scrub Brushes	YES	NO
Steam Cleaner	YES	NO

Comments: _____

_____

_____

3. Is the site/investigation areas secured (fence, markers, etc.): YES NO

Comments: _____

_____

_____

4. Is contaminated material properly stored and in a secure area: YES NO

Comments: _____

_____

_____

DVIRKA AND BARTILUCCI

FIELD AUDIT FORM (continued)

5. Are forms filled out properly:

Field Log Book	YES	NO
Chain of Custody	YES	NO
Equipment Calibration Log	YES	NO
Daily Field Activity Report	YES	NO
Location Sketch	YES	NO
Sample Information Record	YES	NO
Equipment Usage Form	YES	NO

Comments: _____

_____

_____

6. Is the proper sampling and field measurement equipment, including calibration supplies on site: YES NO

Comments: _____

_____

_____

7. Are there adequate sample containers, including deionized water for QA/QC:

Field Blanks	YES	NO
Trip Blanks	YES	NO

Comments: _____

_____

_____

8. Is the equipment decontaminated properly:

Sampling equipment	YES	NO
Construction equipment	YES	NO

Comments: _____

_____

_____

DVIRKA AND BARTILUCCI

FIELD AUDIT FORM (continued)

9. Is field measurement equipment calibrated:

Daily	YES	NO
Properly	YES	NO

Comments: _____

_____

_____

10. Are samples collected and labeled properly: YES NO

Comments: _____

_____

_____

11. Are samples stored at 4°C: YES NO

Comments: _____

_____

_____

12. Are coolers properly sealed and packed for shipment including Chain of Custody taped to underside of lid: YES NO

Comments: _____

_____

_____

13. Is a copy of the Field Investigation Work Plan available on site: YES NO

Comments: _____

_____

_____

DVIRKA AND BARTILUCCI

FIELD AUDIT FORM (continued)

14. Is a copy of the QA/QC Plan available on site: YES NO

Comments: _____

_____

_____

15. Are investigation personnel familiar with the Work Plan and QA/QC Plan: YES NO

Comments: _____

_____

_____

16. Are quality control samples taken:

Trip Blanks YES NO
Field Blanks YES NO

Comments: _____

_____

_____

17. Are samples shipped in a timely and appropriate manner: YES NO

Comments: _____

_____

_____

18. Has the laboratory been contacted regarding planned shipment of samples: YES NO

Comments: _____

_____

_____

DVIRKA
AND
BARTILUCCI

FIELD AUDIT FORM (continued)

General Comments: _____

_____

_____

_____

SITE SPECIFIC
HEALTH & SAFETY PLAN

for

Village of Cuba Landfill
Cuba, New York

Prepared for:

Dvirka and Bartilucci Consulting Engineers
P.O. Box 56
5879 Fisher Road
East Syracuse, NY 13067

Prepared by:

Field Safety Corporation
Suite 101, 579 Lake Drive
Guilford, CT 06437
(203) 457-2100

May, 1997

APPROVAL PAGE

This Site Specific Health and Safety Plan (SHSP) has been prepared and reviewed in accordance with the minimum requirements of 29 CFR 1910.120.

Prepared By: Dawn Han Date: 5/6/97

Dawn Han, CIH, MS, Industrial Hygienist

Reviewed By: Michael H Ziskin/SBB Date: 5/6/97

Michael H. Ziskin, CHCM, CHMM

Approval: _____

Dvirka and Bartilucci Consulting Engineers

DISCLAIMER

This Site Specific Health and Safety Plan (SHSP) has been prepared exclusively for use by Dvirka and Bartilucci Consulting Engineers for the express purpose of conducting a Remedial Investigation/Feasibility Study (RI/FS) at the subject property. Due to the potential for errors, omissions or inaccuracies which may exist from obtaining information from several sources, there is some risk associated with reliance on such information and Field Safety Corporation cannot be responsible for the accuracy or completeness of the information.

Information may be gathered in the future which may modify the contents of the SHSP, and such changes will be presented in the form of an addendum. Use by others is not condoned and the information contained herein is deemed copyrighted. Field Safety Corporation does not warrant its use by others, nor is Field Safety Corporation responsible for its unintended use by others. No other warranty, expressed or implied, is made.

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Appendix G	Care & Cleaning of Respirators
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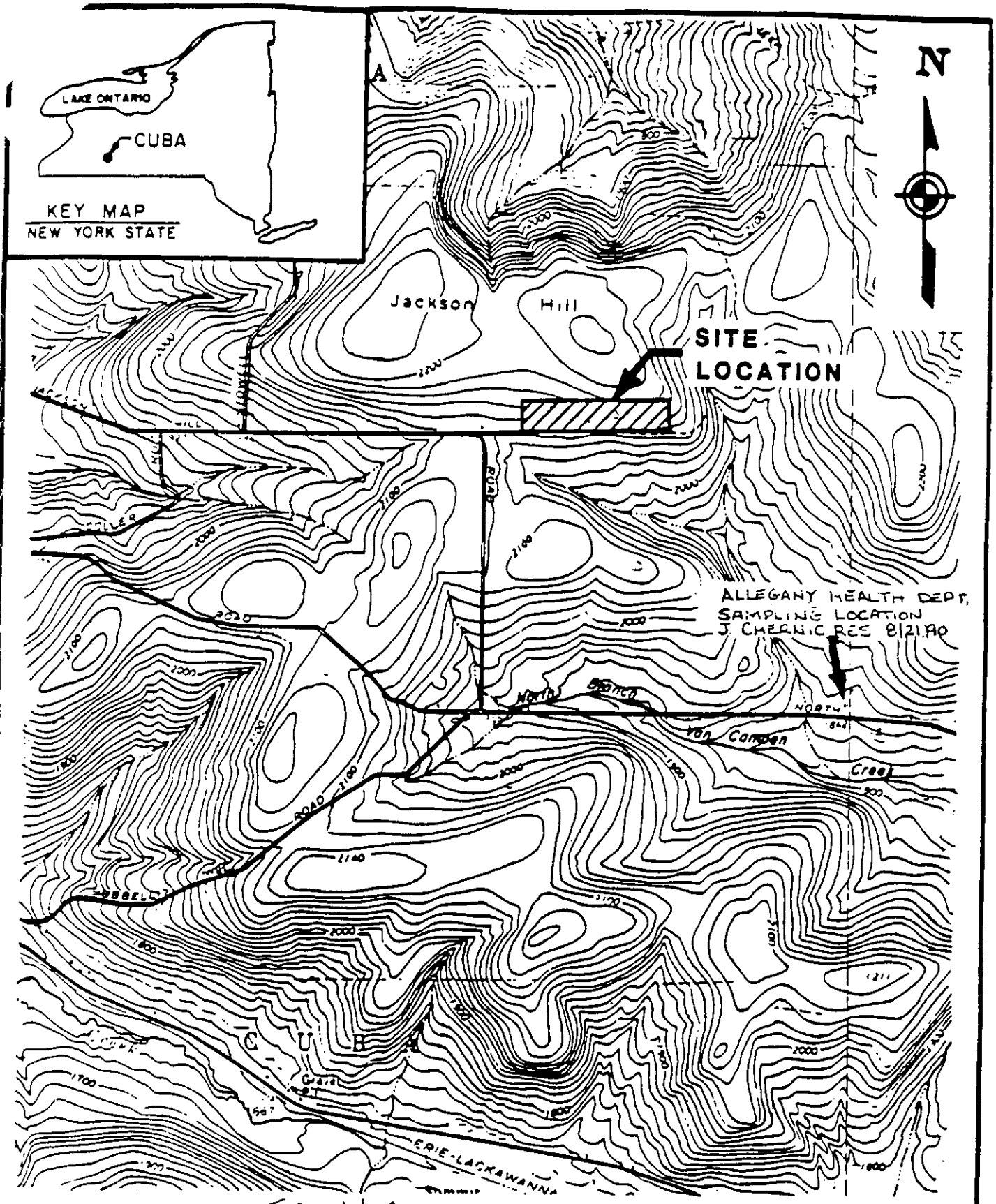
1.0 GENERAL

This Site Specific Health and Safety Plan (SHSP) was prepared to meet the requirements of 29 CFR §1910.120 and §1926, the NIOSH/OSHA/USCG/EPA Guidance Manual for Hazardous Waste Site Activities (NIOSH No. 85-115), USEPA RI/FS guidance, and US EPA "Standard Operating Safety Guides". The SHSP addresses hazardous activities associated with the field investigation and sampling activities during the Remedial Investigation/Feasibility Study (RI/FS) at the Cuba Landfill in Allegany County, New York (see Figure 1). Compliance with the SHSP is required of all on-site personnel entering the site. Visitors to the Cuba Landfill shall be subject to the requirements of this SHSP and be accountable to the authorities having jurisdiction at the site.

1.1 Site Information

Site Name:	Cuba Landfill
Address:	Jackson Hill Road Cuba, New York
Date of SHSP Preparation:	May, 1997



URS CONSULTANTS, INC.

SITE LOCATION MAP
CUBA LANDFILL

FIGURE 1

A-3277

2.0 PURPOSE AND SCOPE

2.1 Purpose and Scope of the Field Investigation

The field investigation to be conducted as part of the Remedial Investigation/Feasibility Study at the subject site will include the following: surface soil sampling, leachate sampling, sediment sampling, soil boring/monitoring well installation, hydraulic conductivity testing, groundwater sampling, test pit program, ambient air monitoring, and surveying and mapping.

2.2 Purpose and Scope of this SHSP

To ensure health and safety during various activities of the RI/FS, including sampling, drilling, and other related investigative activities by setting forth requirement for health and safety supervision, air monitoring, medical monitoring, personal protective equipment, controls, safe work practices, and proper decontamination.

3.0 SUMMARY OF EXISTING SITE INFORMATION

3.1 Site Location

The Cuba Landfill is located on Jackson Hill Road in Cuba of Allegany County, New York (see Figure 1). According to U.S.G.S. Topographic Map, the following location related information is available:

Quadrangle: Friendship/Black Creek
Site Latitude: 42°14'30"
Site Longitude: 78°12'30"
Tax Map Numbers: 155-1-7

3.2 Site Description and History

The Cuba Landfill is a 25 acre municipal landfill operated from the early 1950's until closure in 1983. The site is located on the south side of a hill in a rural area north of the Village of Cuba. Currently, the landfill is covered with vegetation including mostly grasses and small trees, and surrounded by farm fields and forest. There is little evidence of solid waste at or above ground surface.

The Cuba Landfill was permitted as a sanitary landfill in 1979. The landfill operated with waste being deposited in unlined trenches that were 15 feet wide, 12 feet in depth and several hundred feet long. Household, commercial, and industrial waste, including listed hazardous wastes from Acme Electric Corporation were accepted and disposed of at the site during its period of operation. Dewatered wastewater treatment sludge from Village of Cuba was also disposed at the site.

Acme Electric identified several listed hazardous wastes generated by the facility and disposed of at the Cuba Landfill in unknown quantities from 1952 through 1981. These identified wastes included: F001 spent halogenated solvents used in degreasing operations, F002 spent halogenated solvents, F008 plating bath sludges from bottom of plating bath solutions for electroplating operations, F009 spent stripping and cleaning bath solutions from electroplating operations, and B007 PCB capacitors and paint sludges with pH of about 10.

Previous investigations have conducted analysis of soil, groundwater, and surface water samples for the landfill. It was identified that downgradient groundwater samples exceeded applicable groundwater standards (see Table 3-1 below) for this area.

4.0 PERSONNEL ORGANIZATION AND RESPONSIBILITIES

The following subsections briefly describe the health and safety designations and general responsibilities that will be employed for the Cuba Landfill Site. See Appendix A for important telephone numbers and emergency information.

