WORK PLAN (REVISION 1.0)
REMEDIAL INVESTIGATION/FEASIBILITY STUDY
TOWNLEY HILL ROAD DUMP SITE
CHEMUNG COUNTY, NEW YORK

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1.0 INTRODUCTION

Viacom Inc. (Viacom), successor in interest to CBS Corporation (CBS) and Westinghouse Electric Corporation (Westinghouse), has retained Cummings/Riter Consultants, Inc. (Cummings/Riter) to prepare this Remedial Investigation/Feasibility Study (RI/FS) Work Plan for a former waste disposal site known as the Townley Hill Road Dump Site located in the Town of Catlin, Chemung County, New York (the Site) (Figure 1). The New York State Department of Environmental Conservation (NYSDEC) has classified the Site as an inactive hazardous waste site (Site No. 8-08-006), as that term is defined at ECL 27-1301.2. Land disposal activities at this location reportedly occurred between the late 1950s and 1967. The land disposal operation was reportedly closed in 1967 by order of the Chemung County Department of Health.

NYSDEC completed a focused RI for the Site in 1998 and from that study concluded that a more comprehensive RI/FS is needed. In response to a NYSDEC request, Viacom (then CBS) submitted to NYSDEC a Scope of Work for an RI/FS on February 25, 1999. Comments were received from NYSDEC on April 4, 1999 regarding the Scope of Work. Those comments were taken into consideration in the development of an RI/FS Work Plan (Work Plan) that was submitted to NYSDEC on September 12, 2001. On behalf of Viacom, Cummings/Riter has now revised the Work Plan based on discussions with NYSDEC at the meeting held on September 21, 2004. Viacom has also reviewed Scope of Work comments received from NYSDEC via letter dated September 12, 2002 and, based on recent discussions with NYSDEC, has concluded that this revised Work Plan addresses those NYSDEC comments as well.

The objective of the RI is to characterize the various environmental media at the Site sufficiently to allow for the evaluation of the need for remedial action and, if remedial action is deemed necessary, the development and evaluation of remedial alternatives in the FS. The RI is to provide the necessary physical and chemical information pertaining to potential impacts to soil, surface water, sediment, and groundwater at the Site. This Work Plan has been prepared in general accordance with the U.S. Environmental Protection Agency (USEPA) *Guidance for Conducting Remedial Investigations and Feasibility Studies under CERCLA* (EPA 540/G-89/004, October 1988).

This Work Plan is organized as follows: Section 2.0 presents a discussion of the Site background, including the environmental setting; Section 3.0 discusses the objectives of the RI/FS, including data quality objectives; Section 4.0 provides a description of the RI/FS tasks to be completed at the Site; and Section 5.0 presents the project schedule.

This Work Plan also contains the Sampling and Analysis Plan (SAP) including a Field Sampling Plan (FSP) in Appendix A, a Quality Assurance Project Plan (QAPP) in Appendix B, and a Site-specific Health and Safety Plan (HASP) in Appendix C. These plans provide specific procedural guidelines as to how the tasks described in the Work Plan will be performed.

2.0 SITE BACKGROUND AND SETTING

This section provides the Site description and history, including a physical description of the Site. A brief summary of previous investigations is also presented. The information included in this section was primarily taken from that provided in the *Focused RI Report* (NYSDEC, 1998).

2.1 SITE LOCATION AND DESCRIPTION

The Townley Hill Road Dump Site has been identified by NYSDEC as an inactive hazardous waste site (New York State Registry No. 8-08-006), which occupies an approximate 10-acre portion of a larger 28-acre property located on Townley Hill Road in the Town of Catlin, Chemung County, New York. The surrounding area is rural with small population centers along the Post Creek Valley to the northwest (Figure 1). A private residence is situated approximately 700 feet east of the identified “former drum disposal area” at the Site. The Site is not fenced, although a suspended steel cable across the driveway restricts vehicle access. Figure 2 presents a plan of the Site.

2.2 SITE HISTORY

During the period of operation (approximately late 1950s until 1967), the Site was owned by Mr. Joseph Lobell and subsequently, beginning in 1964, by Mr. John Mandzak. The Site was reportedly used for disposal of municipal waste under a permit issued by the Chemung County Department of Health. The Site also reportedly received miscellaneous debris, including tires, junk automobiles, 55-gallon drums, and calcium fluoride sludge (Engineering-Science, 1988). According to NYSDEC, approximately 300 drums containing an incinerator ash-like waste material were also disposed of at the Site.

Calcium fluoride sludge was reportedly buried in eight-foot trenches to the east of the Site access road (Engineering-Science, 1988). This sludge reportedly consisted of “waste treatment plant sludge intermittently containing traces of lead phosphate and cadmium” from the Westinghouse Industrial & Government Tube Division manufacturing facility in Horseheads, New York. According to available Westinghouse records, an unknown quantity of calcium fluoride sludge from its Horseheads plant was disposed of in bulk at the “Madzac property” (presumably the Townley Hill Road Dump Site) between 1964 and 1967.

On October 16, 1967, the Site was closed by the Chemung County Health Department due to complaints of odors and open burning. Beginning in 1969, most of the debris was removed by the new owner, Mr. James Case. The Site was also covered with topsoil and revegetated.

The Site is currently owned by Northwoods Hunting Inc. of Ridgeway, Ontario (Northwoods). Mr. Case had this property taken through foreclosure by the County, and the County then sold the property to Northwoods.

In April 1980, the Site was identified by NYSDEC as an inactive hazardous waste disposal site and placed on the Registry of Inactive Hazardous Waste Disposal Sites in New York. In 1983 and 1984, NYSDEC sampled the contents of the drums and analyzed these drum samples for metals by the Extraction Procedure (EP) to determine if these materials were characteristic hazardous waste under New York and Federal Resource Conservation and Recovery Act (RCRA) regulations. Results from the 1984 sampling event indicated an exceedance of the threshold EP toxicity concentrations for cadmium and lead. The Site was subsequently classified as a “Class 2” site in December 1986.

In July 1988, NYSDEC conducted an interim remedial measure (IRM) in which it removed approximately 300 drums containing ash waste and approximately 100 cubic yards (CY) of soil impacted by cadmium. Following the IRM, several Site investigations were conducted from 1990 through 1997, including the collection of numerous surface and subsurface soil samples. These investigations are discussed in Section 2.4.

2.3 PHYSICAL DESCRIPTION

The Site is located in the Appalachian Uplands Physiographic Province where local topographic features result from glacial and fluvial processes. This province has a long, complex erosional history and can be classified as a mature, eroded plateau. Repeated glacial advances widened existing valleys and deposited accumulations of till.

Deposition of lacustrine silts and clays resulted from local ice blockages of valleys. Large volumes of meltwater have dissected the region with stream valleys and deposited thick accumulations of outwash sand and gravel.

2.3.1 Topography and Surface Hydrology

The Site is within the Susquehanna River basin. An unnamed tributary to Post Creek passes within 500 feet of the Site. Post Creek itself is approximately 1,700 feet northwest of the Site (Figure 1).

The Site is located on a terrace, and the surface of the Site is relatively flat with steeply sloping sides. The hillsides adjacent to the Site slope steeply downward to the south and west, and more gently upward to the northwest. The surrounding hillsides are wooded and (except for a small area at the crest of the hill) hardwoods have grown over the original fill area.

A small pond is located on the western side of the former disposal area. A second, smaller pond (located to the east of the disposal area) is shown on the Site plan (Figure 2), but was not observed during a recent Site visit. Surface runoff appears to flow into the unnamed tributary to Post Creek located to the southeast of the Site area. Runoff on the western portion of the Site likely flows directly toward Post Creek.

2.3.2 Soils

The soils at the Site are classified as Mardin channery silt loam. This soil type is characterized by a relatively impermeable layer at a depth of approximately two feet. Perched water typically is observed above the impermeable layer during periods of heavy rainfall. The surface soil is primarily composed of coarse rock fragments. Man-made ponds can be found in the area, reflecting the overall low permeability of Site soils.

2.3.3 Geology and Hydrogeology

Bedrock in this region is of Upper Devonian age and consists of shales and siltstones from the West Falls Group. These beds reportedly dip gently to the south and show limited structural deformation.

Major aquifers exist in the thick sand and gravel deposits found in the larger valleys of the region. Less extensive aquifers exist in tributary valleys with recharge coming from surface water runoff. Bedrock wells are capable of supplying useable quantities of water for area residents due to their presence along bedding planes and joints.

There are two primary aquifers in the vicinity of the Site. The first is a sand and gravel aquifer within the Post Creek Valley located to the northwest of the Site. Sediments in this aquifer were deposited as glacial outwash and are capable of supplying large volumes of water. Residents in the local area reportedly use water from this aquifer. A second aquifer is located within the bedrock beneath the Site. The residence located immediately to the east reportedly obtains groundwater from an 85-foot deep well. Groundwater in this bedrock well is believed to occur along bedding planes or in fractured zones. Yields from wells installed in this aquifer are expected to be lower than the wells in the sand and gravel aquifer. The groundwater flow direction in the bedrock unit is believed to be to the west-northwest toward Post Creek, but, because of its topographic position and bedrock structure, groundwater flow might also be radial, with components of flow to the west, southwest, south, and southeast.

2.4 SUMMARY OF PREVIOUS INVESTIGATIONS

The summary of previous investigations is primarily taken from the discussion presented in the *Focused RI Report* (NYSDEC, 1998). Following completion of the IRM in 1988, NYSDEC retained Engineering-Science to conduct a Phase I Preliminary Site Assessment, which resulted in a recommendation to conduct a Phase II investigation. Phase II activities included sampling and analysis of soil, sediment, surface water, and groundwater.

Additional soil samples were collected between September 1991 and June 1993 to evaluate the effectiveness of the drum removal IRM. Surface and subsurface (12 to 24 inches in depth) soil samples were collected and analyzed for cadmium. The results of the sampling event, with detected concentrations of cadmium up to 2,100 milligrams per kilogram [mg/kg]), led NYSDEC to remove additional soil. In November 1994, NYSDEC removed soil from the former drum disposal area to a depth of 24 inches below ground surface, resulting in 236 CY of material being sent off-site for disposal.

Reportedly, confirmatory soil sampling was conducted and indicated the continued presence of cadmium in the soils at the former drum disposal area. Sample results of the 1994 confirmatory sampling have not been provided to Viacom.

In December 1996, an "Immediate Investigation Work Assignment Work Plan" was finalized to further investigate Site soils, particularly residual cadmium concentrations of soils in the former drum disposal area. In 1997, NYSDEC conducted a focused RI and issued a report in September 1998 that recommended a comprehensive RI/FS be conducted at the Site to investigate potential impacts to soil, sediment, and groundwater.

2.5 PRELIMINARY SITE CONCEPTUAL MODEL

Using the information obtained from the Site visit and background research, Cummings/Riter has developed a preliminary Site conceptual model to identify potential sources of exposure, exposure pathways, and possible receptors. The Site conceptual model will be expanded and refined as additional Site data are obtained.

The physical setting of the Site is described in Section 2.3. The Site is located on a topographic terrace, and the Site topography ranges from approximately 1,600 to 1,670 feet above mean sea level (MSL). Surface water runoff appears to be to the northwest and southeast. It is suspected that the first water-bearing zone is present in bedrock, where groundwater is believed to follow the general Site topography flowing to the northwest, southwest, and southeast. The residence located to the east of the Site reportedly obtains groundwater from an 85-foot deep bedrock well. This residence is believed to be located hydraulically upgradient from the Site.

The discharge point for both surface water and groundwater is likely to be either the unnamed tributary to Post Creek located to the southeast of the Site or Post Creek itself. The unnamed tributary to Post Creek is located approximately 500 feet southeast of the Site on the southeast side of Townley Hill Road at an approximate elevation of 1,570 to 1,600 feet MSL. Post Creek is located in a valley approximately 1,700 feet northwest of the Site area at an elevation of 1,100 to 1,150 feet MSL.

The primary suspected exposure pathways for Site-related constituents of interest (COI) are by direct contact with surface soils or the ingestion of surface water or groundwater. The presence of Site-related COI in surface water and groundwater has not yet been evaluated.

Potential human receptors of potential Site-related COI include hunters and hikers who may come in contact with Site soils or downgradient surface water or groundwater users. Ecological receptors at higher trophic levels likely include small mammals and birds, larger mammals (e.g., deer, bear), and aquatic species related to the on-site ponds. Potential human and ecological receptors will be further evaluated during the RI/FS.

3.0 OBJECTIVES

This section describes the data quality objectives (DQOs) and specific RI/FS objectives.

3.1 DATA QUALITY OBJECTIVES

The DQOs related to the sampling program for the Site are as follows:

- The data will be gathered or developed in accordance with procedures appropriate for characterization and delineation of Site-related COI.
- The data will be of known or acceptable precision, accuracy, and completeness, within the limits of the methods.

In developing the DQOs, a series of planning steps were conducted based upon USEPA guidance *Data Quality Objectives Process for Superfund* to ensure that the type, quantity, and quality of environmental data are appropriate for their intended use. Acceptable precision, accuracy, and completeness guidelines are further described in the QAPP for the Site.

3.2 SPECIFIC RI/FS OBJECTIVES:

The specific objectives of the RI/FS at the Site include:

- Collect groundwater, soil (surface and subsurface), surface water, and sediment data to characterize Site conditions;
- Determine the nature and extent of waste materials at the Site;
- Assess the potential exposure pathways and human health and environmental receptors for Site-related COI; and
- Develop, screen, and perform a detailed evaluation of alternative remedial actions.

Because the RI/FS may be conducted in a staged approach, additional objectives may be developed during the performance of the RI/FS.

4.0 RI/FS TASKS

The proposed RI/FS includes the following tasks:

- Task 1 – Project Planning,
- Task 2 – Community Relations,
- Task 3 – Field Investigation,
- Task 4 – Sample Analysis,
- Task 5 – Analytical Support and Data Validation,
- Task 6 – Data Evaluation/Geographic Information System (GIS) Setup,
- Task 7 – Qualitative Risk Assessment,
- Task 8 – Remedial Investigation Report,
- Task 9 – Remedial Alternatives Screening,
- Task 10 – Remedial Alternatives Evaluation, and
- Task 11 – Feasibility Study Report.

The following paragraphs describe the details of the proposed scope of work.

4.1 TASK 1 – PROJECT PLANNING

For the initial project task, Cummings/Riter will confirm that the current Site owner, Northwoods, will provide unrestricted Site access. A Site reconnaissance will be made for the purpose of inspecting the Site and surrounding areas with respect to Site features, drainage patterns, topographic features, neighboring areas, and potential sensitive ecological receptors. In particular, an attempt will be made to locate seeps and springs that may provide additional monitoring points. If it appears that RI activities will be required on the adjacent properties, Cummings/Riter (with the assistance of Fagan Engineers, PC of Elmira, New York) will research the property ownership and coordinate with Viacom to prepare temporary access agreements for the affected landowners to allow for the completion of required RI activities.

4.2 TASK 2 – COMMUNITY RELATIONS

Viacom and Cummings/Riter will support NYSDEC and the New York State Department of Health (NYSDOH) in their community relations efforts on an as-requested basis. This task includes participation in public meetings, as necessary.

4.3 TASK 3 – FIELD INVESTIGATION

The purpose of the field investigation is to characterize the nature and extent of Site-related COI. Environmental samples of soils (surface and subsurface), surface water, sediment, landfilled waste, and groundwater will be collected and analyzed as part of the RI. The field investigation will include six subtasks:

- Task 3.1 - Delineation of Disposal Area;
- Task 3.2 - Soil Sampling;
- Task 3.3 - Groundwater Assessment;
- Task 3.4 - Surface Water and Sediment Sampling;
- Task 3.5 - Ecological Characterization; and
- Task 3.6 - Management of Investigation-Derived Waste.

Samples will be collected, handled, and shipped in accordance with the Site-specific SAP, and equipment decontamination and chain-of-custody procedures will be followed during all sampling activities. The data generated during the investigation will be used to develop a qualitative risk assessment and to provide information to evaluate potential remedial technologies. Each of these subtasks is described separately below.

4.3.1 Task 3.1 – Delineation of Disposal Area

The objective of the disposal area delineation task is to define the horizontal and vertical extent of the disposal area. The vertical delineation will provide data so that an estimated volume of waste can be calculated and will help in the evaluation of whether the waste is causing impacts to underlying soils or groundwater. Waste samples will also be collected to determine hazardous characteristics.

The disposal area delineation will be performed in two phases. The initial phase will involve the performance of a surface geophysical survey to help delineate the extent of the waste. The second phase will involve the excavation of test pits to confirm the presence and location of landfilled waste.

Surface Geophysical Survey: Cummings/Riter personnel will perform a bulk ground conductivity survey at the Site using electromagnetic (EM) methods. Specifically, an EM-31, non-contacting terrain conductivity meter and data logger will be used to conduct the survey. The EM-31 measures the average conductivity of subsurface material in the vicinity of the instrument. The purpose of this survey is to locate areas that contain material significantly different than the surrounding soils using a non-intrusive technique.

The proposed area to be surveyed is shown on Figure 3. The procedures for conducting the EM survey are described in Section 5.0 of the FSP.

Test Pit Program: After completion of the EM survey, areas showing anomalies that may indicate the location of landfilled waste will be verified by means of test pit excavations. The horizontal delineation will be accomplished through a series of perimeter test pits that will be oriented perpendicular to the expected disposal limits, beginning beyond the expected waste limits and proceeding inward until waste is encountered. The vertical delineation will be performed using test pits that will be excavated within the interior of the disposal area to allow for waste sampling and characterization. The interior test pits will be excavated approximately two feet into the soil underlying the waste material. If groundwater is encountered during excavation, the test pit will be terminated, and a subsurface soil sample will not be collected. Field observations will determine if the test pit excavation will be attempted at a different location.

The location of the test pits will be determined after the EM survey has been completed. Twelve perimeter test pits and three interior test pits are planned. The number of test pits may be modified based on the results of the EM survey and field observations. Test pit excavation and sampling procedures are described in Section 5.0 of the FSP.

4.3.2 Task 3.2 –Soil Sampling

The objective of the soil sampling task is to further delineate the horizontal extent of soils impacted by cadmium in the vicinity of the former drum disposal area. Soils in the area located east of the large pond at the Site were characterized during the focused RI performed by NYSDEC. Figure 4 shows the focused RI sample locations and the corresponding cadmium concentrations.

Approximately 20 soil locations are proposed in the RI/FS to further delineate impacted soils in this area. The number of soil samples may be modified based on the results of field observations. Figure 4 shows the locations of the proposed samples. Soil sampling procedures are described in Section 5.0 of the FSP.

4.3.3 Task 3.3 – Groundwater Assessment

Four monitoring wells are proposed to evaluate aquifer conditions and groundwater flow directions and to provide a means for collecting groundwater samples. One monitoring well (MW-1) will be located in an upgradient location, and three monitoring wells (MW-2 through MW-4) will be located in the assumed downgradient direction from the disposal area.

The proposed monitoring wells will be located outside the disposal area footprint as identified during Task 3.1. Approximate monitoring well locations are shown on Figure 3. These locations may be adjusted in the field, if necessary, based on local terrain, access, and vegetation. If groundwater sample results from the initial monitoring wells are impacted by Site-related COI, deeper cluster wells may be installed to vertically delineate the COI in groundwater. Drilling, monitoring well installation, and development procedures are described in Section 5.0 of the FSP.

After well development, aquifer testing in the form of slug tests will be conducted in the four new monitoring wells to determine the approximate hydraulic conductivity of the aquifer. Aquifer testing procedures are described in Section 5.0 of the FSP.

The completed monitoring wells will be surveyed to the nearest 0.01 foot vertically and 1 foot horizontally using global positioning system (GPS) surveying. Cummings/Riter will conduct the GPS surveying. If GPS is not effective at the Site, a registered surveyor licensed in the State of New York will conduct conventional land surveying.

4.3.4 Task 3.4 – Surface Water and Sediment Sampling

Surface water and sediment samples will be collected from the two on-site ponds and other surface drainageways identified during the Site reconnaissance. The following locations (one surface water and one sediment sample from each location) are proposed for sample collection during the initial round of sampling:

- Larger on-site pond near the main disposal area - three locations;
- Smaller on-site pond to the east of the main disposal area – one location; and
- Surface drainage features (including seeps and/or springs) identified during Site reconnaissance – two to four locations.

The sample locations from the ponds are shown on Figure 3. Up to eight surface water and eight sediment samples will be analyzed. Surface water and sediment sampling procedures are described in Section 5.0 of the FSP.

4.3.5 Task 3.5 – Ecological Characterization

Available information from both Federal and state agencies will be reviewed regarding sensitive ecological receptors in the vicinity of the Site. The following list of documents will be reviewed for this task:

- U.S. Department of the Interior, Geological Survey, 7.5-minute topographic quadrangle maps;
- NYSDEC freshwater wetlands maps;
- NYSDEC significant habitat maps;
- National Wetland Inventory maps;
- U.S. Department of Agriculture, Soil Conservation Service soil survey for Chemung County; and
- Site aerial photographs, including available black and white, color, and infrared photographs.

NYSDEC and other appropriate state and Federal agencies will be contacted to identify any rare, threatened, or endangered species that could be present at the Site. The results of the initial ecological characterization will be included in the RI report.

4.3.6 Task 3.6 – Management of Investigation-Derived Waste

Soil and rock cuttings, well development water, and well purge water comprise the expected investigation-derived waste (IDW) that will be generated during RI activities. Materials removed from the test pits will be placed back in the pits. Because the monitoring wells will be located outside the disposal area, soil and rock cutting generated during drilling activities will be spread on the ground surface in the vicinity of the borings. Other IDW will be placed in secure containers (e.g., drums, tanks) and securely staged on Site. Representative samples of the IDW will be collected and sent for characterization analysis prior to off-site disposal.

4.4 TASK 4 – SAMPLE ANALYSIS

Laboratories certified under applicable NYSDEC and NYSDOH programs will conduct sample analyses. For the RI, soil samples collected from the test pits, groundwater, surface water, and sediment samples will be analyzed for Target Compound List (TCL) volatile organic compounds (VOCs), semivolatile organic compounds (SVOCs), and pesticides/polychlorinated biphenyls (PCBs), and Target Analyte List (TAL) inorganic parameters. Fluoride will also be analyzed in samples subject to TAL analyses. Aqueous samples collected for TAL analysis will be analyzed for the total fraction only. Analyses will be conducted using NYSDEC Analytical Services Protocol (ASP) Contract Laboratory Program (CLP) methods.