4.1 Designations of Personnel

Health & Safety Officer (HSO)
Gerald Gould, Dvirka & Bartilucci Consulting Engineers
(315) 437-1142

Project Director
Thomas Maher , Dvirka & Bartilucci Consulting Engineers
(516) 364-9892

Project Manager
Gerald Gould, Dvirka & Bartilucci Consulting Engineers
(315) 437-1142

Field Operations Manager
Gerald Gould, Dvirka & Bartilucci Consulting Engineers
(315) 437-1142

Certified Industrial Hygienist
Dawn Han, CIH, M.S., Field Safety Corporation
(203) 457-2100

Physician
Dr. Heitzman, Industrial Medical Associates, Syracuse, NY
(315) 478-1977

4.2 General Responsibilities of Health and Safety Personnel

4.2.1 Health & Safety Officer (HSO)

The HSO has the final authority to resolve health and safety issues at the site. The HSO has overall responsibility for ensuring that the policies and procedures of this SHSP are implemented.

The HSO shall provide regular support for all health and safety activities, including upgrading or downgrading the level of personal protection, as needed.

The HSO is on-site full-time for the duration of the RI/FS of the Cuba Landfill Project. The HSO has the authority to stop work at

any time unsafe work conditions are present. Any potentially hazardous condition posing a risk beyond the defined role or mission which D&B anticipates will require the HSO to consult with the Field Operations Manager (FOM), Project Manager, and Project Director.

The HSO shall complete a daily diary of activities with health and safety relevance including references to maintenance and calibration of health and safety equipment.

4.2.2 Certified Industrial Hygienist (CIH)

The CIH or designee shall remain available off site on an as-needed basis to provide technical support to the HSO.

4.2.3 D&B Project Director

The D&B Project Director will have overall responsibility for implementation of the site-specific health and safety plan, and the supervision and monitoring of D&B employees and subcontractors.

4.2.4 D&B Project Manager

The Project Manager will assure that all elements of this SHSP are implemented where applicable and that all project staff are protected and working in a safe manner.

4.2.5 D&B Field Operations Manager (FOM)

The D&B FOM, or designee, will be responsible for conducting the work and for assuring that the work is conducted in accordance with the requirements of the Contract Document. The FOM, or designee, is on-site for the duration of the project and will manage all day-to-day activities of all parties of this project.

4.2.6 Physician

The Physician will be responsible for all medical review, diagnosis, and certification of all D&B site personnel.

5.0 HAZARD ASSESSMENT AND RISK ANALYSIS

5.1 Potential Health Hazards

The primary concern is to protect workers from potential exposure to contaminated soils, vapors, groundwater and other contaminated materials when conducting the remedial investigation. In addition to the above mentioned chemical hazards, physical, biological and underground hazards also exist. These hazards are described in more detail in the following sections.

5.1.1 Potential Soil and Groundwater Contaminants

Based on the data available for groundwater samples collected downgradient of the Cuba Landfill site and hazard waste disposal history, the following potential contaminants of concern have been identified:

vinyl chloride	toluene
chloroethane	xylenes
1,1 dichloroethane	ethyl benzene
1,2 dichloroathene	chromium
1,1,1 trichloroethane	iron
trichloroethane	PCB

In addition to the above contaminants of concerns, methane and hydrogen sulfide are often present at landfill type of sites.

5.1.2 Health Hazard Evaluation

The primary potential health hazards of concern to workers from contaminants are from inhalation of vapors and dusts, and skin exposure to contaminated soil or splashed water. Potential for these exposures exist when conducting field programs using various investigation techniques.

OSHA Permissible Exposure Levels (PELs) and American Conference of Governmental Industrial Hygienists (ACGIH) Threshold Limit Values (TLV) may be exceeded during investigative activities. Table 5-1 lists the chemicals, PELs, TLVs and primary health hazards. The activities to be performed during remedial investigations are summarized in Section 5.2. These activities will be closely monitored and evaluated to determine the potential for exceeding the standards and the need to implement control measures to protect personnel and the environment.

Table 5-1

PERMISSIBLE EXPOSURE LIMITS (PELS) AND PRIMARY HEALTH HAZARDS FOR POTENTIAL CONTAMINANTS AT THE SITE

Chemical	ACGIH TLV (ppm)	ACGIH STEL*/ Ceiling (ppm)	OSHA PEL (ppm)	OSHA STEL*/ Ceiling (ppm)	Primary Health Hazards
vinyl chloride	5	---	1 Action Level 0.5	5	Liver, skin, resp. sys., CNS, lymphatic system, confirmed human carcinogen
trichloroethene	50	100	100	200	Resp. sys., heart, liver, kidneys, CNS, skin
1,1,1-trichloroethane	350	450	350	---	CNS, eyes, liver, kidneys, skin, cardiovascular systems
1,2-dichloroethene	200	---	200	---	Eyes, resp. sys., CNS
1,1-dichloroethane	100	---	100	---	Skin, liver, kidneys, lungs, CNS
chloroethane	100	---	1000	---	Liver, kidneys, resp. sys., CVS, CNS
toluene	50	---	200	300	Eyes, skin, resp. sys, CNS, liver, kidneys
total xylenes	100	150	100	---	Eyes, skin, resp. sys, CNS, GI tract, blood, liver, kidneys
ethyl benzene	100	125	100	---	Eyes, skin, resp. sys, CNS
chromium (metal)	0.5 mg/m3	---	1 mg/m3	---	Eyes, skin, resp. sys
iron oxide dust and fume (as Fe)	5 mg/m3	---	10 mg/m3	---	Resp. sys
PCB	1 mg/m3	---	0.5 mg/m3	---	Skin, eyes, liver, repro. sys

5.1.3 Potential Exposures

Potential contaminated materials include soil, groundwater, waste, sludge, and vapors. The expected risk of exposure to these chemicals would be from inhalation, ingestion, skin or eye contact with volatile compounds, contaminated dusts, etc. Potential exposure can be mitigated through appropriate investigation procedures, work practices, air monitoring and personal protective equipment. All personnel relate to the investigation will keep upwind of all soil disturbances and sampling activities at all times, when possible. Good workpractice will be implemented to avoid dust generation. In addition, splashing of liquids should be minimized by employing careful handling practices.

5.1.4 Physical Hazards *(This is not an inclusive list- so BEWARE!)*

- Weather conditions-lightning, rain, hurricanes, etc.
- Slips, trips, falls
- Heavy equipment such as drill rig
- Striking and struck-by (heavy equipment)
- Noise
- Cold stress (see Appendix B)
- Heat stress (see Appendix C)

5.1.5 Biological Hazards

Potential biological hazards may include, but are not limited to, ticks, microbiological agents (molds and fungi), poison plants, animals and rodents.

5.2 Activity Safety and Health Hazard Analysis

Field activities for the remedial investigation at the Cuba Landfill will include the following:

- surface soil sampling
- leachate sampling
- sediment sampling
- soil boring/monitoring well installation
- hydraulic conductivity testing
- groundwater sampling
- test pit program
- ambient air monitoring
- surveying and mapping

With the installation of groundwater monitoring wells and soil borings, soil and groundwater sampling, test pit excavations, and other survey activities during the investigation, some inherent safety risks may be expected. There is the potential for mechanical and physical struck-by hazards associated with the equipment and sampling activities. There are also potential electrical hazards from underground lines, overhead lines and use of electrical equipment and tools. The protection of underground utilities is promulgated under New York State Department of Labor Industrial Code 53.

The direct handling of contaminated wastes, containers or concentrated chemicals is not expected during the investigation. In the event that such materials are encountered during the field program, the operation will cease and the uncovered containers which have been damaged will be immediately covered with soil to minimize release of volatile compounds. This condition will be recorded and reported to the NYSDEC, and the field team will be instructed to secure the area until health and safety risks are properly assessed and further actions are determined.

The investigative activities including test pit excavation, monitoring well construction, and various sample collections to be conducted during the remedial investigation represent a moderate health risk given the potential to encounter contaminated material. The risk associated with physical hazards while conducting these investigative activities is moderate to high. Potential levels of airborne contaminants may dictate use of appropriate personal protective equipment as deemed necessary by the HSO.

Proper wearing of protective equipment and employment of stringent personal hygiene practices should reduce potential health hazards.

Restricting access of on-site personnel to all equipment operations, maintaining safe distances from equipment, and wearing proper safety equipment will reduce risk of injuries. Underground utilities should also be identified before any digging related work is conducted.

6.0 TRAINING REQUIREMENTS

6.1 General Health and Safety Training

6.1.1 All on-site personnel who are assigned to work in or enter into the Exclusion Zone or the Contaminant Reduction Zone (see Section 10.0) must be trained in accordance with 29 CFR 1910.120. This training will be required for personnel performing or supervising work; for health, safety, security, or administrative purposes; for maintenance; or for any other site related function. These training requirements also apply to site visitors who enter the Exclusion Zone or the Contaminant Reduction Zone (see Section 10.0 for clarification).

6.1.2 The training shall include a minimum of forty hours of general health and safety training and three days of on-site supervised experience. Documentation of all such training shall be made available to the HSO before any person shall be allowed to enter any potentially contaminated area (namely, the Exclusion Zone or the Contaminant Reduction Zone).

6.2 Site Specific Training

6.2.1 All site personnel shall attend a site specific refresher training program performed by the on-site HSO and become familiar with the SHSP and certify their understanding of this plan (see Appendix D). This training program shall include, at a minimum, training in the following areas:

- Hazard analysis (chemical/physical hazards).
- Standard safety operating procedures.
- Personal hygiene.
- Safety equipment to be used.
- Personal protective equipment to be worn including care, use, and proper fitting.
- Decontamination procedures.
- Areas of restricted access and prohibitions in work areas.
- Emergency procedures and plans.
- Respiratory equipment training and qualitative fit-testing protocols (banana oil and irritant smoke).
- First aid procedures.
- On-site and off-site communications.

- Hazardous materials handling procedures.
- Air monitoring instrumentation use and calibration.
- Sample collection.
- Hazardous materials recognition.
- The "Buddy System" to be used at the site.

6.2.2 Training sessions for visitors entering the Exclusion and Contaminant Reduction Zones shall be conducted by the HSO. See Section 10.1 for descriptions of the Exclusion and Contaminant Reduction Zones. Abbreviated awareness training for visitors who remain in the Support Zone will also be provided by the HSO.

6.2.3 Safety and health meetings shall be conducted at the initiation of the project by the HSO for all personnel assigned to work at the site. (See Appendix E for Safety Meeting record.)

6.2.4 Proof of training for all D&B personnel can be found in Appendix F. Personnel who have not successfully completed the required training shall not be permitted to enter the Exclusion Zone or the Contaminant Reduction Zone.

6.2.5 Daily "Tool Box" safety meetings shall be conducted to keep all on-site personnel aware of current safety and health hazards and changes to work site conditions. Any modifications that the HSO makes to the SHSP will be communicated to personnel at this time.

6.2.6 New employees involved in hazardous activities shall be indoctrinated by the HSO prior to entering the site to work. All training requirements must be completed by a new employee prior to indoctrination. Indoctrination will be comprised of the site-specific refresher training program, the task/operation safety and health risk analysis, and the phased accident prevention plan. This training shall be documented in the Site Worker Training and Medical Examination Record (Appendix F).

7.0 PERSONAL PROTECTIVE EQUIPMENT

7.1 General

All on-site personnel shall have appropriate PPE. All PPE is to be used properly and protective clothing is to be kept clean and well maintained. The HSO shall maintain constant communication with on-site personnel when conducting air monitoring and consult the Certified Industrial Hygienist, if necessary, with regard to "action levels" at which the specified minimum levels of protection are either upgraded or downgraded based upon air monitoring results and direct contact potential. The HSO has the authority to require the use of additional equipment, if necessary, for specific operations, or may tailor PPE specifications to best fit the hazard control requirements as appropriate. Action levels are defined in Section 9 and are summarized in Table 9-1.

7.2 General Site Safety Equipment Requirements

This is the basic work uniform and will primarily be worn outside the Exclusion Zone and the Contaminant Reduction Zone at the Cuba Landfill Site.

7.2.1 Equipment

- Coveralls. (Optional, may be disposable type).
- Boots/shoes - (OSHA compliant construction footwear).
- Hard hat with splash shield - ANSI approved.
- Gloves (optional).
- Safety glasses - ANSI approved.

7.2.2 Each work task performed on-site will require some level of personal protection for each person. See Table 7-1 for a listing of PPE requirements. Each level of protection is discussed below.