Soils collected in the vicinity of the former drum disposal area will be analyzed for cadmium and lead, and 10 percent of these soil samples will be analyzed for all TCL/TAL parameters. These analyses will similarly be conducted using NYSDEC ASP-CLP methods. Samples of waste collected from the test pits will be analyzed for RCRA characteristics, including ignitability, corrosivity, reactivity, and toxic characteristic leaching procedures (TCLP) parameters using USEPA SW-846 methods.

After the initial sampling events, Cummings/Riter will perform a review of the sampling results to determine if any parameters from the TCL/TAL can be eliminated from future analyses. For all ASP-CLP analyses, the required laboratory data deliverable package will include the NYSDEC “Category B” package. CLP-like deliverables will be requested for the waste analyses using SW-846 methods. Quality assurance and quality control (QA/QC) samples (including trip blanks, duplicate samples, matrix spike/matrix spike duplicate samples, equipment blanks, and/or field blanks) will be collected at the frequencies defined in the Site QAPP. Table 1 summarizes the anticipated samples that will be collected and analyzed during the RI.

4.5 TASK 5 – ANALYTICAL SUPPORT AND DATA VALIDATION

DQOs that have been identified specify the quality of data required to support decisions regarding remedial response activities. Analytical support will be provided by a qualified analytical laboratory, and a data usability evaluation will be performed on the analytical data in accordance with the procedures listed in the NYSDEC document, *Guidance for the Development of Data Usability Summary Reports*.

4.6 TASK 6 – DATA EVALUATION/GIS SETUP

Data evaluation includes the compilation and review of field and laboratory data generated during the RI field investigations. Data assembly and review will be assisted by using GIS to locate sample points and Site features. The GIS will require setup and customization for this Site including input of the historical analytical results into the database.

Fate and transport modeling using Site data may help to evaluate the migration potential of Site-related COI in soils (surface and subsurface), surface water, sediment, and groundwater. Available computer software programs may be evaluated to determine applicability for fate and transport modeling. Processes that may be analyzed, depending on the COI identified for the Site, include ion exchange, adsorption, oxidation/reduction for inorganic compounds, and biodegradation and bioaccumulation for organic compounds. Natural attenuation processes may also be evaluated, if appropriate.

4.7 TASK 7 – QUALITATIVE RISK ASSESSMENT

Using the data developed in the RI, Viacom will conduct a qualitative risk assessment to identify potential exposure pathways and receptors. Viacom will also prepare a screening-level ecological risk assessment following USEPA and NYSDEC guidance given in *Ecological Risk Assessment Guidance for Superfund: Process for Designing and Conducting Ecological Risk Assessments* (USEPA, 1997) and *Fish and Wildlife Impact Analysis for Inactive Hazardous Waste Sites*, respectively.

Subtask 7.1 - Human Health Risk Assessment: Risk assessment involves the characterization of potentially adverse human health effects from the exposure to chemicals in the environment. The goal of the human health risk evaluation process is to provide a framework for developing risk information necessary to assist in making remedial decisions. It provides analysis of baseline risks to determine the need for action at sites and a basis for determining cleanup levels that will be adequately protective. Furthermore, it provides a method for comparing the potential health impacts of various remedial alternatives and a consistent process for evaluating and documenting public threats at hazardous waste sites.

Exposure assessment involves the identification of potential human exposure pathways at the Site for present and potential future-use scenarios. Present conditions are as they exist today and future conditions are based on potential future land uses of the site. Viacom will use USEPA guidance (*Land Use in the CERCLA Remedy Selection Process,* OSWER Directive 9355.7-04, May 25, 1995) to identify appropriate future land use scenarios. Potential releases and transport mechanisms will be identified for source media and waste materials. Exposure pathways will be identified by assessing the various ways in which human receptors living or working in the area could be exposed to chemicals originating from the site. Generally, an exposure pathway is considered complete if it consists of a source and mechanism of release, a transport medium, an exposure point (point of potential contact with a COI), and an exposure route (e.g., ingestion) at the exposure point. Current and realistic potential future-use scenarios considered will be presented.

Subtask 7.2 - Ecological Risk Assessment: A screening-level ecological risk assessment will be completed for the Site. This ecological risk assessment will be completed in accordance with NYSDEC guidance, and the fish and wildlife impact analysis will include Steps I, II, and III as described in applicable NYSDEC guidance (NYSDEC, 1994).

As necessary and appropriate, the ecological reconnaissance will characterize habitats at the Site, delineate wetlands on the Site, preliminarily map wetlands adjacent to the Site, characterize habitats, and identify potential receptor species. A conceptual exposure pathway analysis will be completed after the field investigation. Sediment and surface water sample data will be reviewed. After sample collection and analysis, a screening-level problem formulation and ecological effects evaluation will be completed to evaluate risk to terrestrial and aquatic receptors on or adjacent to the site. In this screening-level assessment, preliminary problem formulation will occur and a site conceptual model will be developed. The ecological effects analysis will consist of comparing the maximum detected concentrations for site-related COI with appropriate screening levels.

4.8 TASK 8 – PREPARATION OF REMEDIAL INVESTIGATION REPORT

The data collected and evaluated during RI activities will be presented in an RI report. The RI report will characterize Site-related COI and assess the potential risks to human health and the environment. The general outline for the RI report includes:

- Site background;
- Field investigation and technical approach, including field and analytical methodologies;
- Site description, including physical characteristics of the Site (e.g., climate, topography, hydrology, geology, hydrogeology, demography and land use, ecology);
- Nature and extent of COI, including sources, distribution, and trends;
- Fate and transport of COI;
- Results of qualitative risk assessment; and
- Summary and conclusions.

In addition to the required hardcopy versions, an electronic version of the RI report (including text, tables, and figures) will be provided to NYSDEC on compact disk, read-only format (CD-ROM). The electronic data will also include the GIS and sampling databases.

4.9 TASK 9 – REMEDIAL ALTERNATIVES SCREENING

Remedial alternatives will be screened as the initial step of the FS process, to identify potential technologies that are applicable to the Site. The screening process will be conducted in accordance with applicable USEPA and NYSDEC guidance and regulations outlined in the National Contingency Plan (NCP). The remedial alternatives that are identified during the initial screening evaluation will be analyzed in more detail during Task 11 (Remedial Alternatives Evaluation). As part of this evaluation, Viacom will also identify potential IRMs that may be cost-effective in reducing potential Site-related risk or otherwise simplify the remedy evaluation and development process.

4.10 TASK 10 – REMEDIAL ALTERNATIVES EVALUATION

Remedial alternatives that are identified during the initial screening process will be more fully evaluated and defined during this task. Additionally, applicable New York State Standards, Criteria, and Guidelines (SCGs) will be identified and verified [as described in Section 5.2 of the Technical and Administrative Guidance Memorandum (TAGM) 4030]. The possible remedial alternatives will be compared to seven evaluation criteria, including:

- Compliance with applicable SCGs;
- Overall protection of human health and the environment;
- Short-term effectiveness;
- Long-term effectiveness and permanence;
- Reduction of toxicity, mobility, or volume;
- Implementability; and
- Cost.

This analysis will be conducted consistent with the NCP and applicable USEPA and NYSDEC guidance.

4.11 TASK 11 – FEASIBILITY STUDY REPORT

After remedial alternatives have been screened and evaluated, an FS report will be prepared and will include the following:

- Introduction and Site background;
- Feasibility study objectives;
- Remedial action objectives;
- General response actions;
- Identification and screening of remedial technologies;
- Description and detailed analysis of remedial alternatives; and
- Summary and conclusions.

In addition to the required hardcopy versions, an electronic version of the FS report (including text, tables, and figures) will be provided to the NYSDEC on CD-ROM.

5.0 PROJECT SCHEDULE

The total estimated time to complete the scope of activities described in this RI/FS Work Plan is approximately 45 weeks from approval. Of this time, approximately six weeks are for sample analysis and four weeks are for regulatory review/negotiations. However, the following factors could adversely affect this schedule:

- Delays related to obtaining access agreements for off-site sample locations;
- Adverse weather;
- Unanticipated subsurface and/or hazardous conditions; and
- Delays in receipt of Site-specific information or comments.

The anticipated project schedule is included as Figure 5. The schedule will be modified if unanticipated circumstances affect the progress of the investigation.

Respectfully submitted
Cummings/Riter Consultants, Inc.

Matthew J. Valentine, P.G.
Project Supervisor

William A. Baughman, P.G.
Vice President

MJV/WAB/cld

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TABLES

TABLE 1

SUMMARY OF SAMPLING PROGRAM

SAMPLE MATRIX	PARAMETERS[a]	SAMPLES	FIELD DUPLICATES	MS/MSD SAMPLES	EQUIPMENT RINSATE BLANKS[b]	TRIP BLANKS[c]
Soil (Geoprobe® borings)	Cadmium Lead	80[d]	4[d]	4[d]	4[d]	--
	Full TCL/TAL Fluoride	4	--[e]	--[e]	--[e]	--
Soil – Test Pits	Full TCL/TAL Fluoride	30	2	2	1	--
Waste	RCRA Characteristics	3	--	--	--	--
Surface Water	Full TCL/TAL Fluoride	8	1	1	1	1
Sediment	Full TCL/TAL Fluoride	8	1	1	1	--
Groundwater	Full TCL/TAL Fluoride	8	2	2	2	2

(a) Parameters include: Full TCL/TAL includes VOCs, SVOCs, pesticides/PCBs, and TAL inorganics.
RCRA characteristics include ignitability, corrosivity, and reactivity, and toxicity characteristic leaching procedure (TCLP) VOCs, SVOCs, PCB/pesticides, and metals.

(b) Equipment rinsate blanks will not be collected if disposable sampling tools are used.

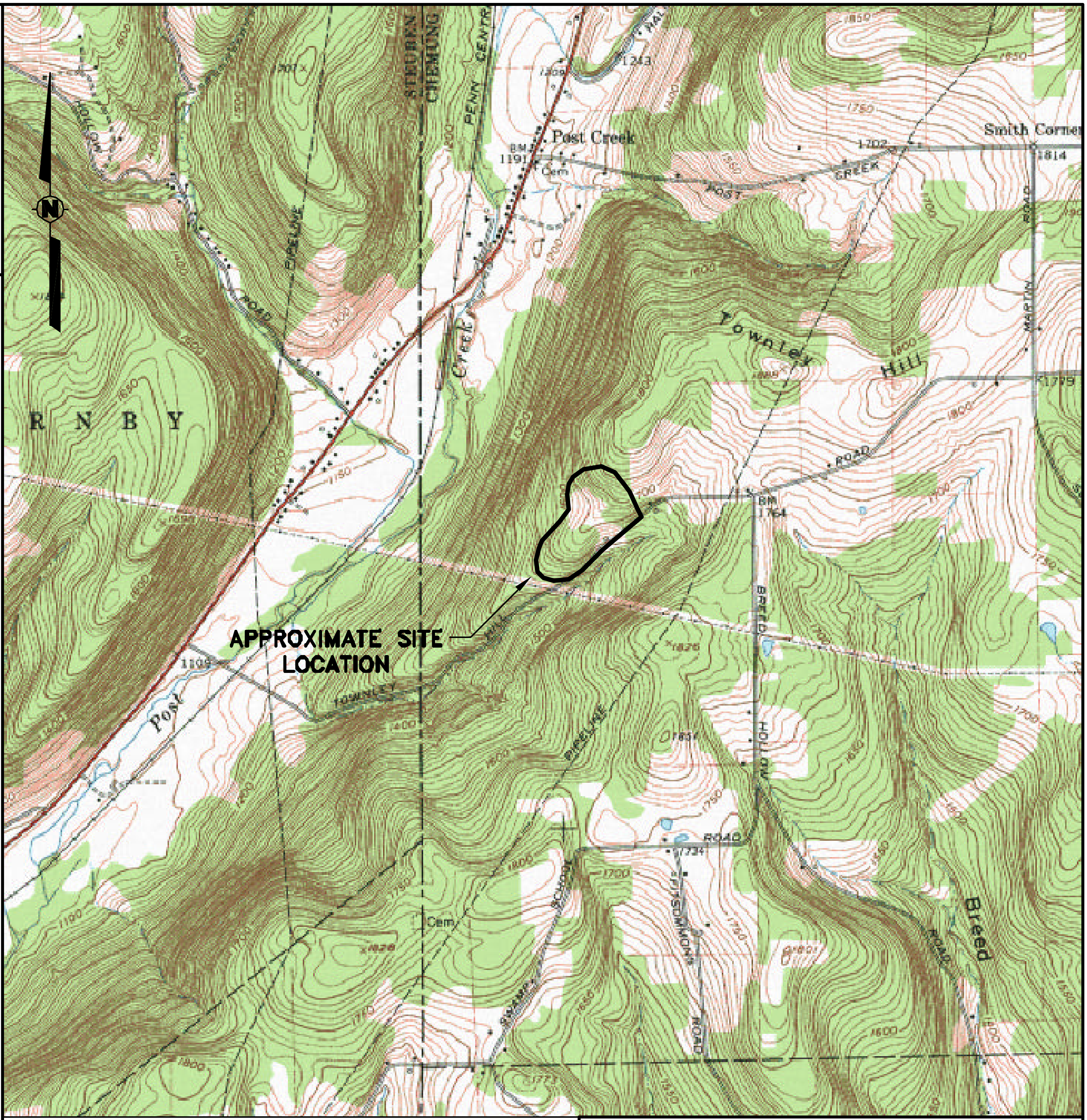
(c) One trip blank will be shipped with each container submitted to the laboratory for VOC analyses. The total number of trip blanks in the table is an estimate.

(d) Samples to be analyzed sequentially. Actual number of analyses will depend on results, with a maximum of 80 samples. The numbers of actual QC samples will be prorated according to the actual number of field samples.

(e) Samples to be analyzed in same Sample Delivery Group as soils from test pits.

FIGURES

DRAWING NUMBER 01304A1



S C A L E

0 2000 4000 FEET

REFERENCES:

7.5-MIN. TOPOGRAPHIC QUADRANGLE
BIG FLATS, NY, DATED 1969
PHOTOINSPECTED 1976
SCALE 1:24000

QUADRANGLE LOCATION

FIGURE 1

SITE LOCATION MAP

TOWNLEY HILL ROAD DUMP SITE
CHEMUNG COUNTY, NEW YORK

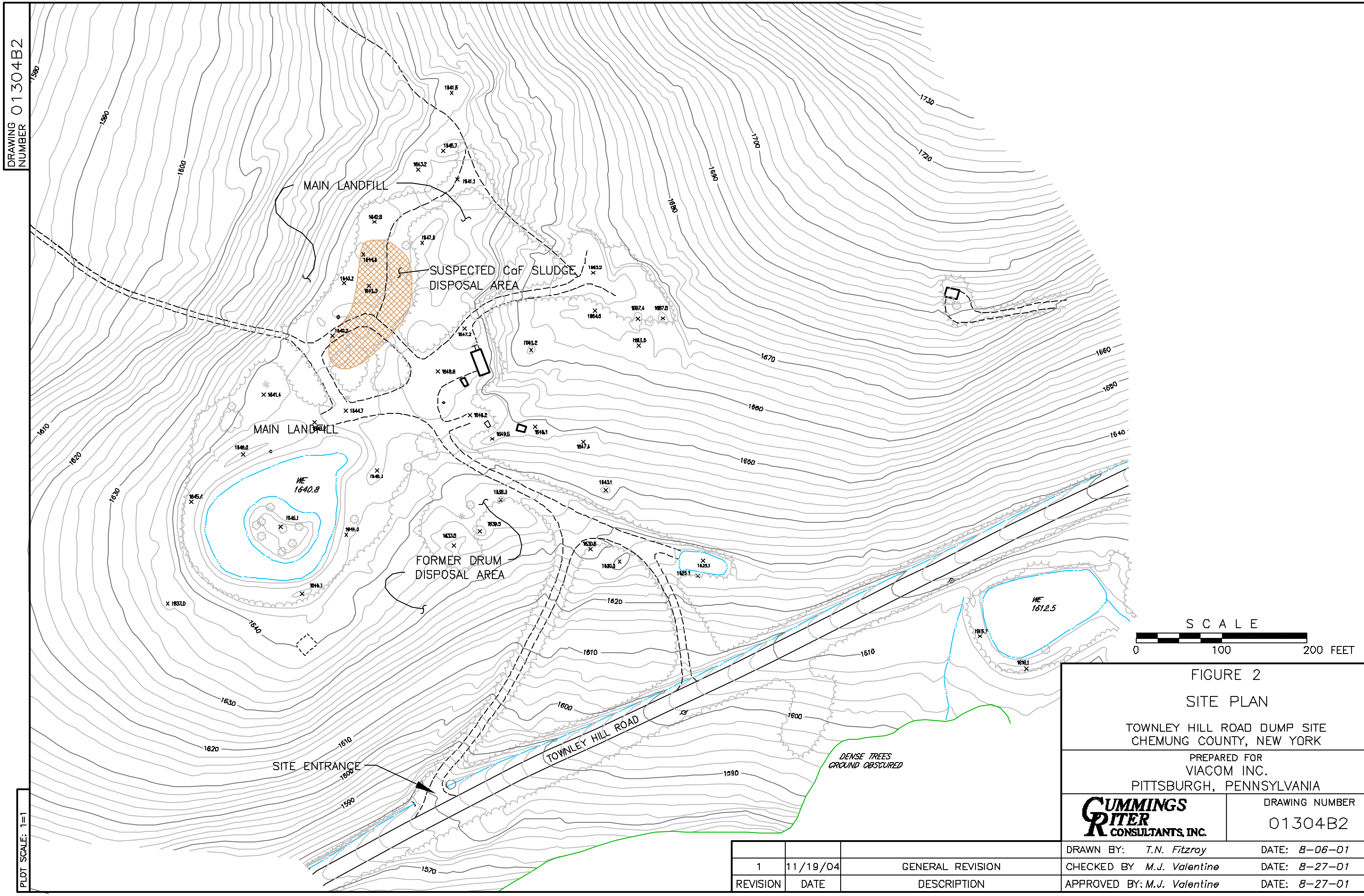
PREPARED FOR
VIACOM INC.
PITTSBURGH, PENNSYLVANIA

CUMMINGS RITER CONSULTANTS, INC.

DRAWING NUMBER
01304A1

REVISION	DATE	DESCRIPTION				
			DRAWN BY:	T.N. Fitzroy	DATE:	08-06-01
			CHECKED BY:	M.J. Valentine	DATE:	11-19-04
			APPROVED BY:	W.A. Baughman	DATE:	11-19-04

DRAWING NUMBER 01304B2



PLOT SCALE: 1=1

FIGURE 2

SITE PLAN

TOWNLEY HILL ROAD DUMP SITE
CHEMUNG COUNTY, NEW YORK

PREPARED FOR
VIACOM INC.
PITTSBURGH, PENNSYLVANIA

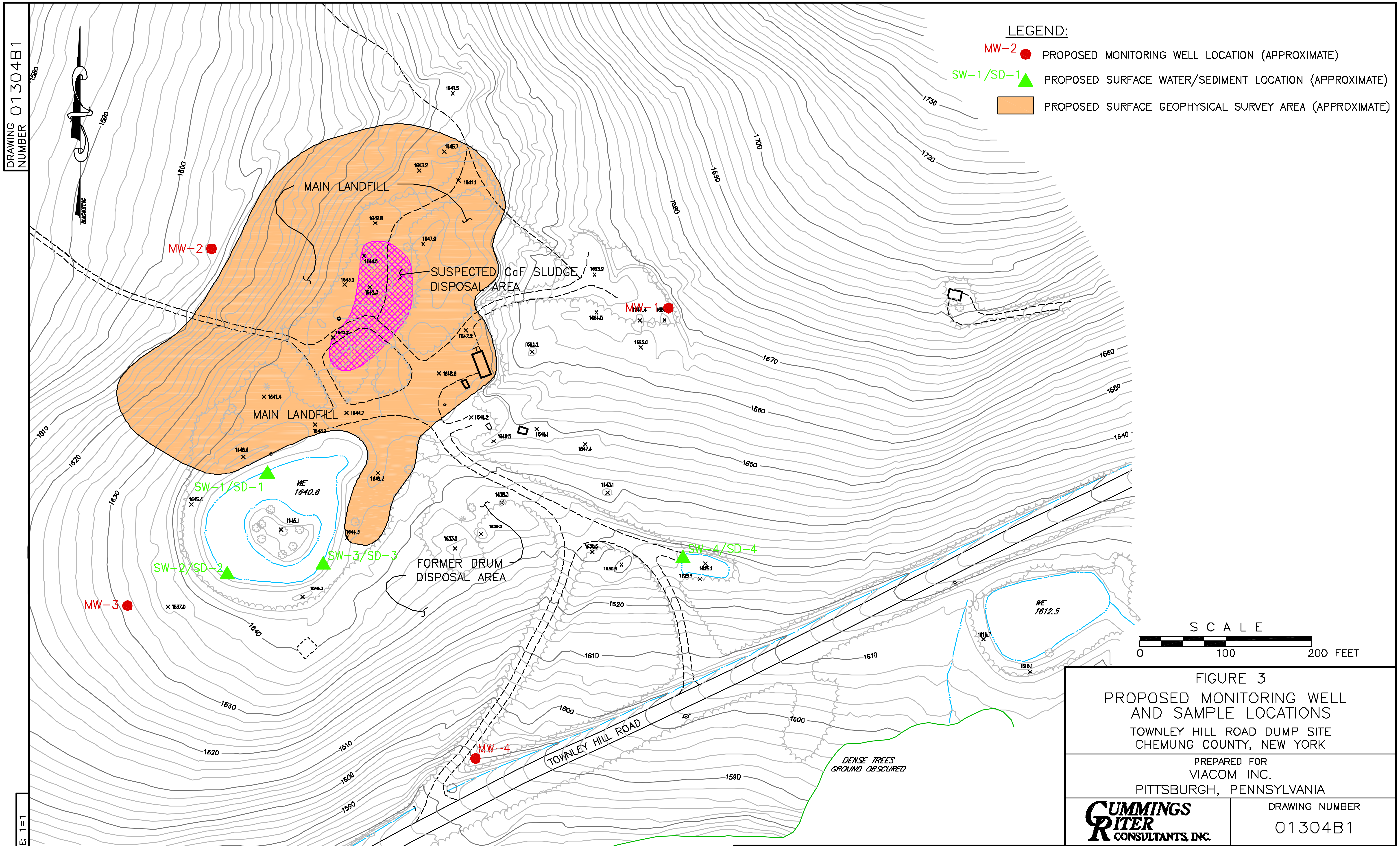
CUMMINGS RITER CONSULTANTS, INC.