7.3 Level D Protection

Level D protection initially shall be worn in the Exclusion Zone and Contaminant Reduction Zone during non-intrusive sampling and investigative activities, and equipment shall be selected by the HSO from the equipment in Section 7.3.1. The HSO will determine appropriate protective equipment as deemed necessary for specific site operations.

7.3.1 Equipment

- One or two piece disposable suit, PE-tyvek or equivalent (modification of protective suits may be made upon the approval of the HSO).
- Gloves - Outer (minimum 11 mil. nitrile or equivalent); Inner (latex).
- Boots - Outer (neoprene or equivalent); Inner (steel toe and shank) or equivalent combination (ANSI approved).
- Safety glasses or goggles (ANSI approved).
- Hard hat with splash shield, if needed (ANSI approved).
- Hearing protection (if work is near heavy or noisy equipment).

7.4 Level C Protection

Level C protection shall be selected when a modified level of respiratory protection is needed. Selection shall be made when air monitoring results of the site or individual work areas exceed the action level criteria.

7.4.1 Equipment

- Full facepiece, air purifying respirator with combination organic vapor and high efficiency particulate air (HEPA) cartridges (OSHA/NIOSH approved).
- Hooded one or two piece chemical resistant suit, PE - Tyvek or equivalent (modification of protective suits may be made upon the approval of the HSO).
- Gloves - Outer (minimum 11 mil nitrile or equivalent); Inner (latex).
- Boots - Outer (neoprene or equivalent); Inner (steel toe and shank) or equivalent combination (ANSI approved).
- Two way radio communications (for remote operations).
- Hard hat with splash shield (ANSI approved).
- Hearing protection (if work is near heavy or noisy equipment)

7.5 Level B Protection

Level B protection requires full chemical resistant clothing with a full facepiece SCBA or supplied air respirator. Generally, this level of protection is not expected for this project. However, provision will be made to have this equipment available should its use be determined to be required. Investigative activities which may result in this level of protection being required will not be implemented until the equipment has been transported to the site. The HSO will be notified should air monitoring indicate this level of protection is required. Implementation of Level B protection will only be performed when sufficiently trained personnel

(minimum of two) are available on-site.

7.6 Confined Spaces

Under no circumstances will confined spaces be entered unless discussed with the Project Director and HSO, and the HASP is prepared to incorporate additional safety requirements, and all personnel are trained appropriately to deal with confined space hazards.

7.7 Standing Orders

7.7.1 All prescription eyeglasses in use on the site shall be safety glasses. Prescription lens inserts shall be provided for full-face respirators. All eye and face protection shall conform to OSHA 1910.133.

7.7.2 Programs for respiratory protection shall conform to OSHA 1910.134 and ANSI Z88.2-1980. A respiratory program addressing site specific respirator care and cleaning is described in Appendix F.

7.7.3 Personnel unable to pass a fit-test shall not enter or work in the Exclusion Zone or Contaminant Reduction Zone.

7.7.4 Each respirator shall be individually assigned and not interchanged between workers without cleaning and sanitizing. Cartridges/canisters and filters shall be changed daily or upon breakthrough, whichever occurs first. If breakthrough occurs, a reevaluation by the HSO of the protection level is warranted. A procedure for assuring periodic cleaning, maintenance, and change of filters shall be followed by each respirator wearer. This procedure is described in Appendix G - Respiratory Cleaning and Maintenance Procedure.

7.7.5 A hard hat shall be worn by all personnel. All head protection shall conform to the requirements in OSHA 1910.135.

7.7.6 All Level D or C personal protective equipment worn on-site shall be decontaminated before being reissued. Disposable equipment shall be properly disposed of (as contaminated solid waste) at the end of the work day in the Personnel Decontamination Area. The HSO is responsible for ensuring all personal protective equipment is decontaminated before being reissued (see Section 11.0).

7.7.7 All safety boots shall conform to OSHA 1910.136.

7.7.8 Power equipment may generate excessive noise levels (in excess of 85 decibels). Proper ear protection shall be provided and used in accordance with OSHA 1926.52

TABLE 7-1
PERSONAL PROTECTIVE EQUIPMENT REQUIREMENTS

LEVEL OF WORK TASK	LEVEL OF PROTECTION*	SPECIFIC PPE**
Restricted Zone/Support Zone Operations	D	Work clothes, hard hat, safety glasses with side shields, steel toe work shoes or boots
Drilling/Sampling/Air Monitoring Inside Exclusion Zone	D, C, or B	Same level as above but with liquid-proof resistant coverall, gloves, rubber boots, full-face air-purifying respirators with organic vapor/HEPA cartridges (based on Action Levels)
Emergency Entry	B	Same protective clothing, gloves and boots as above but with self-containing breathing apparatus (SCBA) pressure demand

* Level of protection may be modified by the HSO dependent upon air monitoring and visual observations

** Specific combinations of PPE will be determined by the HSO and will depend upon specific job assignment of worker. Proper use of respiratory protection, including mask cleaning, disinfection, inspection and maintenance, will be enforced. All contaminated clothing will be disposed of in accordance with the procedures in Section 11.0 of this SHSP.

8.0 MEDICAL SURVEILLANCE

All personnel involved in hazardous waste operations must have satisfactorily completed a comprehensive medical examination prior to the initiation of hazardous waste operations at the Cuba Landfill Site. Medical examinations are required for any and all personnel entering Exclusion or Contamination Reduction Zones (with the exception of visitors wearing respiratory protection as deemed necessary by the HSO).

Medical examinations are not required for people making periodic deliveries provided they do not enter Exclusion or Contamination Reduction Zones.

The date of physical examination of each site worker is documented in Appendix E - Site Worker Training and Medical Examination Record. A specific Medical Data Sheet for each individual will be filed with the HSO on-site prior to commencing operations. See Appendix H for Medical Data Sheet.

All contractor personnel who will enter the Exclusion Zone or the Contaminant Reduction Zone shall be provided with medical surveillance prior to their participation in work.

8.1 Medical Surveillance Protocol

8.1.1 Medical surveillance protocol is the physician's responsibility but shall meet the requirements of OSHA Standard 29 CFR 1910.120 for all personnel. The protocol shall be selected by the physician.

8.1.2 Additional clinical tests may be included at the discretion of the attending Physician performing the medical examination.

8.2 Non-Scheduled Medical Examinations

The scope of the Non-Scheduled Medical Examinations shall be determined by the physician.

8.2.1 Non-scheduled medical examinations shall be conducted under the following circumstances:

- After acute exposure to any toxic or hazardous material.
- At the discretion of the HSO and/or the Physician, when an employee has been exposed to potentially dangerous levels of toxic or hazardous materials.
- At the discretion of the HSO and/or the Physician, and at the request of an employee with demonstrated symptoms of exposure to toxic or hazardous materials.

8.3 Documentation and Recordkeeping

8.3.1 The examining Physician shall notify the HSO in writing that the individual has received a medical examination and shall advise as to any specific limitations upon such individual's ability to work at the project site which were identified as a result of the examination. Appropriate action shall be taken in light of the advice given pursuant to this paragraph.

8.3.2 The ability of on-site personnel to wear respiratory protection during hazardous waste activities shall be certified by the Physician. Cardiopulmonary system examination and pulmonary function testing are minimum requirements.

8.3.3 The Physician shall maintain and provide access for employees to medical surveillance records according to OSHA requirement (29 CFR 1910.20). These records shall be maintained for a period of 40 years.

9.0 ENVIRONMENTAL AND PERSONAL MONITORING PROGRAM

9.1 General

In order to protect site workers from harmful levels of airborne toxic materials, potentially explosive environmental, or excessively hot/cold conditions, regular environmental and personnel monitoring may be accomplished to document exposures and to decide when to increase protective measures.

9.2 Air Monitoring

Particular phases of work or tasks may require the utilization of specific air monitoring equipment to detect relative levels of contaminants or identify unknown environments.

Air monitoring will be conducted continuously by the HSO for the express purpose of safe-guarding the health and welfare of site workers and the general public residing in the vicinity of the Cuba Landfill Site. The on-site air monitoring will include using direct reading air monitoring equipment.

- Photoionization Detector fitted with a 10.6 eV lamp, or approved equal.
- Combustible gas, hydrogen sulfide and carbon monoxide meter.
- Mini-RAM Model PDM-3 or equivalent digital respirable dust indicator.
- Drager gas detector tubes for detecting specific hydrocarbons (e.g. vinyl chloride) should PID reading exceed 1 ppm.

9.2.1 Work Zone Air Monitoring

The primary areas or zones to be monitored during the project are the work zones established around sampling, drilling or excavation locations. Monitoring will be documented within these work zones and at the site perimeter. Air monitoring conducted at the sampling locales will focus on worker's breathing zones and may include personal breathing zone samples. Air monitoring just outside of these locations will consist of instruments attempting to quantify the types and degrees of emissions originating from sampling sites.

❑ Exclusion Zone Air Monitoring

Air monitoring conducted in the Exclusion Zone will focus on real time measurement of toxic compounds that pose inhalation hazards, levels of flammable compounds for

explosive hazards, and oxygen deficient atmospheres. A summary of the action levels are provided in Table 9-1.

General visual observation shall also be used during all intrusive activities to identify airborne releases (vapors, smoke, etc.) changes in the coloration of excavated materials, changes to the structural integrity of the surface or mechanical integrity of the equipment. Should such conditions be noticed or encountered, work shall be halted, and the area evacuated until such time the FOM can be contacted and specific procedures for characterizing and handling the hazard can be developed.

The HSO, or on-site designee, shall observe site conditions daily with special attention to the aforementioned conditions. Depending on site conditions, additional personal protection measures shall be implemented during the course of site work.

- **Perimeter Air Monitoring**

  Air monitoring will be accomplished at the upwind and downwind perimeter of the drilling and sampling locations, if deemed necessary by the HSO, to document real time levels of contaminants which might be moving off-site.

- **Background Air Monitoring**

  Background air monitoring will be conducted prior to the start of work each day. Contaminant levels shall be obtained at the upwind site perimeter of the Exclusion Zone. Wind direction will be determined prior to initiation of investigative activities. This background data must be annotated on the appropriate air sampling forms for that day.

- **Duration, Frequency, and Protocol**

  Monitoring is required continuously or as deemed necessary by the HSO, during all activities in the Exclusion Zone, particularly during intrusive activities. The HSO may modify the work zone sampling frequency upon review of previously analyzed work zone samples.

9.3 Cold Stress Monitoring

Cold Stress guidelines are described in detail in Appendix B.

9.4 Heat Stress Monitoring

Heat stress guidelines are described in detail in Appendix C.

9.5 Quality Assurance and Control

All monitoring instruments will be protected from surface contamination during use to allow easy decontamination. All instrumentation shall be calibrated before and after use and operational checks conducted periodically in the field over the duration of the day's field activities.

9.5.1 The following data shall be recorded by the HSO on the Air Monitoring Data form:

- Date and time of monitoring;
- air monitoring location;
- instrument, model #, serial #;
- calibration/background levels;
- results of monitoring; and
- HSO signature.

Note: See Appendix I for Air Monitoring Results Form.

9.5.2 Interpretation of the data and any further recommendations shall be made by the HSO.

9.5.3 Air monitoring results shall be given verbally to the FOM following each site scan that indicates contaminant concentrations in excess of the action levels. Results will then be documented in writing and provided to the FOM by the end at work day.

Table 9-1

ACTION LEVELS FOR REMEDIAL INVESTIGATIONS

Action Level	Action To Be Taken
PID	
Background	Level D
Background to 5 units* above background in breathing zone, and no vinyl chloride present	Halt work, evacuate area and allow area to ventilate prior to resuming work. Should levels persist, upgrade to Level C protection if required upon approval by HSO and FOM.
Greater than 5 units* above background in breathing zone, and no vinyl chloride present	Halt work, evacuate work area and allow area to ventilate prior to resuming work. Should levels persist, upgrade to Level B protection if required upon approval by HSO and FOM.
DRAGER COLORIMETRIC TUBE	
Positive color change for vinyl chloride <0.5 ppm	Halt work, evacuate area and allow area to ventilate prior to resuming work. Should levels persist, upgrade to Level C protection if required upon approval by HSO and FOM.
Vinyl chloride 0.5-1.0 ppm	Halt work, evacuate work area and allow area to ventilate prior to resuming work. Should levels persist, upgrade to Level B protection if required upon approval by HSO and FOM.
Vinyl chloride or benzene > 1 ppm	Shut down work activities. Monitor site to check for off-site migration.
COMBUSTIBLE GAS METER	
Greater that 10% Lower Explosive Limit (LEL)	Halt work, evacuate area and allow area to ventilate to below 10% LEL prior to resuming work. Notify FOM.

Action Level	Action To Be Taken
OXYGEN	
Less than 20.5%	Continuous monitoring. Consider engineering controls.
Less than 19.5%	Evacuate work area. Institute ventilation and engineering controls. Maintain site conditions for at least 15 minutes before proceeding. Notify FOM.
Greater than 22%	Continuous monitoring and identify combustion sources.
Greater than 23.5%	Evacuate and institute engineering controls as necessary before proceeding. Explosive condition may be present. Notify FOM.
HYDROGEN SULFIDE	
Less than 10 ppm at breathing zone	Level D and continuous monitoring
Above 10 ppm at breathing zone	Halt work, evacuate area and allow area to ventilate to below 10 ppm. If levels persist, upgrade to Level B protection if required upon approval by HSO and FOM.
RESPIRABLE DUST	
Respirable dust $\geq$ 150 ug/m3	Halt work, evacuate area and allow area to ventilate prior to resuming work. Should levels persist, upgrade to Level C protection if required upon approval by HSO or FOM.

* **Units equal total ionizable organic/inorganic vapors and gases.**

** **Reading sustained for one (1) minute (60 seconds) or longer.**

10.0 SITE CONTROL MEASURES

10.1 Work Zones

Those tasks discussed previously in Section 5.0 will be subject to zonation. The Restricted Zone (RZ) will be identified by D&B as the area within which all project operations take place. At each drilling and sampling site, three work areas shall be established: the Exclusion Zone (EZ), Contaminant Reduction Zone (CRZ), and Support Zone (SZ). Only authorized personnel will be allowed in the RZ. As long as an Exclusion Zone exists, a five foot wide (or distance determined by the HSO) strip of land bordering the EZ will be considered the CRZ if applicable. In addition to this strip of land, a specially demarcated area that connects the decontamination area to the CRZ will also be treated as an extension of the CRZ. All other areas inside the restricted area that are not an active Exclusion or Contaminant Reduction Zone will be treated as a Support Zone. Detailed explanations of each Zone are provided below.

10.1.1 Exclusion Zone

The Exclusion Zone includes the intrusive activities and isolates the area of contaminant generation and restricts (to the extent possible) the spread of contamination from active areas of the site to support areas and off-site locations. This area will encompass all intrusive work. The Exclusion Zone is demarcated by the Hot Line (i.e.; a tape or rope line or physical barrier). Personnel entering the Exclusion Zone must:

- enter through a controlled access point (the Contaminant Reduction Zone),
- wear the prescribed level of protection (see Section 7.0), and
- be authorized to enter the Exclusion Zone (see Section 4.0, 6.0, and 8.0).

Any personnel, equipment, or materials exiting the Exclusion Zone will be considered contaminated. The HSO shall determine by visual inspection site personal requiring decontamination. Equipment and materials will either be subject to decontamination or containerized in uncontaminated devices as deemed necessary by the HSO. The HSO will consult the Project Director or Manager to assure compliance with work plan specifications concerning decontamination issues.

Specific access for emergency services to areas of specific site operations will be established by the HSO prior to commencing any operation. The delineated area of the Exclusion Zone may

vary with task. (See Section 5.0 for specific task descriptions and the levels of protection to be used.)

10.1.2 Contaminant Reduction Zone

Moving upwind from the Exclusion Zone, starting at the Hot Line and continuing to the Contaminant Control Line is the Contaminant Reduction Zone. This zone will border the Exclusion Zone and extend a distance of 20 feet in width, or as deemed necessary by the HSO. The Contaminant Reduction Zone is a transition zone between contaminated and uncontaminated areas of the site. When contaminated personnel, equipment, or materials cross the Hot Line, they are assumed to be contaminated from site operations. Being subjected to the decontamination process, they become less contaminated; when they reach the Contaminant Control Line, they are considered clean and can exit this zone without spreading contamination.

Within the Contaminant Reduction Zone is the Contaminant Reduction Corridor (CRC), where materials necessary for personnel and equipment decontamination are kept. A separate area shall be established for heavy equipment decontamination. In addition, certain safety equipment (e.g.; emergency eye wash, fire extinguisher, and first aid kit) are staged in this zone.

The level of protection to be used within the Contaminant Reduction Zone will normally be Level D. However, the HSO shall determine appropriate levels of protection based upon air monitoring readings, and visual inspection of personnel, and equipment operations in the Contaminant Reduction and Exclusion Zones. Equipment operators (cranes & trucks) physically performing tasks outside the CRC may be exempt from this requirement as approved by the HSO.

10.1.3 Support Zone

The Support Zone is the outermost zone of the site, separated from the Contaminant Reduction Zone by the Contamination Control Line; it is considered a clean area. Movement of personnel and materials from this zone into restricted areas and the Contaminant Reduction Zone will be through access points controlled by the HSO.

The Support Zone contains the necessary storage of equipment, stockpiling of material and support facilities (including personal

hygiene facilities) for site operations. Eating, drinking, and smoking will be allowed only in this zone. It also contains the command post, communications center, security check point and source of emergency assistance for operations in the Exclusion Zone and Contaminant Reduction Zone. A log of all persons entering the site will be maintained by the HSO.

The level of protection used in this zone is general site safety equipment (see Section 7.0).

10.2 Drilling Excavation Operations Start-up

10.2.1 The location and depth of each bore hole/test pit/trench will be determined on-site.

10.2.2 Staging for excavation material will be determined prior to commencing drilling/excavation operations.

10.2.3 No personnel will be positioned downwind during drilling/excavation operations.

10.2.4 Location of staging area for support equipment (i.e.; air bottles) will be determined on-site however, it must be upwind and in close proximity to the Exclusion Zone.

10.2.5 The hollow-stem augers, drilling rods, bucket and drill cuttings shall be thoroughly wetted with water to limit airborne releases.

10.2.6 The driller will then decontaminate equipment and the HSO will survey the rig/excavator for any contamination prior to drilling the next hole.

10.3 Buddy System

10.3.1 All on-site personnel shall utilize a buddy system when any task performed at the Cuba Landfill Site requires:

- Personnel to assist in completing an activity.
- Intrusive work performed in the Exclusion Zone (e.g.; drilling, boring, etc.).
- The use of protective clothing.
- Communication between the Exclusion Zone and outside the Exclusion Zone.

10.3.2 The HSO and FOM shall enforce the buddy system and has the authority to modify the criteria stated above to deal with changing site specific and environmental conditions.

10.3.3 In order to ensure that help will be provided in an emergency, all on-site personnel shall be in line-of-sight contact or in communication by radio with the HSO when working in the

Exclusion Zone.

10.4 Site Communications Plan

10.4.1 Internal communications will be used by on-site supervisory personnel.

10.4.2 The HSO shall ensure all site personnel are trained to use internal communications to:

- alert personnel on-site of emergencies;
- pass along safety information (such as for heat stress, cold stress control, or rest period time, etc.);
- changes in work scope, scheduling or sequencing of operations; and
- maintain site control (such as notification of vandalism, intruders, or violations of SHSP protocol).

10.4.3 Verbal communications and hand signals shall be used for all tasks of the Cuba Landfill Project. However, for those tasks performed in Level D or Level C, radio communications may be used.

10.4.4 Any Exclusion Zone work activity being performed out of the line of sight of the HSO, may require use of radio communications. The HSO may designate a radio operator at the location where the work activity is being performed.

10.4.5 Air horns shall be positioned at any Exclusion Zone work area to be used for emergency response only. The HSO shall designate air horn blast sequences for identification of work location, type of emergency, and need for evacuation of all personnel.

10.4.6 Wind direction indicators shall be installed such that a line-of-sight is maintained with all personnel in all work zones. The HSO shall designate specific locations for wind direction indicators.

10.4.7 All moving machinery, bulldozers, cranes, dump trucks, etc. shall have working backup alarms.

10.4.8 External communications (outside the Cuba Landfill Site) shall be maintained and be used to coordinate emergency response, report to management, and maintain contact with essential off-site personnel.

10.4.9 All on-site personnel shall be informed of external communications hardware (such as telephone, etc.) and the necessary telephone numbers to contact in the event of an emergency situation (fire, police, ambulance, etc.).

10.4.10 All emergency numbers shall be posted in the command post (see Appendix A for listing of important telephone numbers).

10.4.11 Appropriate action shall be taken should any hazardous environmental condition be observed on site. These conditions and the appropriate action to be taken as follows:

OBSERVATION	ANTICIPATED HAZARD	ACTION
Muddy Condition	Slip/Fall Equipment Instability	Monitor Work Until Condition Improves
Lightning	Electrocution	Stop Work Until Condition Subsides
Horn Blasts or Other Notification by Site Personnel	Site Emergency	Stop Work Evacuate Site Follow Emergency Notification Procedures
Personal Injury	Other Personnel May Be Affected	Follow Emergency Notification Procedures
Personal Fatigue	Heat/Cold Stress	Follow Heat/Cold Stress Guidelines
Windy Condition	Overhead Hazards Visual Impairment	Stop Work Until Condition Subsides

10.5 Medical Assistance (see Appendix A for complete listing of emergency contacts)

The primary source of medical assistance for the Cuba Landfill Site is:

Cuba Memorial Hospital

Location: 140 W. Main Street, Cuba
Telephone: 716-968-2000

See Figure 2 for Hospital Route Map and Directions.

EMERGENCY TELEPHONE NUMBERS

AGENT/FACILITY	TELEPHONE	EMERGENCY
Emergency Medical Services		
Ambulance		911
Hospital	716-968-2000	
Police Department		911
Fire Department		911
NYSDEC Project Contact	518-457-5636	
Gary Kline		
D&B Office	315-437-1142	
FSC Office	203-457-2100	

ON-SITE FIRST AID EQUIPMENT

A first aid kit will be available at the site

EMERGENCY MEDICAL INFORMATION FOR SUBSTANCES PRESENT

SUBSTANCE	EXPOSURE SYMPTOMS	FIRST AID
VOCs	Dermal: Irritation	Rinse affected area with water
	Inhalation: Dizziness, Nausea	Ventilate, artificial respiration
H_2S	Inhalation: Irritation	Ventilate, artificial respiration
Methane	Inhalation: Dizziness, Nausea	Ventilate, artificial respiration
PCB	Eye irritations, chloracne, liver damage	Soap wash immediately, respiratory support

GENERAL EMERGENCY PROCEDURES

The following standard emergency procedures will be used by on-site personnel. The HSO shall be notified of any on-site emergencies and shall be responsible for ensuring that the appropriate procedures are followed.

Personal Injury: Administer first aid and/or CPR, and arrange for medical attention

Fire/Explosion: The fire department shall be alerted by the field engineer. Personnel shall move a safe distance from the involved area.

10.6 Safe Work Practices

Workers are expected to adhere to established safe work practices for their respective specialties. The need to exercise caution in the performance of specific work tasks is made more acute due to:

- physical, chemical, and toxicological properties of contaminated material present;
- other types of hazards present, such as heavy equipment, falling objects, loss of balance or tripping;
- weather restrictions;
- restricted mobility and reduced peripheral vision caused by the protective gear itself;
- the need to maintain the integrity of the protective gear; and
- the increased difficulty in communicating caused by respirators.