DRAWING NUMBER
01304B2

REVISION	DATE	DESCRIPTION
1	11/19/04	GENERAL REVISION

DRAWN BY: T.N. Fitzroy DATE: 8-06-01
CHECKED BY M.J. Valentine DATE: 8-27-01
APPROVED BY: M.J. Valentine DATE: 8-27-01

DRAWING NUMBER 01304B1



LEGEND:

- MW-2 ● PROPOSED MONITORING WELL LOCATION (APPROXIMATE)
- SW-1/SD-1 ▲ PROPOSED SURFACE WATER/SEDIMENT LOCATION (APPROXIMATE)
- ▨ PROPOSED SURFACE GEOPHYSICAL SURVEY AREA (APPROXIMATE)

S C A L E
0 100 200 FEET

FIGURE 3
PROPOSED MONITORING WELL
AND SAMPLE LOCATIONS
TOWNLEY HILL ROAD DUMP SITE
CHEMUNG COUNTY, NEW YORK

PREPARED FOR
VIACOM INC.
PITTSBURGH, PENNSYLVANIA

CUMMINGS RITER CONSULTANTS, INC.

DRAWING NUMBER
01304B1

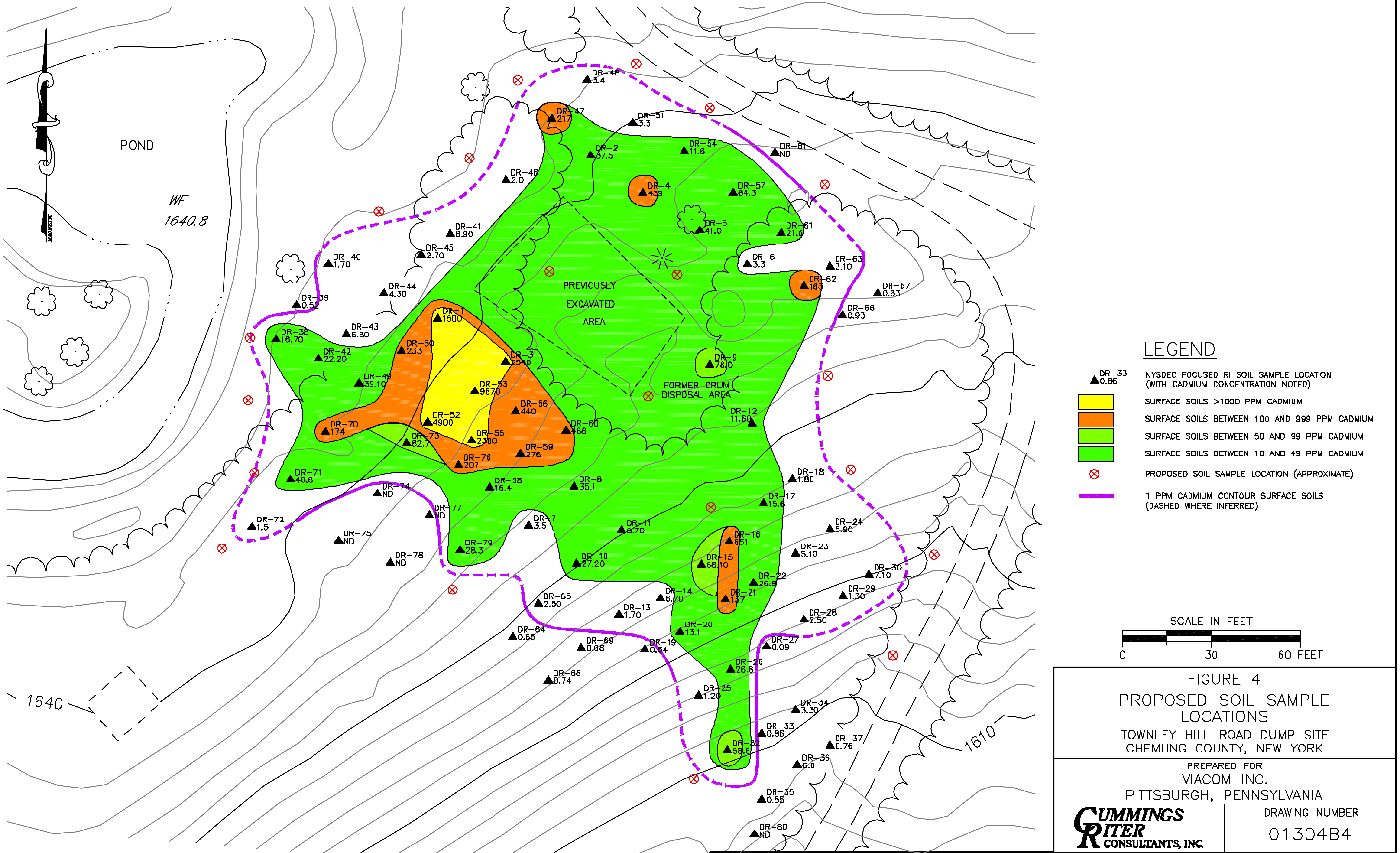
DRAWN BY:	T.N. Fitzroy	DATE:	8-06-01
CHECKED BY	M.J. Valentine	DATE:	8-27-04
APPROVED BY:	M.J. Valentine	DATE:	8-27-04

REVISION	DATE	DESCRIPTION
1	11/19/04	GENERAL REVISIONS

PLOT SCALE: 1=1

REFRENCE:
TOWNLEY HILL ROAD SITE CATLIN, NEW YORK, CHEMUNG COUNTY;
FIGURE 4; TITLED "TEST PIT LOCATIONS MAIN LANDFILL"
PROJECT 8-08-006

DRAWING NUMBER 01304B4



REFRENCE:
TOWNLEY HILL ROAD SITE CATLIN, NEW YORK, CHEMUNG COUNTY;
FIGURE 4; TITLED "TEST PIT LOCATIONS MAIN LANDFILL"
PROJECT 8-08-006

PLOT SCALE: 1=1

REVISION	DATE	DESCRIPTION
1	11/19/04	ADDED 1 PPM CADMIUM CONTOUR

FIGURE 4
PROPOSED SOIL SAMPLE LOCATIONS
TOWNLEY HILL ROAD DUMP SITE
CHEMUNG COUNTY, NEW YORK

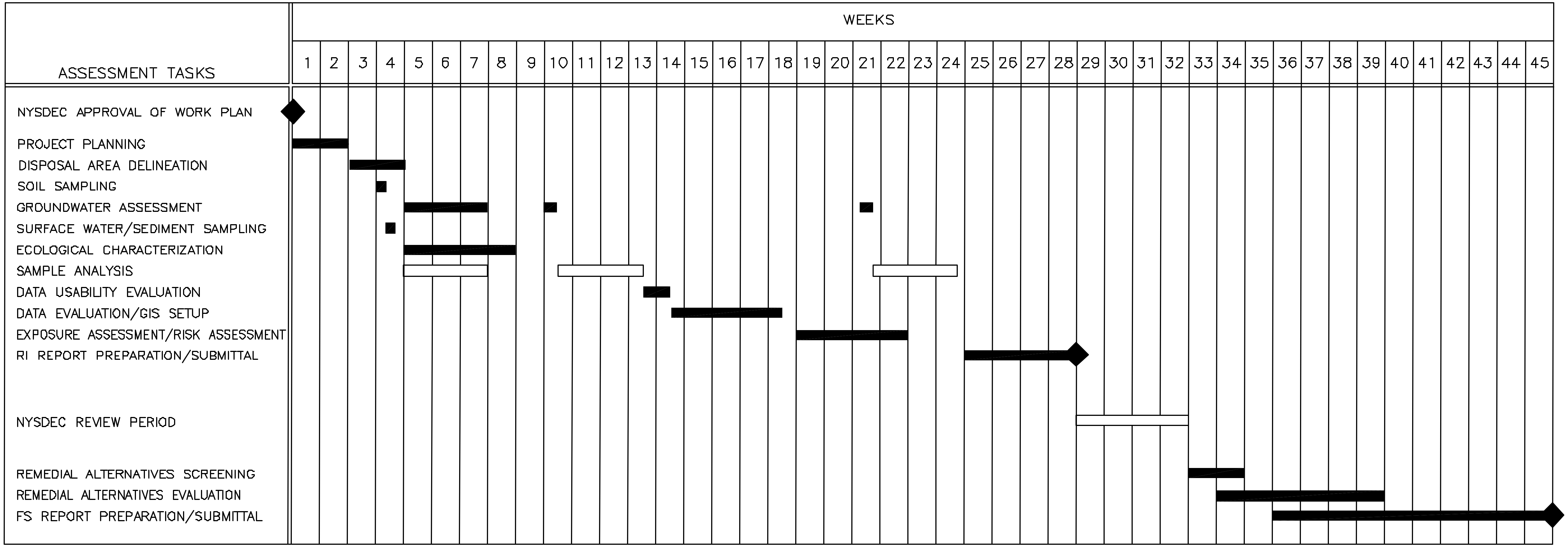
PREPARED FOR
VIACOM INC.
PITTSBURGH, PENNSYLVANIA

CUMMINGS RITER CONSULTANTS, INC.

DRAWING NUMBER
01304B4

DRAWN BY: T.N. Fitzroy DATE: 8-10-01
CHECKED BY: M.J. Valentine DATE: 8-27-01
APPROVED BY: M.J. Valentine DATE: 8-27-01

DRAWING NUMBER 01304B5



LEGEND

▬ ESTIMATED TASK DURATION

▭ INDICATES LABORATORY ANALYSIS OR REGULATORY REVIEW

NOTE:

1. THIS SCHEDULE ASSUMES PROPERTY ACCESS WILL BE OBTAINED DURING THE TWO WEEKS OF PROJECT PLANNING.
2. THIS SCHEDULE ASSUMES FOUR MONITORING WELLS ARE INCLUDED IN THE GROUNDWATER ASSESSMENT.

PLOT SCALE: 1=1

FIGURE 5

PROJECT SCHEDULE

TOWNLEY HILL ROAD DUMP SITE
CHEMUNG COUNTY, NEW YORK

PREPARED FOR
VIACOM INC.
PITTSBURGH, PENNSYLVANIA

CUMMINGS RITER CONSULTANTS, INC.

DRAWING NUMBER
01304B5

REVISION	DATE	DESCRIPTION

DRAWN BY: *T.N. Fitzroy* DATE: *08–10–01*
CHECKED BY: *M.J. Valentine* DATE: *11–19–04*
APPROVED BY: *W.A. Baughman* DATE: *11–19–04*

APPENDIX A

SAMPLING AND ANALYSIS PLAN
VOLUME I - FIELD SAMPLING PLAN

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VOLUME I - FIELD SAMPLING PLAN

1.0 INTRODUCTION

On behalf of Viacom Inc. (Viacom), successor in interest to CBS Corporation and Westinghouse Electric Corporation, Cummings/Riter Consultants, Inc. (Cummings/Riter) has prepared this Sampling and Analysis Plan (SAP) to support remedial investigation activities to be conducted at a former disposal site known as the Townley Hill Road Dump Site located in the town of Catlin, Chemung County, New York (the Site) (see Figure 1 of the Work Plan). In 1997, the New York State Department of Environmental Conservation (NYSDEC) conducted a limited investigation (focused remedial investigation) at the Site. A "Focused Remedial Investigation Report" was issued in September 1998 that recommended a comprehensive remedial investigation/feasibility study (RI/FS) be conducted at the Site to investigate potential impacts to soil, sediment, and groundwater.

The SAP consists of two plans: the Field Sampling Plan (FSP) and the Quality Assurance Project Plan (QAPP). This Appendix A is the FSP and is to be used in conjunction with the QAPP (Appendix B) to support activities related to the performance of the RI/FS. This SAP has been prepared in general accordance with the U.S. Environmental Protection Agency's (USEPA) *Guidance for Conducting Remedial Investigations and Feasibility Studies under CERCLA* (EPA 540/G-89/004, October 1988). The objective of this FSP is to describe field sampling procedures to be followed during field activities conducted in support of the RI/FS conducted at the Site.

The Site is an inactive hazardous waste landfill where disposal activities reportedly operated between the late 1950s to early 1960s under a permit issued by the Chemung County Department of Health. The landfill was reportedly closed in 1967 by the Chemung County Department of Health. The Site background and description are summarized in Section 2.0 of the RI/FS Work Plan. The field activities related to data collection during the RI phase are as follows:

- Surface geophysical surveying,
- Excavation of test pits,
- Soil and waste sampling,
- Drilling and monitoring well installation,
- Water level measurement,
- Surface water and sediment sampling,
- Groundwater sampling; and
- Land surveying.

The following sections describe the procedures to be followed for these activities.

2.0 PROJECT APPROACH AND SAMPLING OBJECTIVES

The primary objective for the RI is to gather representative environmental data to allow for a detailed evaluation and selection of an appropriate remedial alternative for the Site. Additional Site investigation activities may be completed before the selection of a remedial alternative can be completed.

A surface geophysical survey will be conducted in an attempt to delineate the landfill "footprint" using a non-intrusive technique. Test pits will be excavated to confirm the presence of suspected waste and provide a means of collecting waste samples for characterization. Also, the test pits will allow for the collection of soil samples to evaluate potential impacts to Site soils. Monitoring wells will be drilled and installed to allow for the collection of representative groundwater levels to determine flow direction and gradient(s). The monitoring wells will also be sampled to evaluate the nature and extent of Site constituents of interest (COI) in groundwater.

Soil, surface water, sediment, and groundwater samples will be collected and analyzed to characterize potential impacts to these media resulting from disposal activities at the Site. Specific objectives for RI field activities include:

- Performance of a surface geophysical survey and excavation of test pits to delineate the location, extent, and volume of suspected landfilled waste disposed of at the Site. The test pits will also allow for the means of collecting samples for waste characterization.

- Collection and analysis of surface and subsurface soil samples to delineate the extent of soils impacted by cadmium and other constituents in the vicinity of the former drum disposal area.

- Drilling, installation, and development of monitoring wells to allow for the measurement of water levels to obtain information on groundwater flow direction and gradient in the uppermost water-bearing zone beneath the Site.

- Collection and analysis of soil, surface water, sediment, and groundwater samples to characterize the nature and extent of potential impacts to these media from Site disposal activities. Resulting analytical data will be used for the screening and selection of an appropriate remedial alternative for the Site to be developed during the FS.

3.0 CONSTITUENTS OF INTEREST

This section identifies the COI and parameters for the RI field investigation. Based on the results of soil samples collected during previous investigations, the COI for soil include semivolatile organic compounds (SVOCs), cadmium, and lead. Soil samples collected during the focused RI (NYSDEC, 1998) were analyzed for Target Compound List (TCL) parameters, including volatile organic compounds (VOCs), SVOCs, and pesticides/polychlorinated biphenyls (PCBs), and Target Analyte List (TAL) inorganic parameters. Samples of other media (surface water, sediment, and groundwater) have not been collected and therefore, the COI for these media have not been determined. The results of the RI sampling program will create a baseline allowing for the comparison of future sampling results. Table A-1 outlines the proposed sampling approach and presents the number (and type) of samples that will be collected during the RI at the Site.

During the RI, groundwater, surface water, and sediment samples will be analyzed for the full TCL/TAL lists including TCL VOCs, SVOCs, and pesticides/PCBs and TAL inorganic compounds, plus fluoride. Aqueous samples collected for TAL analysis will be analyzed for the total fraction only. Surface and subsurface soil samples collected as part of the delineation of the soils impacted by cadmium in the vicinity of the former drum disposal area (Task 3.2) will be analyzed for cadmium and lead. Additionally, 10 percent of the soil sampled collected in the vicinity of the former drum disposal area will be analyzed for the full TCL/TAL list, plus fluoride. Surface and subsurface soil samples collected from the test pits will be analyzed for the full TCL/TAL, plus fluoride.

Analytical methods include appropriate NYSDEC Analytical Service Protocol (ASP) Contract Laboratory Program (CLP) methods. Samples of waste collected from the test pits will be analyzed for Resource Conservation Recovery Act (RCRA) characteristics, including ignitability, corrosivity, reactivity, and toxic characteristic leaching procedures (TCLP) parameters using USEPA SW-846 methods.

4.0 SAMPLING LOCATIONS AND FREQUENCY

This section discusses the selection of sampling locations and frequency of sample collection. Table A-1 outlines the proposed sampling approach and presents the number (and type) of samples that will be collected during the RI at the Site. Additionally, Figures A-1 and A-2 provide the approximate locations of the proposed samples.

To meet the sampling objectives stated in Section 2.0, Cummings/Riter will sample the existing monitoring wells installed during the RI. A total of four groundwater samples will be collected (per event). The frequency of groundwater sampling will be two quarterly events. The remaining samples (soil, surface water, sediment, and waste) will be collected only during the initial sampling event.

Cummings/Riter will also collect several types of quality control (QC) samples. The frequency of QC samples is defined in the QAPP.

5.0 EQUIPMENT AND PROCEDURES

This section describes equipment and procedures to be used during the performance of field activities conducted as part of RI. The Standard Operating Procedures (SOPs) for the field instruments to be used during the performance of the RI field activities are included in Attachment A-1.

5.1 GENERAL DOCUMENTATION REQUIREMENTS

Each day work is performed at the Site, a field activity daily log will be completed by the field staff. It will be the responsibility of the members of the field crew to ensure that this record is completed. Information to be provided on the log includes, as appropriate:

- Field activity subject,
- General work activity,
- Unusual events,
- Changes to plans and specifications,
- Visitors on Site,
- Subcontractor progress or problems,
- Communication with Viacom or others,
- Weather conditions, and
- Personnel on Site.

The field activity daily log will be signed by the individual who prepares it. Field activity daily logs will be submitted on a weekly basis to the Project Supervisor or Project Manager. Following review, the logs will be placed in the project file. A blank field activity daily log is provided in Attachment B-2 of the QAPP.

Other data forms used for documenting sample data and field tests are described in the subsections that follow. Chain-of-custody documentation is described in Section 5.0 of the QAPP (Appendix B).

5.2 SURFACE GEOPHYSICAL SURVEYING

Cummings/Riter personnel will perform a bulk ground conductivity survey for an area of approximately three acres at the Site. For this survey, a Geonics, Limited Model EM-31

(EM-31), non-contacting terrain conductivity meter and data logger will be used. The EM-31 measures the average conductivity of subsurface material in the vicinity of the instrument. The purpose of this survey is to provide horizontal delineation of landfilled waste by locating areas that contain material with significantly different anomalies than the surrounding soils. The proposed area to be surveyed is shown on Figure A-1.

The EM-31 has three settings at which measurements can be obtained. The quad-phase vertical position readings provide average subsurface conductivity values to a depth of approximately 20 feet. The quad-phase horizontal position readings provide average subsurface conductivity values to a depth of approximately ten feet. The comparison of quad-phase horizontal and vertical surveys can provide additional information on the depth of subsurface conductivity anomalies. The in-phase position readings are used to identify buried ferrous metal (readings less than zero) and assist in distinguishing variations in ground conductivity from buried ferrous metals. These three measurements will be obtained at each grid station.

The bulk conductivity survey will be conducted using a 10-foot by 10-foot spacing within the 20-foot grid established by global position system (GPS) surveying (if possible). If GPS is not possible because of interferences, etc., conventional surveying methods will be used.

Using the established survey grid as a baseline, readings will be collected every ten feet along the north/south and east/west oriented lines. A data logger will be used to automatically record the quad-phase horizontal, quad-phase vertical, and in-phase position readings at each grid station. Results of the conductivity survey will be used to locate test pits for confirmation of the delineated landfill “footprint” and “hot spots.”

5.3 TEST PIT EXCAVATION AND SOIL/WASTE SAMPLING

Soil samples will be collected from test pits at the Site. The test pits will be located based on the results of the surface geophysical survey. Soil samples will be collected to acquire sufficient information to make informed decisions regarding remedial alternatives.

Twelve perimeter test pits will be excavated to confirm the location of the suspected landfill "footprint." The perimeter pits will be excavated inward until visibly identifiable waste is encountered. Once waste is encountered, the pit will be extended downward in an attempt to define the vertical thickness of the waste material. Samples will be collected from each of the perimeter test pits as follows:

- Surface soil (zero to six inches in depth) at a distance of 10 feet from the horizontal limit of waste; and
- Subsurface soil (24 to 30 inches in depth) at a distance of 10 feet from the horizontal limit of waste.

Soil samples will be collected from specified locations and intervals as discrete samples using precleaned, stainless-steel trowels and/or spoons. The samples will be retrieved from the bucket of a backhoe performing the excavation. The backhoe will be decontaminated prior to, between test pit locations, and at the completion of the final test pit using the methods described in Section 5.10. The soil samples will also be classified on Site by a geologist, based on physical characteristics which include soil type, cohesiveness, color, grain size and relative moisture content. After completion of the perimeter test pit excavations, the horizontal limits of waste will be staked for surveying.

In addition to the perimeter test pits, three test pits will also be excavated within the interior of the disposal area (interior test pits) to further delineate the vertical extent of the waste and confirm suspected "hot spots". The interior test pits will be excavated approximately one foot into the soil underlying the waste material. Samples of the following will be collected at each of the interior test pit locations:

- Surface material (zero to six inches in depth);
- Visibly identified waste material; and
- Underlying native soil (6 to 12 inches below the soil/waste contact).

If groundwater is encountered during excavation of the interior test pits, the excavation will be terminated, and a subsurface soil sampling will not be collected. Field observations will determine if the test pit excavation is attempted at a different location.

The waste samples will be collected based on physical characteristics (e.g., composition, color, texture, etc.) to identify a range of the waste materials disposed of at the Site. The number of test pits and soil samples may be modified based on field conditions. Waste samples will be collected by the same methods as described for soil sampling above.

The interior test pits will also be logged by a Cummings/Riter geologist regarding the physical nature of the waste, adjacent and underlying soils, and any soils within the waste material. Test pit logs will be completed and will include soil and waste descriptions, depths, and any other relevant observations made during excavation of the pits. A blank test pit log is provided in Attachment B-2 of the QAPP.

Excavated material will be placed back into the test pits and staked for surveying. Each of the test pits will be surveyed using GPS (if possible). If GPS is not possible because of interferences, etc., conventional surveying methods will be used.

5.4 SOIL SAMPLING

Soil sampling is proposed to further delineate the extent of soils impacted by cadmium and other constituents located in the vicinity of the former drum disposal area. Up to four samples per location will be collected at each of the 20 locations. The number of surface and subsurface soil samples may be modified based on the results of field observations. Figure A-2 shows the locations of the proposed samples. The proposed sample locations may be modified in the field. Samples will be biased toward surface drainage channels.

At each location, soil samples will be collected from the ground surface to six inches in depth and from the next three one-foot intervals (0.5 to 1.5 feet, 1.5 to 2.5 feet, and 2.5 to 3.5 feet). If bedrock is encountered before reaching the target sampling depth, the Sampling will be truncated at the bedrock surface.