Work at the site will be conducted according to established protocols and guidelines as contained in this document for the safety and health of all involved. Among the most important of these principles for working at the Cuba Landfill Site are the following:

10.6.1 General

- In any unknown situation, always assume the worst conditions and plan responses accordingly.
- Because no personal protective equipment is 100 percent effective, all personnel must minimize contact with contaminated materials. Plan work areas, decontamination areas, and procedures accordingly.
- Smoking, eating, chewing gum or tobacco, or drinking in the Contaminant Reduction Zone and the Exclusion Zone will not be allowed. Oral ingestion of contaminants is the second most likely means of introducing toxic substances into the body (inhalation is the first).
- Work breaks should be planned to prevent stress related accidents or fatigue related to wearing protective gear.
- Medicine and alcohol can potentate the effects from exposure to toxic chemicals and cold stress. Prescribed drugs should not be taken if working in the Contaminant Reduction Zone or Exclusion Zone, unless approval has been given by the physician. Alcoholic beverage consumption shall be prohibited on the site.
- Personnel must be observant of not only one's own immediate surrounding, but also those of others. Everyone will be working under constraints, therefore, a team effort is needed to notice and warn of impending dangerous

situations. Extra precautions are necessary when working near heavy equipment and while utilizing personal protective gear because vision, hearing, and communication will be restricted.

- Contact lenses are not allowed to be worn on site; if corrosive or lachrymose substances enter the eyes, proper flushing is impeded.
- All facial hair, that interferes with the respirator facepiece fit, must be removed prior to donning a respirator for all tasks requiring **Level C** or **Level B** protection.
- Personnel must be aware that chemical contaminants may mimic or enhance symptoms of other illnesses or intoxication. Avoid use of alcohol or working while ill during the duration of task assignment.
- The HSO will maintain records in a bound notebook (e.g.; daily activities, meetings, incidents, and data). Notebooks will remain on-site for the duration of the project so that other safety and health personnel may add information, thereby maintaining continuity. These notebooks and daily records will become part of the permanent project file.

10.6.2 Site Personnel

- All personnel at the Cuba Landfill Site shall be identified to the HSO.
- All personnel operating in respective work zones shall dress according to the protection levels set forth in this SHSP (see Section 7.0).
- No red head wooden matches or lighters of any kind will be allowed in the Contaminant Reduction Zone or Exclusion Zone.
- All personnel will have their buddy with them when the buddy system is in effect.
- All personnel will notify the HSO of any unusual occurrences that might effect the overall safe operation of the site.
- Any time a fire extinguisher is used, personnel shall notify the HSO of what took place.
- All injuries and accidents shall be immediately reported to the HSO and the appropriate reports filed.

10.6.3 Traffic Safety Rules

- Any project related vehicles that will not be involved in the site operations will be secured and the motor shut down.
- Only personnel assigned to this job will be allowed to enter the site. Any other people, whether from OSHA, EPA, or

vendors supplying equipment, etc., will have to be met prior to entering the site.

- At no time will any equipment be allowed to block any access road. If in the moving of said equipment, a temporary blockage will exist, that equipment will have an operator available to move that equipment.
- All deliveries by outside personnel will be met at the gate and escorted by HSO or designee onto the site.

10.6.4 Equipment Safety Rules

- Proper loading and operation of trucks on-site shall be maintained in accordance with DOT requirements covering such items as grounding, placarding, driver qualifications and the use of wheel locks.
- Operation of heavy construction equipment shall be in accordance with OSHA regulations 29 CFR 1910 and 1926.
- All equipment that is brought on-site will be available for inspection by the HSO.
- The HSO, or designee, will assign protective equipment to all site personnel and this equipment will be made available for inspection at anytime.
- All equipment shall be installed with appropriate equipment guards and engineering controls. These include rollover protective structures.
- Safe distances will be maintained when working around heavy equipment.
- All equipment and tools to be operated in potentially explosive environments must be intrinsically safe. They should be pneumatically or hydraulically driven, and not generat sparks. Portable electric tools and appliances can be used when there is no potential for flammable or explosive conditions. Three-wire grounded extension cords should be used to prevent electric shocks. Ground fault interrupters shall be used as well.
- With hydraulic power tools, fire-resistant fluid that is capable of retaining its operating characteristics at the most extreme temperatures shall be used.
- Cutting or welding operations shall not be carried out without the approval of the HSO and FOM.
- At the start of each work day and on a weekly basis, inspection of brakes, hydraulic lines, light signals, fire extinguishers, fluid levels, steering, and splash protection shall be made by the equipment operators.
- All non-essential people shall be kept out of the work area.
- Loose-fitting clothing or loose long hair around moving

machinery shall be prohibited.

- Cabs shall be free of all non-essential items and all loose items shall be secured.
- The rated load capacity of a vehicle shall not be exceeded.
- Dust control measures shall be enforced by the HSO to prevent the movement of dusts from contaminated areas to clean areas.
- Equipment operators shall report to their supervisor(s) any abnormalities such as equipment failure, oozing liquids, unusual odors, etc.
- When an equipment operator must negotiate in tight quarters, a second person shall be used to ensure adequate clearance.
- A signalman shall be used to direct backing as necessary.
- Refueling shall be done in safe areas. Engines should not be fueled while vehicle is running. Ignition sources near a fuel area shall be prohibited.
- All blades and buckets shall be lowered to the ground and parking brakes set before shutting off the vehicles.
- An ongoing maintenance program for all tools and equipment shall be implemented by D&B or the responsible subcontractor equipment supervisor. All tools and moving equipment shall be regularly inspected to ensure that parts are secured and intact with no evidence of cracks or areas of weakness, that the equipment turns smoothly with no evidence of wobble, and that it is operating according to manufacturer's specifications.
- Tools shall be stored in clean, secure areas so that they will not be damaged, lost, or stolen.

10.6.5 Daily Housekeeping

The site and all work zones shall be kept in an orderly fashion and the site is to be left safe and secure upon completion of each day's work.

10.6.6 Site Personnel Conduct

- All site personnel shall conduct themselves properly and in accordance with generally accepted good work practice.
- At all times, the HSO will monitor all safe operations at the site. Any operation not within the scope of the SHSP will be discussed fully before that operation begins.

11.0 PERSONAL HYGIENE AND DECONTAMINATION

11.1 General

11.1.1 All personnel performing or supervising remedial work within a hazardous work area, or exposed or subject to exposure to hazardous chemical vapors, liquids, or contaminated solids, will observe and adhere to the personal hygiene-related provisions of this section.

11.1.2 Any personnel found to be repeatedly disregarding the personal hygiene-related provisions of the SHSP shall be barred from the site by the HSO.

11.1.3 All on-site personnel shall wear personal protective equipment as required at all times whenever entering the Contaminant Reduction Zone or the Exclusion Zone.

11.1.4 Personal hygiene and decontamination facilities, in accordance with OSHA 29 CFR 1910.120 (N), will be provided on-site and include:

- Storage and disposal containers for used disposable outerwear
- potable water for hand washing.

11.1.5 Hand washing facilities, a lunch area, and toilet facilities will be available off-site at a predesignated location as determined by the Project Manager prior to initialing Exclusion Zone work.

11.2 Contamination Prevention

To minimize contact with contaminated substances and lessen the potential for contamination, the following will be adhered to during all phases of site entry and excavation.

- Personnel will make every effort not to walk through any areas of obvious contamination (i.e., liquids, discolored surfaces, smoke/vapor clouds, etc.).
- Personnel will not kneel or sit on the ground in the Exclusion Zone and/or the Contaminant Reduction Zone.

11.3 Personal Hygiene Policy

11.3.1 Smoking and chewing tobacco shall be prohibited except in a designated break area within the Support Zone.

11.3.2 Eating and drinking shall be prohibited except in the designated lunch or break area within the Support Zone.

11.3.3 All outer protective clothing (e.g.; chemically protective suits, gloves, and boots) shall be removed and personnel shall

thoroughly cleanse their hands and other exposed areas before leaving the Contaminant Reduction Zone.

11.3.4 Drinking of replacement fluids shall be permitted in a designated area of the Contaminant Reduction Zone. Personnel shall, as a minimum, remove outer and inner gloves, respirator and coverall top, and wash hands prior to drinking replacement fluids.

11.3.5 All personnel returning from the Contaminant Reduction Zone or the Exclusion Zone should change into fresh clothing after each working period or shift. Showering is mandatory upon return to each individuals' rest place.

11.4 Personnel Decontamination Procedures

Decontamination procedures are followed by all personnel leaving the Exclusion Zone. Under no circumstances (except emergency evacuation) will personnel be allowed to leave the Exclusion Zone prior to decontamination. Generalized procedures for decontamination follow. All procedures apply for Level C, however for Level D only steps 2, 3, and 8 apply. The HSO may modify these procedures based on site conditions.

Step 1 Drop tools, monitors, samples, and trash at designated drop stations (i.e.; plastic containers or drop sheets). See Section 9.4 for equipment decontamination specifics.

Step 2 Scrub outer boots and outer gloves with decon solution or detergent and water. Rinse with water.

Step 3 Remove tape from outer boots (if applicable) and remove boots; discard tape in disposal container. Place boots on boot rack.

Step 4 Remove tape from outer gloves (if applicable) and remove only outer gloves; discard in disposal container.

Step 5 This is the last step in the decontamination procedure if the worker has left the Exclusion Zone to exchange the cartridges on his/her air purifying respirator. The cartridges should be exchanged, new outer gloves and boot covers donned, the joints taped, if necessary, and the worker returns to duty.

Step 6 Remove outer garments and discard in disposal container. New outer garments shall be issued at the beginning of each work day or as deemed necessary by the HSO.

Step 7 Remove respirator and place or hang in the designated area.

Step 8 Remove inner gloves and discard in disposal container.

Note: Disposable items (i.e.; coveralls, gloves, and boots) will be changed on a daily basis unless there is reason to change sooner. Dual respirator cartridges will be changed daily, unless more frequent changes are deemed appropriate by site surveillance data or by assessments made by the HSO.

Pressurized sprayers or other designated equipment will be available in the decontamination area for wash down and cleaning of personnel, samples, and equipment.

A waterless hand cleaner and paper towels may be used for hands, arms, and any other skin surfaces potentially in contact with contaminated material.

Respirators (if used) will be decontaminated daily and taken from the drop area. The masks will be disassembled, the cartridges set aside, and all other parts placed in a cleansing solution. After an appropriate time in the solution, the parts will be removed and rinsed with tap water. Old cartridges will be discarded in the contaminated trash container for disposal. In the morning, the masks will be reassembled and new cartridges installed, if appropriate. Personnel will inspect their own masks and readjust the straps for proper fit.

11.5 Emergency Decontamination

Decontamination will be delayed if immediate medical treatment is required to save a lift. Decontamination will then be done after the victim is stabilized. When decontamination can be performed without interfering with medical treatment, or a worker has been contaminated with an extremely toxic or corrosive material that could cause additional injury or loss of life, decontamination will be performed immediately.

When decontamination cannot be done, the victim will be wrapped in a chemical protective barrier (clothing or sheeting) to reduce contamination of other personnel. Emergency and off-site medical personnel will be informed of potential contamination and will be instructed about specific decontamination procedures. When the victim is transported off the site, personnel knowledgeable of the incident, the site, and decontamination procedure will accompany with victim.

11.6 Equipment Decontamination - General

11.6.1 Work crews exiting from the Exclusion Zone must pass through the Contaminant Reduction Zone. All vehicles and equipment

used in the Exclusion Zone shall be decontaminated in the Contaminant Reduction Zone prior to leaving the site.

11.6.2 No vehicles shall leave the Contaminant Reduction Zone until they are properly inspected and approved by the HSO for general cleanliness of frame and tires.

11.6.3 No vehicle shall leave the site unless it is in a broom-clean condition; free of loose dirt or material on tailgates, axles, wheels, etc.

11.6.4 The HSO will monitor all vehicles to confirm proper decontamination prior to exiting. Approval shall be based on visual inspection of all exposed surfaces.

11.6.5 Equipment decontamination wash water residues shall be collected for disposal.

11.6.6 Personnel engaged in vehicle decontamination shall wear Level C or Level D equipment with respiratory protection consistent with the air monitoring results collected by the HSO, and perform personal decontamination at the completion of equipment decontamination.

11.6.7 An equipment decontamination area will be located within the Contaminant Reduction Zone for removing soil from all equipment leaving the work area. It will include a wash area for equipment and vehicles. This area is to be used when personnel are required, by normal practices, to come in contact with soil (i.e.; vehicle repair and refueling). All equipment being decontaminated by wash down will be located in the Contaminant Reduction Zone prior to maintenance work or refueling.

11.6.8 Only clean water will be used for personnel, equipment, and vehicle decontamination.

11.7 Small Equipment Decontamination Procedures

Small equipment should be protected from contamination as much as possible by draping, masking, or otherwise covering the instruments with plastic (to the extent feasible) without hindering operation of the unit. For example, the Photoionization Detector can be placed in a clear plastic bag to allow reading the scale and operation of the controls.

Step 1 Remove coverings from equipment left in the drop area and place the coverings in appropriate waste containers.

Step 2 Any soil or moisture will be brushed or wiped with a disposal paper wipe. Place soiled wipes in appropriate containers.

Step 3 Bare units will then be placed in a clean plastic tub and wiped off with a damp, clean, disposable wipe. Equipment will then be

allowed to air dry.

Step 4 Following decontamination, equipment will be checked and recharged, as necessary, for the next day's operations.

Step 5 Prior to entering the Exclusion Zone, all small equipment will be recovered with new, protective coverings, if necessary.

11.8 Heavy Equipment Decontamination Procedures

The decontamination area for the drill rig will be set up in close proximity to the Exclusion Zone (preferably uphill). A wash/rinse will be done to all surfaces that came in contact with contaminants (e.g., augers). Prior to removing any heavy equipment or vehicles from the Exclusion Zone, they must be thoroughly decontaminated. Specific procedures are as follows:

Step 1 Initially, inspect equipment/vehicles to determine if gross decontamination is required first. Particular attention must be paid to tires, under surfaces, points of contact with the ground, and horizontal surfaces where dusts or aerosols might settle.

Step 2 If visible contamination is present, the equipment/vehicle must be moved to the decontamination pad where gross contamination will be scraped, brushed, or swept off.

Step 3 Following gross decontamination, or if visible contamination is no longer present, wash the equipment/vehicle with high pressure washer as deemed necessary by the HSO. Efforts should be made to minimize water usage to reduce wastewater quantities.

Step 4 Prior to releasing any heavy equipment or vehicles from the Contaminant Reduction Zone, decontamination personnel will contact the HSO for final approval.

12.0 EMERGENCY RESPONSE AND CONTINGENCY PLAN

12.1 General: This plan has been prepared in accordance with 29 CFR 1910.120 (l) and will address the following potential emergencies:

- Emergencies outside the Cuba Landfill Site.
- Emergencies within the Cuba Landfill Site.
- Chemical exposures.
- Site Evacuation.

12.2 Emergency Equipment: Specially marked and readily accessible emergency equipment will be provided as depicted in Table 12-1.

12.3 Special Requirements

12.3.1 The Project Manager or FOM will be on-call for any after hour emergencies resulting from adverse weather conditions. Incidents resulting from adverse weather will be reported via the HSO who will in turn contact the Project Manager or FOM.

12.3.2 First aid kit locations will be specially marked and have adequate water and other supplies necessary to cleanse and decontaminate burns, wounds, or lesions. First aid stations will also stock buffer solutions for treating acid and caustic burns.

12.3.3 All site personal shall notify each other including the HSO by verbal communications or by using emergency signals as depicted in Table 12-2.

12.4 Emergency/Accident Reporting and Investigation

In the event of an emergency associated with the site work, the HSO will, without delay take: 1) diligent action to remove or otherwise minimize the cause of the emergency, 2) alert the FOM, and 3) institute whatever measures are necessary to prevent any repetition of any conditions or actions leading to, or resulting in, the emergency. Notification of the FOM will occur immediately and initially be verbal with written notification occurring within 24 hours of the incident (i.e.; accident, explosion, serious exposure, etc.). The Incident Notification Form (See Table 12-3) and the OSHA 200 Form (available from the Project Manager) will be used for written notifications and documentation.

Table 12-1

LOCATION OF EMERGENCY EQUIPMENT

EQUIPMENT	TYPE	LOCATION(S)
Fire Extinguisher	20A-80B:C Dry Chemical	Each Work Area
First Aid Kit	Portable	Each Work Area
Eye Wash	Portable	Each Work Area
Emergency Sprayer	Portable	Each Work Area
Communication	Air Horns	Each Work Area
Map (Figure 2)	Hospital Route	Each Work Area

Table 12-2

EMERGENCY SIGNALS

In most cases, field personnel will carry portable radios for communications. If this is the case, a transmission that indicates an emergency will take priority over all other transmissions. All other site radios will yield the frequency to the emergency transmissions.

Where radio communication is not available, the following air-horn and/or hand signals will be used:

EMERGENCY AIR-HORN SIGNALS

HELP!	Three Short Blasts	(...)
EVACUATION!	Three Long Blasts	(- - -)
ALL CLEAR!	Alternating Long and Short Blasts	(-.-.)

EMERGENCY HAND SIGNALS

OUT OF AIR, CAN'T BREATH!	Hand gripping throat
LEAVE AREA IMMEDIATELY, NO DEBATE!	Grip partner's wrist or place both hands around waist
NEED ASSISTANCE!	Hands on top of head
OKAY! - I'M ALL RIGHT! - I UNDERSTAND!	Thumbs up
NO! - NEGATIVE!	Thumbs down

Table 12-3

INCIDENT NOTIFICATION FORM

TO: Dvirka and Bartilucci Project Manager

Date:_____

FROM: HSO
and/or_____
(someone who has direct knowledge of the incident)

1. Contractor's name:_____

2. Organization:_____

3. Telephone Number:_____

4. Location:_____

5. Reporter Name:_____

6. Name of Injured:_____
   Birthdate_____

7. Company Employing Injured:_____

8. Date of Incident:_____

9. Location of Incident:_____

10. Brief Summary of Incident (provide pertinent details including type of operation at time of incident):

_____

_____

_____

Table 12-3 (continued)

11. Cause, if known:_____

12. Casualties, if any:_____

13. Details of Any Existing Chemical Hazards or Contamination:

_____

_____

14. Estimated Property Damage:_____

15. Affect on Contract Schedule:_____

16. Actions Taken by Contractor:_____

17. What Medical Help was Given:_____

_____

_____

18. Doctor and/or Hospital (if known):_____

_____

19. When did Employee Return to Work:_____

20. Other Damages/Injuries Sustained (public or private):

_____

_____

_____

21. Additional Information:

_____

_____

12.5 Emergency Medical Care

12.5.1 Emergency medical care will be provided to site workers and visitors by Cuba Memorial Hospital, Inc. (Cuba Hospital)

12.5.2 The hospital will be informed by the HSO or FOM of potential medical emergencies that could result from site operations and have been advised on the types of hazardous materials that are on site. In the event of an incident requiring their assistance, specific details of hazardous materials should be provided to Cuba Hospital medical staff, if available.

12.5.3 A list of Emergency Information will be posted at every work site telephone.

12.6 Emergencies Outside the Cuba Landfill Site

12.6.1 All work in the Cuba Landfill area will stop when advised by any authorized personnel and will remain so until otherwise instructed.

12.6.2 The HSO and FOM will be fully advised of any work that may affect the safety of on-site employees or property.

12.6.3 Actions to be taken in the event of an outside emergency will include:

- Cease all operations immediately; shut all equipment down and secure that equipment.
- All personnel will leave vehicles in work zone in a safe manner making sure any remaining vehicles will not hamper any emergency traffic in the area or block any fire hydrants or foam supply systems.
- All personnel will evacuate to a prearranged master area.
- All personnel will remain in the master area to await further instructions.

12.7 Emergencies Within Cuba Landfill Site

12.7.1 As stated, the Cuba Landfill Site will be the site that D&B will be operating in. The HSO will monitor all operations and assist any emergency personnel responding to an emergency within this work zone.

12.7.2 It will be the HSO's responsibility to maintain communications

with public work personnel.

12.7.3 In the event of an emergency within the work zone at the Cuba Landfill Site, the emergency notification procedures shall be followed as described in Section 12.0 and Appendix A of this SHSP.

12.7.4 In all emergency situations, it will be the responsibility of the HSO, to ensure that all site personnel are accounted for.

12.8 Personnel Exposures

The emergency procedures to be used in the event of acute exposure (eyes, skin contact, inhalation) are described in Appendix A.

12.9 Site Evacuation

The site area will be evacuated and fire and police departments will be notified in the event of fire, explosion or their potential. A meeting area for evacuation purposes shall be designated by the HSO and the FOM prior to the start of the project. The HSO or designee will conduct head counts after any evacuations. Depending on the cause and magnitude of the conditions requiring evacuation, three stages have been designated as follows:

12.9.1 Upwind withdrawal - withdraw to a safe upwind location if:

- » Air quality concentration contain excessive concentrations of volatile organics, combustible gases, particulates, or oxygen percentage above or below safe levels for the level of protection being worn. The field team will withdraw to a safe upwind location determined by the HSO.
- » A minor accident occurs. The victim will undergo decontamination procedures and be transported to a safe upwind location. Field operations will resume after first aid and/or decontamination procedures have been administered to the affected individual.
- » Protective clothing and/or respirator malfunctions.

12.9.2 Withdrawal from site - evacuate the site if:

- » Explosive levels of combustible gases, toxic gases, or volatile organics are recorded.
- » A major accident or injury occurs.
- » Fire and/or explosion occurs.
- » Shock-sensitive, unstable, or explosive materials are discovered.
- » High levels of radioactive materials are discovered.

1.2.9.3 Evacuation of nearby facilities - if a continuous release of toxic, flammable, or explosive vapors from the site could affect people off-site.

» Air quality should be monitored downwind to assess the situation. The FOM, or the on-site designee, is responsible for determining if circumstances exist for any level of off-site contamination warranting concern for people off-site. Always assume worst case conditions until proven otherwise. If conditions are marginal, evacuation should be conducted until acceptable conditions resume. Key personnel identified in the SHSP should be contacted when evacuation of nearby facilities becomes necessary.

13.0 REGULATIONS

Regulations will be made available to all personnel involved in the Cuba Landfill project by the HSO. The regulations will cover three specific areas:

- Use of personal protective equipment.
- Personal hygiene.
- Provisions for smoking, eating, chewing, and drinking.

These regulations may be added to based on need to disseminate information or policy. All regulations will be coordinated through Dvirka and Bartilucci Consulting Engineers for approval prior to distribution. The three specified regulations are shown as Appendix J, K and L.

APPENDIXES

APPENDIX A

EMERGENCY INFORMATION

EMERGENCY SERVICES	TELEPHONE	EMERGENCY NO.
Police		911
Fire		911
Medical Services		
Ambulance		911
Cuba Memorial Hospital	716-968-2000	
Board Certified Physician: Dr. Heitzman	315-478-1977	
Dvirka and Bartilucci Office:	315-437-1142	
Field Safety Corporation:	203-457-2100	
NYSDEC Project Contact: Gary Kline	518-457-5636	

Appendix A (Continued)

EMERGENCIES WITHIN THE CUBA LANDFILL SITE

- Contact the HSO
- Contact the FOM
- Report the following:
  - Location of emergency in relation to a specific recognizable landmark.
  - Nature of emergency:
    - **FIRE**, if so of what kind and what equipment is involved.
    - **EMERGENCY MEDICAL INCIDENT, ALL INJURIES, ACCIDENTS, OR FIRES.**

      Communication will include:
      - Number of injured people.
      - Nature of injuries.
      - If project field team members can't handle injuries with its resources, what emergency medical services will be needed.

    - If any outside personnel must enter the Cuba Landfill Site, any hazards will be communicated and those people will be supervised by the HSO.
    - In the event that any site personnel wearing protective equipment in the Exclusion Zone becomes injured, the HSO or designated individual will do whatever decontamination is necessary to remove that equipment.
    - Any emergency treatment information dealing with the injury will accompany the injured party so that those treating that person will have any and all information.
    - **REQUEST FOR POLICE**. If any person entering the Cuba Landfill Site who does not belong there becomes a problem, the Police will be notified. If that person either endangers the safe operation of project field team members or himself, the HSO will suspend all work until that person can be removed.
  - If site personnel will be evacuating the Cuba Landfill Site due to emergency.