Samples will be collected by means of direct push (Geoprobe® or equivalent) techniques using macrocore samplers fitted with acetate sleeves. It is likely that an all-terrain vehicle will be required. With the exception of the VOC sample fraction, which will be collected as discrete grab samples, the soil removed the Geoprobe® macrocore will be placed in a stainless-steel bowl and blended. The blended soil will then be placed directly into the appropriate sample containers provided by the analytical laboratory using precleaned, stainless-steel trowels or spoons. The VOC fraction of the soil samples will be collected from a representative portion of the sample interval and placed directly into the sample containers provided by the laboratory. In addition, the required QC samples will also be collected in accordance with the frequency defined in the QAPP.

The soil samples will also be classified on site by a geologist, based on physical characteristics which include soil type, cohesiveness, color, grain size and relative moisture content. The locations of the surface soil samples will be staked for surveying. A blank soil sample collection form is provided in Attachment B-2 of the QAPP.

Although samples will be collected from each of the depth intervals described above, the analytical protocol is to analyze the uppermost sample from each Geoprobe® location. If that sample is found to contain elevated cadmium or lead concentrations, the next lower sample will be analyzed. The step-wise analytical protocol will be followed for all of the Geoprobe® sampling locations. The long holding time allowable for metals analyses in soils facilitates this approach.

Locations selected for full TCL/TAL analyses will primarily be the 0.5 to 1.5 foot interval at near-field locations around the former drum disposal area and in defined surface water drainage channels.

5.5 DRILLING, MONITORING WELL INSTALLATION, AND WELL DEVELOPMENT

5.5.1 Drilling Activities

Borings for the installation of the monitoring wells will initially be advanced using hollow-stem augers. Standard penetration test (SPT) samples will be collected continuously from ground surface to the top of bedrock in general accordance with American Society for Testing and Materials (ASTM) Method D1586-84. Standard two-inch outside diameter (O.D.) split-barrel soil samplers will be driven 24 inches into the soil by dropping a 140-pound weight through a height of 30 inches. The number of blows required to drive the sampler through each six-inch increment of soil will be recorded. The soil samples will be classified on Site by a Cummings/Riter geologist, based on physical characteristics which include soil type, cohesiveness, color, grain size and relative moisture content.

The initial hollow-stem auger borings will be advanced to the approximate top of bedrock. If needed, a temporary steel casing will be placed in the borehole to prevent the hole from collapsing. The borehole will then be advanced using NQ wireline coring techniques and will be terminated within the first water-bearing zone. The rock core will be placed in properly labeled, wooden core boxes. The Cummings Riter geologist will visually log the core according to rock type, color, hardness, mineral content, discontinuities, and structure. Based on the reported depth of an upgradient groundwater supply well, the depth to the first water-bearing zone is expected to occur at a depth of approximately 80 feet below ground surface. After coring has been completed, the boring will be reamed using a 7-7/8 inch diameter tri-cone roller (or air hammer) bit to allow for the installation of a monitoring well.

Air monitoring of total VOCs will be conducted during drilling operations using a photoionization detector (HNu™ or equivalent). Results of positive detections and related corrective action are discussed in the Health and Safety Plan for the Site (Appendix C).

Since the monitoring wells will be located outside the disposal area, drill cuttings will be spread on the ground surface in the vicinity of the borings.

5.5.2 Monitoring Well Installation

Monitoring wells will be constructed with two-inch I.D., threaded, flush joint, Schedule 40 polyvinyl chloride (PVC) screen (0.01-inch slots) and two-inch I.D., threaded, flush joint, PVC casing. The well screen lengths will be a maximum of 10 feet. The annular space between the well screen and borehole will be backfilled with a clean, appropriately sized sand to approximately two feet above the screen.

A minimum three-foot thick sodium bentonite pellet seal will be placed directly above the sand pack to inhibit vertical migration along the borehole. The annular space above the sodium bentonite seal will be backfilled with a cement-sodium bentonite grout mixture consisting of approximately 5 percent sodium bentonite, to protect the well from surface runoff. The cement-sodium bentonite grout will be placed from the bottom using the tremie method.

Monitoring wells will be completed by installing a locking steel protective casing set in concrete with three feet of aboveground stick-up. Monitoring wells will have a concrete pad at the ground surface which extends 6 inches beyond the borehole diameter and 12 inches below ground surface to prevent infiltration between the surface casing and the borehole. A typical well construction diagram is included as Figure A-3.

5.5.3 Well Development

Monitoring wells will be developed with a clean, dedicated, Teflon® bailer attached to new nylon rope and/or a submersible pump with new polyethylene tubing. Well development will continue until a minimum of five well casing volumes are removed and the discharge water from the borehole reaches a stable pH, specific conductance and temperature.

Development water will be collected and contained with the decontamination water in a temporary storage tank located on the Site property. This water will be sampled at the completion of the sampling and analysis program and characterized for proper disposal by Viacom. The analytical results will be used to determine the manner by which the water will be disposed.

5.6 AQUIFER TESTING

After the completion of well development, aquifer testing in the form of slug tests will be conducted in the four new monitoring wells to determine the approximate Site-specific hydraulic conductivity (K) of the aquifer. Groundwater level measurements will be used to estimate groundwater flow directions and the horizontal groundwater gradient in the first water-bearing unit beneath the Site. Rising and falling head slug tests will be performed at each monitoring well location. The rising and falling head testing will be performed in accordance with ASTM Method D 4044-91 (ASTM, 1994).

Prior to performing the test, the water level in the well being tested will be measured. Water levels will be obtained using pressure transducer data loggers or manual water level measurements. If a pressure transducer/data logger is used, the pressure transducer will be placed in the well and the water level will be permitted to stabilize prior to testing. Once the water level in the well is stable, a slug constructed of solid PVC will be lowered rapidly into the water. The data logger will be programmed to collect water level data logarithmically and the initiation of data collection will coincide with the lowering of the slug into the water. The maximum water level collection interval will be five minutes. The collection of water level data will continue until the water level has recovered to within 90 percent of the initial water level. A rising head slug test will then be performed on the well. The data logger will be reprogrammed and water level data will be collected upon removal of the PVC slug from the well. The collection of water level data will continue until the water level in the well has recovered to within 90 percent of the initial water level. The PVC slug and pressure transducer will be decontaminated between test locations. The average K value will then be calculated for each well location using an appropriate analytical method included in the software program, AquiferTest® (developed by Waterloo Hydrogeologic) in accordance with ASTM Method D 4105-91 (ASTM, 1994).

After the completion of the aquifer testing, dedicated submersible pumps/tubing may be installed in the wells to allow for groundwater sampling.

5.7 OTHER SAMPLING ACTIVITIES

Samples of surface water, sediment, and groundwater will be collected for TCL/TAL parameters using ASP-CLP methods. The proposed locations are shown on Figure A-1. Surface water and sediment samples will be collected as discrete or grab samples. The sampling procedures are discussed separately in the following subsections.

5.7.1 Surface Water and Sediment Sampling

Surface water samples will be collected by gently submerging a clean laboratory supplied container (transfer bottle) beneath the water surface and filling the appropriate sample bottles. A coliwasa or long-handled dipper may also be used in place of the transfer bottle for surface water sample collection. A transfer bottle (or equivalent) must be used so that sample preservatives are not lost during sampling. Surface water samples collected from the ponds will be retrieved from approximately one to two feet below the top of the water. If a non-aqueous sheen is observed at any of the surface water locations, an additional sample of the water and sheen will also be collected. For flowing water, samples will be collected from downstream locations followed by upstream locations to minimize sample disturbance.

Sediment samples will be collected at the same locations as the surface water samples immediately after surface water sampling is complete. Sediment samples will be collected from the uppermost six inches of material using a trowel, hand auger, or similar sampling tool. Sample locations will be staked and flagged for future location (if necessary). Sample collection forms will be completed at each sampling location. A blank sample collection form is provided in Attachment B-2 of the QAPP.

5.7.2 Groundwater Sampling

Groundwater samples will be collected for laboratory analysis from the four proposed monitoring wells (MW-1 through MW-4) during two quarterly sampling events. The initial groundwater sampling event will be conducted no sooner than two weeks after the new wells have been properly developed. The second groundwater sampling event will be performed no sooner than three months after the initial sampling event. Figure A-1 depicts the locations of the proposed monitoring wells.

Groundwater samples will be collected using low-flow groundwater sampling procedures (M.J. Barcelona and R.W. Puls, 1995). Prior to purging and sampling, the groundwater level for each Site monitoring well will be measured from a fixed point on the well casing. This point will be used as the reference point during surveying of wellhead elevations and locations. The groundwater level and well depth will be obtained using an electronic water level indicator. The depth of the well will be measured after sampling to minimize disturbance to the water column prior to sampling. The bottom of the well will be determined by resting the water level indicator on the well bottom. Measurements will be made and recorded to the nearest 0.01 foot for the water level and the nearest 0.1 foot for the well depth. Water level measurements will be converted into groundwater elevations for purposes of estimating groundwater hydraulic gradient and flow direction for the bedrock aquifer.

Groundwater monitoring wells will be purged and sampled using portable, positive displacement bladder pumps or other appropriate submersible pumps. The groundwater will be analyzed using an analytical flow-through cell for field parameters pH, specific conductivity, temperature, dissolved oxygen, oxidation-reduction potential (ORP), and turbidity.

The groundwater purging and sampling procedures to be used are provided in Barcelona, et al. (1994) and are summarized as follows:

- Water levels will be obtained prior to sampling using an electronic water level device. Depth to water will be measured to the nearest 0.01 foot and referenced to the top of PVC casing.

- Purging will be accomplished using an adjustable-rate, submersible pump. Purge water will be collected from each well and stored on-Site for characterization and disposal.

- The water level in the well being sampled will be monitored during purging. The purge rate will be adjusted such that little or no drawdown, where possible, is observed in the well. Purge rates will be maintained at a maximum rate of one liter per minute (l/min) to minimize drawdown in the well.

- Following removal of the standing water contained in the discharge tubing, an analytical flow-through cell will be utilized to monitor field parameters during purging (one reading approximately every five minutes) until the parameters stabilize to within 10 percent (plus or minus 5 percent) over a minimum of three readings. Field parameters monitored with the analytical flow-through cell will include pH, specific conductance, temperature, dissolved oxygen, turbidity, and ORP.

- Once the field parameters have stabilized, the analytical flow-through cell will be disconnected. The flow rate will be checked and adjusted (as necessary) to maintain a flow rate of less than 100 milliliters per minute (ml/min) during sampling. The groundwater samples will be collected by filling the appropriate containers directly from the discharge tube. The sample containers will be filled by allowing the water from the discharge tube to flow gently down the inside of the bottle with minimal turbulence. The VOC containers will be filled prior to other sample containers.

Well purging and water sample collection forms will be completed for each monitoring well to be sampled. Blank copies of these forms are provided in Attachment B-2 of the QAPP. The labeling and handling of sample containers is described in Section 5.3.3.

5.8 SAMPLE PREPARATION AND HANDLING

5.8.1 Sample Containers and Cleaning Requirements

Sample containers will be supplied by the analytical laboratory. This will ensure that sufficient sample volume is obtained for laboratory analysis and associated laboratory quality assurance/quality control (QA/QC) procedures. Sampling container requirements for the various types of samples to be collected during the RI are summarized in Table A-2. Containers are purchased precleaned in accordance with appropriate USEPA guidelines.