Appendix A (Continued)

PERSONNEL EXPOSURES WITHIN THE CUBA LANDFILL SITE

- Contact the HSO
- Contact the FOM
- Provide Treatment as follows:

  - Eye Exposure - treat by immediate flushing with distilled water (portable eyewash). Transport for examination and treatment to Cuba Hospital (716-968-2000)
  - Skin Exposure - remove contaminated clothing and treat by washing with soap and water.
  - Inhalation - if a person inhales a large amount of organic vapor, the person will be removed from the work area to fresh air and artificial respiration will be administered if breathing has ceased. The affected person will be transported to Cuba Hospital if overexposure to lungs has occurred.
  - Personal Injuries - in case of severe injury, the victim will receive emergency first aid at the site, as appropriate, and will be transported by ambulance or emergency vehicle to Cuba Hospital. An accident form must be completed for any accident or occupational exposure and forwarded to the FOM and HSO.

CONDITION	SKIN SURFACE	TISSUE UNDER SKIN	SKIN COLOR
frostnip	soft	soft	red-white
frostbite	hard	soft	white/waxy
freezing	hard	hard	white/gray

HYPOTHERMIA occurs when the body is unable to maintain its proper temperature of 98.6 degrees. It is important for the worker to realize that this can occur in temperatures of 50 degrees and below. Submersion of a body part in cold water will also cause hypothermia very quickly. Some early signs are:

1. Shivering
2. Numbness in extremities
3. Drowsiness
4. Slow breathing and pulse rates
5. Failing eyesight
6. Loss of coordination, inability to do easy tasks
7. Freezing of body parts

Proper treatment begins by activation of emergency medical service procedure. Hypothermia required prompt qualified medical treatment. Initial site action would revolve around getting the affected worker out of the weather and begin the warming process. The most important thing to realize is that Hypothermia is a MEDICAL EMERGENCY.

Workers exposed to cold temperatures for extended period of time can experience lesions in the form of red swollen areas that seem hot and itchy. These chronic lingering lesions are known as CHILBLAINS. Although not an emergency, the Chilblains indicate that the worker in not adequately protecting the affected area.

A common problem in wet work areas is TRENCHFOOT. The worker whose feet remain unprotected by leather footwear in water close to freezing will have swollen limbs that appear waxy and mottled in color. The affected limb will appear cold to the touch. Basic treatment revolves around getting the worker to a warm place and slowly removing the wet footwear. The obvious way to prevent Trenchfoot is to wear rubber protective footwear.

Some suggestions to prevent cold weather operation problems:

1. Plan ahead as to the proper work clothes to be worn.
2. Avoid early overheating which dampens clothes and hastens the release of body heat by evaporation.
3. Use of windbreaks in the work zone.
4. Elimination of standing water or avoid prolonged immersion in that water.
5. Provision of heated rest area (i.e. trailer or vehicle).

6. Avoid overheating of the rest area. Extreme temperature differentials between the work area and the rest area will lead to chilling upon return to work.
7. Proper diet and eating habits.
8. Avoid or cut down smoking which constricts the blood vessels.

REMEMBER, YOU ARE THE BEST PROVIDER OF INFORMATION ABOUT HOW YOU FEEL. THE BEST WAY TO PREVENT INJURIES FROM COLD WEATHER OPERATIONS IS TO RECOGNIZE THE EARLY SIGNS AND PREVENT SERIOUS INJURY.

APPENDIX C

HEAT STRESS

WORKING CONDITIONS AS RELATED TO HEAT STRESS

Operations at the Site are scheduled for start up in early fall. Since all operations will be done in some level of personal protection, consideration of the effects of heat stress is in order.

Personal Protective Clothing

All of the protective ensemble does not lend itself to the release of body heat generated during work. With this in mind, the following will be taken into consideration during the work schedule so as to minimize the heat stress to all personnel:

A. All personnel will be advised to wear lightweight undergarments with short sleeves, under the chemical protective coverall.

B. Personnel will be advised that extra clothing be on-site for use as the workday progresses due to the clothing becoming wet from perspiration.

C. Dressing-out will be done in a designated trailer and be scheduled so as not to extend time in the protective ensembles.

D. The dress-out area will have a table with fresh water and/or other water replenishing liquids along with disposable cups. All personnel will be expected to drink liquids before each work cycle. The HSO will supervise the dressing and water intake.

E. As the job progresses and more information becomes available as to the materials that the workers are coming in contact with, consideration as to modifications to the protective ensemble will be examined. Such things as allowing personnel to keep the protective garment's hood down allowing for the release of heat. All decisions regarding the protective ensemble will be the HSO's decision based on available information.

F. After completion of each work cycle, personnel will pass through personnel decontamination and remove their protective ensembles in the designated area. All personnel will then be medically monitored, if deemed necessary by the HSO. Liquid replenishment will be mandatory after each work cycle.

G. Eating facilities will allow for meal periods to be taken in the designated lunch area. On days of extreme temperatures, the use of air conditioning in the decontamination trailer will be limited so as not to have personnel exposed to temperature extremes.

Causes of Heat Stress

Wearing the expected levels of protection on-site can put personnel at risk of developing heat stress. This section will discuss heat stress and what steps will be taken to monitor personnel for the signs of it.

The body's chemical activities take place in a limited temperature range. Heat is generated by these processes. Any heat not needed to sustain the activities must be lost from the body to maintain a balance. HYPERTHERMIA is an abnormally high body temperature. The three main avenues for the release of body heat are:

A. Respiration is our breathing pattern. Care should be taken that the body is not fooled into believing it is cool based on skin temperature.

B. Radiation is how heat is released from the skin. Blood will pool on the surface of the skin as body temperatures increase. The protective ensemble specified for this site will not allow for this type of heat release.

C. Evaporative Heat Loss normally allows for a body to cool itself by the evaporation of perspiration. Because the protective ensemble stops any contact with moving air the sweat coming off of the body will not evaporate.

If any of these release mechanisms is out of balance, the following conditions can occur and may be considered emergencies needing care:

A. **HEAT RASH** is a common occurrence in areas where body parts rub causing friction. The level of protection will heighten its effects. Proper treatment would be personal washing of the affected areas and administering powder to help healing.

B. **HEAT CRAMPS** occur when people are exposed to heat for extended periods of time. Due to the wearing of the required protective ensemble, this will be expected. The person will sweat heavily and drink large quantities of water. The more the person sweats, the more electrolytes are lost. If enough body salts are lost, the individual will begin to experience body cramps and pain in the extremities.

Proper treatment includes slow replenishment of body fluids augmented by a proper salt solution along with cooling the individual down, taking care not to expose the person to extreme cooling measures. The worker will not be allowed to return to work until the HSO has monitored and approved re-entry.

C. **HEAT EXHAUSTION** occurs as the blood pools at the skin surface in an attempt to cool the body. Sweating is profuse, skin is moist and cool, and the patient will experience dizziness, nausea, or fainting. This condition is an indicator of overwork in the environmental conditions. Treatment includes all for heat cramps with an extended rest period before re-entry. Depending on the worker's physical condition, rest periods may be from 30-60 minutes. After experiencing heat exhaustion, the worker should be closely monitored for symptoms reoccurring.

D. **HEAT STROKE** can occur if heat exhaustion is not cared for. This occurs when the body loses its ability to regulate its temperature. Sweating stops and, if not treated, can lead to death. Signs and symptoms include dry red skin with no perspiration along with nausea, dizziness and confusion. A strong, rapid pulse should be carefully monitored as this condition can lead to coma. Proper treatment begins by understanding that this is a true medical emergency and requires activating the emergency medical system as covered in other sections. When notifying the Emergency Medical Response organization, emphasis should be placed on the words HEAT STROKE and the need for rapid transportation to the medical facility. (See Appendix A of the SHSP). Emergency medical treatment in the field includes immediate cooling of the body with total body immersion preferable. Water temperature should be cool enough to absorb the high body heat but not cold. Ice packs can be applied to the person's head area and under the arms. Due to the personnel needed to treat the patient while awaiting emergency medical care, all work will stop and all attention will be devoted to the person in stress. The First Aid Technician will evaluate all personnel after the patient is transported to determine if they also are showing signs of heat stroke.

To facilitate treatment of all of the above, the trailer, with its air conditioning, fresh water supply and shower, will be used if necessary. In all cases requiring treatment, emergency decontamination procedures based on the individual's degree of contamination will be done before entry into the trailer. Remember: *You* are your own best indicator of signs of heat stress.

Heat Stress Monitoring

The use of PPE may place site workers at risk of developing heat stress. This can result in health effects ranging from transient heat fatigue to serious illness or death. Because heat stress is probably one of the most common illnesses at hazardous waste sites, regular monitoring, and other preventative measures, will be taken to protect site workers. The HSO may modify heat stress monitoring. Specific measures to be taken include (See Table I - Apparent Temperature Dangers Posed by Heat Stress):

- Using a thermometer to measure ambient temperatures.
- Periodically measure heart rate, oral temperature, blood pressure, and body water loss, whenever workers are in impervious clothing in temperatures above 70 °F.
- Instituting work cycles and rest periods accordingly.

Ambient Temperature Measurements - Permeable Personal Protective Equipment

The HSO, or designee, will utilize a thermometer to measure the ambient temperature in the Exclusion Zone whenever temperatures are expected to exceed 70 °F.

Once the ambient temperature has been calculated, it must be compared to Table I.

Worker Monitoring-Permeable Personal Protective Equipment

Worker monitoring for heart rate, oral temperature, and body water loss will be accomplished jointly by each individual and by the HSO. Once temperatures exceed 70° F, site workers should be weighed before donning protective clothing/equipment and following final decon/doffing protective gear. During these days or periods of days where temperatures exceed
70°F, site workers may have their oral temperatures and heart rates monitored by the HSO during rest periods, at the discretion of the HSO. Specific procedures and guidelines for monitoring bodily functions are discussed below.

Heart Rate - Count the radial pulse during a 30 second period as early as possible in the rest period. If the heart rate exceeds 110 beats per minute at the beginning of the rest period, the HSO, will shorten the next work cycle by 1/3 and keep the rest period the same. If the heart rate still exceeds 110 beats per minute at the

next rest period, the HSO will shorten the following work cycle by 1/3.

Oral Temperature - Using a clinical thermometer, the HSO, or designee, will place the thermometer under the worker's tongue, to measure the oral temperature at the end of the work period (before drinking). If the oral temperature exceeds 99.6°F, the HSO, or designee, will shorten the next work cycle by 1/3 without changing the rest period. If the worker's oral temperature still exceeds 99.6°F at the beginning of the next rest period, the following work cycle will be shortened by 1/3.

Body Water Loss - The HSO, or designee, will measure site workers' weights on a scale at the beginning and end of each workday to account for body fluid loss. To ensure consistency, weights will be measured while workers wear similar clothing. The body water loss should not exceed 1.5 percent total body weight in a workday.

Heat stress monitoring frequency will increase as ambient temperatures increase or as slow recovery rates are observed.

TABLE I

Suggested Frequency of Physiological Monitoring for Fit and Acclimatized Workers [a]

ADJUSTED TEMPERATURE [b]	NORMAL WORK ENSEMBLE [c]	IMPERMEABLE ENSEMBLE
90 °F (32.2°C) or above	After each 45 minutes of work	After each 15 minutes of work
87.5 -90 °F (30.8 -32.2° C)	After each 60 minutes of work	After each 30 minutes of work
82.5 -87.5 (28.1 -30.8 C)	After each 90 minutes of work	After each 60 minutes of work
77.5 -82.5 °F (25.3 -28.1°C)	After each 120 minutes of work	After each 90 minutes of work
72.5 -77.5 °F (22.5 -25.3°C)	After each 150 minutes of work	After each 120 minutes of work

Source: NIOSH/OSHA/USCG/EPA Guidance Manual for Hazardous Waste Site Activities (NIOSH No. 85-115)

a For work levels of 250 kilocalories/hour

b Calculate the adjusted air temperature (t_a adj) by using this equation: t_a adj F + (13 x % sunshine). Measure air temperature (t_a) with a standard mercury-in-glass thermometer, with the bulb shielded from radiant heat. Estimate percent sunshine by judging what percent time the sun is not covered by clouds that are thick enough to produce a shadow. (100 percent sunshine = no cloud cover and a sharp, distinct shadow; 0 percent sunshine = no shadows.)

c A normal work ensemble consists of cotton coveralls or other cotton clothing with long sleeves and pants.

APPENDIX D

FIELD TEAM REVIEW FORM

SITE HEALTH AND SAFETY PLAN

INSTRUCTIONS: This form is to be completed by each person working on the subject work-site. Upon completion, this form is to be given to the HSO.

JOB NUMBER: _____

CLIENT/PROJECT: _____

DATE: _____

I represent that I have read and understand the contents of the above mentioned SHSP and agree to perform my work in accordance with it:

_____
Signature

_____
Name Printed

_____
Company/Office

_____
Date Signed

APPENDIX E

SAFETY MEETING

DATE HELD _____ Time _____

1. The safety meeting was held this date for the following personnel:

   (CONTRACTOR) _____

   (SUB-CONTRACTOR) _____

   (HSO) _____

   (OTHER) _____

2. Subjects discussed (note, delete, or add):

   Accident trends/new hazards -
   Individual protective equipment -
   Back injury, safe lifting techniques -
   Fire prevention -
   Sanitation, first aid, waste disposal -
   Tripping hazards -
   Staging -
   Equipment inspection & maintenance (zero defects) -
   Hoisting equipment -
   Ropes, hooks, chains, and slings -
   Trucks, tractors, front-end loaders, scrapers, graders, gradall -
   Electrical grounding, temporary wiring, GFCI -
   Lockouts for safe clearance procedures: electrical, pressure moving parts -
   Steep slopes -
   Toxic materials: hazards, MSDS, respiratory, ventilation -
   Other -

3. Forwarded _____

   Prepared by _____

   Signature _____

APPENDIX E

SAFETY INSPECTION LIST

Project Name/Number:_____
Date:_____

Name:_____
Title:_____

This safety inspection list is to be completed by the HSO and turned into the Project Manager. Any deficiencies found are to be corrected immediately.

1. Is the OSHA Safety and Health protection poster on the job? _____

2. Are emergency telephone numbers conspicuously posted? _____

3. Are first-aid kits and supplies on the job? _____

4. Are there first-aid trained personnel on the job? _____

5. Are warning signs and posters adequate? _____

6. Is there an adequate supply of personal protective gear available?

    a. Hard Hats _____
    b. Hearing Protection _____
    c. Eye and Face Protection _____
    d. Respiratory Protection _____

7. Are all personnel wearing the appropriate personal protective gear? _____

8. Is there an adequate slope or support provided for all trenches and excavations? _____

9. Is temporary electrical service grounded and is all other electrical equipment grounded? _____

10. Is the housekeeping adequate-are all aisles, passageways, and stairways clear of obstructions? _____

11. Are there any fire hazards on the job that could be eliminated? _____

APPENDIX E (continued)

12. Have heavy equipment been thoroughly inspected and is there a record of the inspections on file? _____

13. Is the job site fire protection adequate?

    a. Fire Extinguishers - have they been checked? _____

    b. Available Water Hoses? _____

    c. Barrels of Water with Buckets? _____

14. Is there adequate clearance between equipment or machinery and energized power lines? _____

15. Is the record of injuries and illnesses properly maintained and on file? _____

16. Are there job site safety meetings being held at least once a week? _____

17. Are all new employees indoctrinated with respect to their individual safety responsibilities? _____

18. Do my personal safety practices set a good example for all employees? _____

19. Misc.: _____

_____

_____

_____

_____ _____

Signature Date

APPENDIX F

SITE WORKER TRAINING AND MEDICAL EXAMINATION RECORD

SITE: Cuba Landfill

Name	Date Training Completed		Date of Last Physical Examination
	Initial	Refresher*	

*Refresher training on-site is documented on the following page.

APPENDIX F (continued)

REFRESHER TRAINING DOCUMENTATION

EMPLOYEE/VISITOR NAME REPRESENTING

1. _____ _____

2. _____ _____

3. _____ _____

4. _____ _____

5. _____ _____

6. _____ _____

TOTAL TIME ALLOCATED TO REFRESHER TRAINING:_____

DATE OF TRAINING: _____

LOCATION: _____

TOPICS COVERED (describe clearly):

_____

_____

_____

MATERIALS USED (if any):

_____

_____

_____ _____ _____

Trainer Signature Trainer Name Printed Date

APPENDIX G
CARE AND CLEANING OF RESPIRATORS

General Requirements

Any organization using respirators on a routine basis should have a program for their care and cleaning. The purpose of a program is to assure that all respirators are maintained at their original effectiveness. If they are modified in any way, their Protection Factors may be voided. Usually one person in an organization is trained to inspect, clean, repair, and store respirators.

The program should be based on the number and types of respirators, working conditions, and hazards involved. In general, the program should include:

- Inspection (including a leak check)
- Cleaning and Disinfection
- Repair
- Storage

Inspection

Inspect respirators after each use. Inspect a respirator that is kept ready for emergency use monthly to assure it will perform satisfactorily.

On air-purifying respirators, thoroughly check all connections for gaskets and "O" rings and for proper tightness. Check the condition of the facepiece and all its parts, connecting air tubes, and headbands. Inspect rubber or elastomer parts for pliability and signs of deterioration.

Maintain a record for each respirator inspection, including date, inspector, and any unusual conditions for findings.

Cleaning and Disinfection

Collect respirators at a central location. Brief employees required to wear respirators on the respirator program and assure them that they will always receive a clean and sanitized respirator. Such assurances will boost morale. Clean and disinfect respirators as follows:

- Remove all cartridges, canisters, and filters, plus gaskets or seals not affixed to their seats.
- Remove elastic headbands.
- Remove exhalation cover.
- Remove speaking diaphragm.
- Remove inhalation valves.

- Wash facepiece and breathing tube in cleaner/sanitizer powder mixed with warm water, preferably at 120% to 140% F.
- Wash components separately from the facemask, as necessary. Remove heavy soil from surfaces with a hand brush.
- Remove all parts from the wash water and rinse twice in clean, warm water.
- Air dry parts in a designated clean area.
- Wipe facepieces, valves, and seats with a damp lint-free cloth to remove any remaining soap or other foreign material.

NOTE: Most respirator manufacturers market their own cleaners/sanitizers as dry mixtures of a bactericidal agent and a mild detergent. One-ounce packets for individual use and bulk packages for quantity use are usually available.

Repairs

Only a trained person with proper tools and replacement parts should work on respirators. No one should ever attempt to replace components or to make adjustments or repairs beyond the manufacturers' recommendations. It may be necessary to send high pressure side components of SCBA's to an authorized facility for repairs.

Make repairs as follows:

- Disassemble and hand clean the pressure-demand and exhalation valve assembly (SCBA's only). Exercise care to avoid damage to the rubber diaphragm.
- Replace all faulty or questionable parts or assemblies. Use parts only specifically designed for the particular respirator.
- Reassemble the entire respirator and visually inspect the completed assembly.
- Insert new filters, cartridges, or canisters, as required. Make sure that gaskets or seals are in place and tightly sealed.

Storage

Follow manufacturers' storage instructions, which are always furnished with new respirators or affixed to the lid of the carrying case. In addition, these general instructions may be helpful:

- After respirators have been inspected, cleaned, and repaired, store them so to protect against dust, excessive moisture, damaging chemicals, extreme temperatures, and direct sunlight.
- Do not store respirators in clothes lockers, bench drawers, or tool boxes. Place them in wall compartments at work stations or in a work area designated for emergency equipment. Store them in the original carton or carrying case.

- Draw clean respirators from storage for each use. Each unit can be sealed in a plastic bag, placed in a separate box, and tagged for immediate use.

APPENDIX H

MEDICAL DATA SHEET

This Medical Data Sheet will be completed by all on-site personnel and will be kept in the Support Zone during site operations.

Project:_____

Name:_____

Address:_____

Home Telephone: Area Code ( )_____

Date of Birth:_____ Height:_____ Weight:_____

In case of Emergency, contact:_____
(name and relationship)

Address:_____

Telephone: Area Code (___)_____

Do you wear contact lenses? ( ) Yes ( ) No

Allergies:_____

List medication taken regularly:_____

Particular sensitivities:_____

Previous/recent illnesses or exposures to hazardous chemicals:_____

_____

Name of Personal Physician:_____

Telephone: Area Code(___)_____

APPENDIX I
AIR MONITORING RESULTS REPORT

Date: _____ Duration of Monitoring: _____

Work Location and Task: _____

_____

Instrument Reading _____ (Time)	Instrument Reading _____ (Time)	Instrument Reading _____ (Time)
_____	_____	_____
_____	_____	_____
_____	_____	_____

(Note: If instruments have recorders, just attach tape to report. Also note any action levels when exceeded.)

Instrument Calibration: _____

Perimeter Samples Collected: _____

_____

Personnel Samples Collected: _____

_____

Perimeter and Personnel Sample Results From Previous Day (attach data once received):

_____

Comments: _____

_____

_____ _____

Name Title (Site Safety Officer)

Signature _____

APPENDIX J

Regulation 1 - Use of Personal Protective Equipment

WHO This regulation applies to all site workers, supervisors, and visitors, *without exception.*

WHEN Prior to entering the Contaminant Reduction Zone (CRZ) or Exclusion Zone (EZ) provisions of this regulation will be followed.

WHAT This regulation outlines the initial forms of PPE required to be worn while working in the CRZ and EZ. Particular types or forms of PPE may be altered based on the authority of the HSO. Specific guidelines are provided in Section 7.0 of this SHSP. Disposable PPE will not be worn more than one workshift of workday. In some instances disposable PPE may have to be replaced more than once during a workday. The HSO shall determine the frequency of replacing disposable PPE. Reusable PPE will be properly decontaminated, cleaned, sterilized (if appropriate), and stored. Doubts regarding what to wear shall be directed to the HSO for resolution.

WHY The levels of protection specified in the SHSP were chosen to protect individuals from potentially harmful exposures to chemicals or physical hazards. No changes to PPE specifications are authorized without the permission of the HSO.

APPENDIX K

Regulation 2 - Personal Hygiene

WHO This regulation applies to all site workers, supervisors, and visitors, but is intended primarily for site workers.

WHEN Before beginning work, during scheduled breaks, and at the end of a workday.

WHAT This regulation summarizes the policy on personal hygiene that applies to all site personnel. Personal hygiene includes those activities such as washing hands, showering, shaving, etc., that are conducive to keeping one's body clean and mind refreshed. For the individual's sake, and his/her coworkers, each worker will be responsible for maintaining a high level of personal hygiene. This is especially critical prior to breaks where food, beverages, or smoking will occur. If proper personal hygiene is not followed, potential ingestion, absorption, or inhalation of toxic materials may occur. Particular attention must be paid to close shaving whenever respirators are worn. Facial hair and long hair will interfere with respirator fit and will allow excessive contaminant penetration.

WHY To avoid accidental ingestion, absorption, or inhalation of hazardous materials. To maintain an elevated state of awareness, thus reducing potential mental errors and accidents.

APPENDIX L

Regulation 3 - Provisions for Smoking, Eating, Chewing, and Drinking

WHO This regulation applies to all site workers, supervisors, and visitors, *without exception.*

WHEN At all times personnel are on-site. This regulation will specifically apply during breaks and rest periods.

WHAT Site personnel are forbidden to smoke, eat, chew, or drink in the Exclusion Zone or Contaminant Reduction Zone. Only those areas specified as break areas or common areas in the Support Zone may be used for smoking, eating, chewing, or drinking. The rest/break facility and office trailers in the Support Zone may be used. Individuals found to be repeatedly disregarding these provisions will be released.

The only exception to this regulation involves access to electrolytic fluids in the Contaminant Reduction Zone when the HSO has determined heat stress warrants regular replenishing of lost body fluids.

WHY To protect personnel from accidental exposures to hazardous materials, smoking, eating, chewing, and drinking is prohibited everywhere except designated break areas. To avoid potential fires and explosions, smoking is prohibited everywhere except designated break areas and office trailers.