5.8.2 Sample Preservation and Holding Times

Because certain constituents in water can change chemically with time, it will be necessary to preserve individual samples to maintain the integrity of time-dependent constituents. Laboratory personnel will add the required preservatives to each individual sample bottle. Preservation includes maintaining the samples in a chilled condition (4°C) once they have been obtained.

The samples will be stored at 4°C prior to analysis. The laboratory analysis will be performed within specified holding times to ensure the validity of the analytical results. The type and volume of sample containers, number of containers, preservatives, and holding times for each analytical parameter are provided in Table A-2.

5.8.3 Sample Labeling and Handling

Sample containers will have blank labels, as supplied by the laboratory. The labels will be filled out at the time of sample collection by the field personnel performing the sampling. Sample identification is described in Section 6.1. Information marked on the label will include:

- Sample identification number,
- Collector's initials,
- Date of collection,
- Type of sample,
- Preservatives used, and
- Analysis to be performed.

The samples will be transported to the laboratory in durable, secured metal or plastic coolers or laboratory-supplied, insulated shipping containers. Containers will be shipped via common carrier (e.g., Airborne or Federal Express) or hand carried. Samples will be shipped in accordance with state and federal Department of Transportation regulations. Chain-of-custody documentation will accompany the samples.

5.9 FIELD QUALITY CONTROL SAMPLES

As a check on field sampling QA/QC, trip blanks, equipment rinsate samples (field blanks), and field duplicates will be prepared and sent to the laboratory at specified frequencies. In addition to the field QA/QC samples, samples will be collected for laboratory QA/QC. These samples consist of matrix spike/matrix spike duplicate (MS/MSD) samples. The frequencies at which these samples will be collected and the number of such samples are presented in the QAPP.

A trip blank for liquid samples is a sample bottle filled by the laboratory with analyte-free laboratory reagent water, handled like a sample but not opened, and sent to the laboratory for analysis. Trip blanks are analyzed for VOCs only and are used to determine if contaminants are introduced during sample handling and shipment. One trip blank will be included with each shipping cooler of VOC samples sent to the laboratory.

Equipment rinsate samples are defined as analyte-free deionized water poured through sampling equipment, transferred to the sample bottle, and then transported to the laboratory for analysis. For groundwater, potable water will be passed through the decontaminated pump prior to well purging. These samples help determine whether sampling equipment was sufficiently clean before sampling. The equipment rinsate blanks will be analyzed for the same parameters as the sampled media.

A field duplicate is defined as two or more samples collected independently at a sampling location during a single act of sampling. Duplicate samples will be collected by filling alternate sample containers from one sample location. For example, a groundwater VOC duplicate would be collected by filling the vials for one sample and then into the vials for the duplicate sample. The number of field duplicates required is presented in Table A-1.

Field duplicates will be indistinguishable by the laboratory from other samples. Therefore, one complete sample set will be identified with a "coded" or false identifier in the same format as other identifiers used for this sample matrix. Both the coded and the true identifiers will be recorded on the sample collection form. The coded identifier will be used on the chain-of-custody forms. These coded field duplicates are used to assess the representativeness of the sampling procedure as well as laboratory precision.

MS/MSD samples are required for VOC analyses of groundwater samples. Samples designated for MS/MSD analysis will be collected at a frequency defined in the QAPP. Triple the normal sample volume will be collected for VOCs. Procedures for collecting MS/MSD samples at any location will be the same as those used to collect field duplicate samples.

5.10 DECONTAMINATION

Decontamination of equipment used for sampling, if not dedicated to a well, will be carefully performed to minimize any possibility of cross-contamination through the use of tools and equipment. Sampling equipment will be decontaminated prior to initial use.

An area on Site will be designated for decontaminating equipment and materials. Decontamination residues will be managed and disposed of in accordance with relevant regulatory requirements.

5.10.1 Large Equipment

The decontamination area for large equipment will consist of a 40-mil plastic-lined pad with berms and a sump to collect water generated by the decontamination process. The drilling rig, backhoe, and related equipment will be decontaminated before and after each monitoring well installation and test pit, respectively. Large equipment will be decontaminated using a steam cleaner to reduce the risk of cross-contamination. Monitoring well screen and casing will be transported to the Site in plastic bags, direct from the manufacturer, and stored in a clean dry location on Site prior to installation.

5.10.2 Small Tools and Equipment

This category includes small tools and other apparatus used for sampling, such as trowels, hand augers, spoons, or bailers. This equipment will be washed in a detergent and water solution (e.g., Alconox or Liquinox) and rinsed with tap water to remove particulates. Field filtration equipment (if required) will be rinsed with dilute nitric acid.

The equipment will then be rinsed with methanol. The final step will be a distilled or deionized water rinse. Following decontamination, the equipment will be wrapped in aluminum foil to prevent possible contamination prior to next use.

5.10.3 Pumps

If pumps are not dedicated to a monitoring well, they will be decontaminated using the following procedure:

- Clean with tap water and Liquinox® detergent (or equivalent) using a brush, if necessary, to remove particulate matter and surface films. Then, operate the pump so that a minimum of 10 gallons of the solution are flushed through the pump;
- In a similar manner, operate the pump so that a minimum of 10 gallons of potable water are flushed through the pump;
- Rinse the exterior of the pump with methanol;
- Rinse the exterior of the pump with distilled water; and
- Air-dry and wrap with aluminum foil.

5.10.4 Monitoring Equipment

Monitoring equipment, including water level sensors, pH probes, slugs, and pressure transducers will be rinsed with distilled water and methanol between usages.

6.0 SAMPLE DOCUMENTATION AND CUSTODY

This section describes the procedures to be used to identify samples, document sample collection, and maintain sample custody.

6.1 SAMPLE IDENTIFICATION

Cummings/Riter will use an identification numbering system to describe all samples collected during RI field activities. This number will identify the sample media and location. Samples from the various locations will have the following prefixes:

- Soil from test pits: TP-,
- Soils: SS-,
- Surface water: SW-, and
- Sediment: SD-.

The identification will also include a number to allow for identifying the location from which the sample was collected. If more than one soil sample is collected at a specific location, the depth interval may also be used to modify the sample identification. For example, a sample identified as TP-2 (24”-36”) indicates a soil sample collected at location Test Pit TP-2 from a depth of 24 to 36 inches. Groundwater samples will be identified using the monitoring well identification from which the sample is collected (MW-1 through MW-4).

6.2 SAMPLING DOCUMENTATION

Sampling personnel will document sampling activities on sample collection forms. The following information at each sample location will be recorded: the time the sample was collected, sampling personnel, sample number, specific conductance, temperature, water level, and any field observations.

Sample collection forms will be maintained in the project file in Cummings/Riter's Pittsburgh office. After completion of the RI, the information will be transferred to Viacom.

6.3 SAMPLE CUSTODY

The appropriate chain-of-custody for the samples collected during the RI field activities will be followed. Custody procedures are described in Section 5.0 of the QAPP (Appendix B).

TABLES

TABLE A-1

SUMMARY OF SAMPLING PROGRAM

SAMPLE MATRIX	PARAMETERS[a]	SAMPLES	FIELD DUPLICATES	MS/MSD SAMPLES	EQUIPMENT RINSATE BLANKS[b]	TRIP BLANKS[c]
Soil (Geoprobe® borings)	Cadmium Lead	80[d]	4[d]	4[d]	4[d]	--
	Full TCL/TAL Fluoride	4	--[e]	--[e]	--[e]	--
Soil – Test Pits	Full TCL/TAL Fluoride	30	2	2	1	--
Waste	RCRA Characteristics	3	--	--	--	--
Surface Water	Full TCL/TAL Fluoride	8	1	1	1	1
Sediment	Full TCL/TAL Fluoride	8	1	1	1	--
Groundwater	Full TCL/TAL Fluoride	8	2	2	2	2

(a) Parameters include: Full TCL/TAL includes VOCs, SVOCs, pesticides/PCBs, and TAL inorganics.
RCRA characteristics include ignitability, corrosivity, and reactivity, and toxicity characteristic leaching procedure (TCLP) VOCs, SVOCs, PCB/pesticides, and metals.

(b) Equipment rinsate blanks will not be collected if disposable sampling tools are used.

(c) One trip blank will be shipped with each container submitted to the laboratory for VOC analyses. The total number of trip blanks in the table is an estimate.

(d) Samples to be analyzed sequentially. Actual number of analyses will depend on results, with a maximum of 80 samples. The numbers of actual QC samples will be prorated according to the actual number of field samples.

(e) Samples to be analyzed in same Sample Delivery Group as soils from test pits.

TABLE A-2

SAMPLE CONTAINERS, VOLUMES, PRESERVATIVES, AND HOLDING TIMES

PARAMETER	CONTAINER	CONTAINER VOLUME	NO. OF CONTAINERS	PRESERVATIVES	HOLDING TIME (1)
SOILS/WASTE:					
Cadmium Lead	glass	4 oz	1	Ice	6 months
TCL SVOCs	glass	4 oz (2)	1	Ice	10 days to extraction; 40 days analysis from extraction
TCL Pesticides/PCBs	glass	4 oz(2)	1	Ice	10 days to extraction; 40 days analysis from extraction
Herbicides	glass	4 oz (2)	1	Ice	14 days to extraction; 40 days analysis from extraction
TAL Inorganics	glass	4 oz(2)	1	Ice	6 months except for CN at 12 days and Hg at 26 days
Fluoride	glass	4 oz(2)	1	Ice	28 days
RCRA Hazard Analysis	glass	4 oz	2	Ice	14 days for reactivity
TCLP VOCs	glass	4 oz	1	None	14 days to TCLP extract; 14 days to analysis
TCLP SVOCs	glass	16 oz (3)	1	None	14 days to TCLP extract; 7 days to extraction and 40 days for analysis from extraction
TCLP Pesticides/Herbicides	glass	16 oz (3)	1	None	14 days to TCLP extract; 7 days to extraction and 40 days for analysis from extraction
TCLP Inorganics	glass	16 oz (3)	1	None	14 days to TCLP extract; 6 months for analysis; except Hg at 26 days

TABLE A-2
(Continued)

PARAMETER	CONTAINER	CONTAINER VOLUME	NO. OF CONTAINERS	PRESERVATIVES	HOLDING TIME (1)
AQUEOUS:					
TCL VOCs	glass	40 ml septa	3	HCl	10 days
TCL SVOCs	glass	1000 ml	3	Ice	5 days to extract; 40 days for analysis from extraction
TCL Pesticides/PCBs	glass	1000 ml	3	Ice	5 days to extract; 40 days for analysis from extraction
Herbicides	glass	1000 ml	3	Ice	7 days to extract; 40 days for analysis from extraction
TAL Inorganics (metals)	plastic	1000 ml	1	HNO_3	6 months except for Hg 26 days
Cyanide	plastic	500 ml	1	NaOH	12 days
Fluoride	plastic	250 ml	1	Ice	28 days

---

(1) Holding time is calculated from the Verified Time of Sample Receipt (VTSR) at the laboratory. CLP samples must be received by the laboratory within 48 hours of sample collection.

(2) Volumes can be combined into two 8-oz glass containers.

(3) All analyses can be performed from one 16-oz glass container. The following analyses do not require CLP methodology: Fluoride, Herbicides, TCLP, RCRA characteristics. The holding times listed are method-specific holding times.

FIGURES

DRAWING NUMBER 01304B3

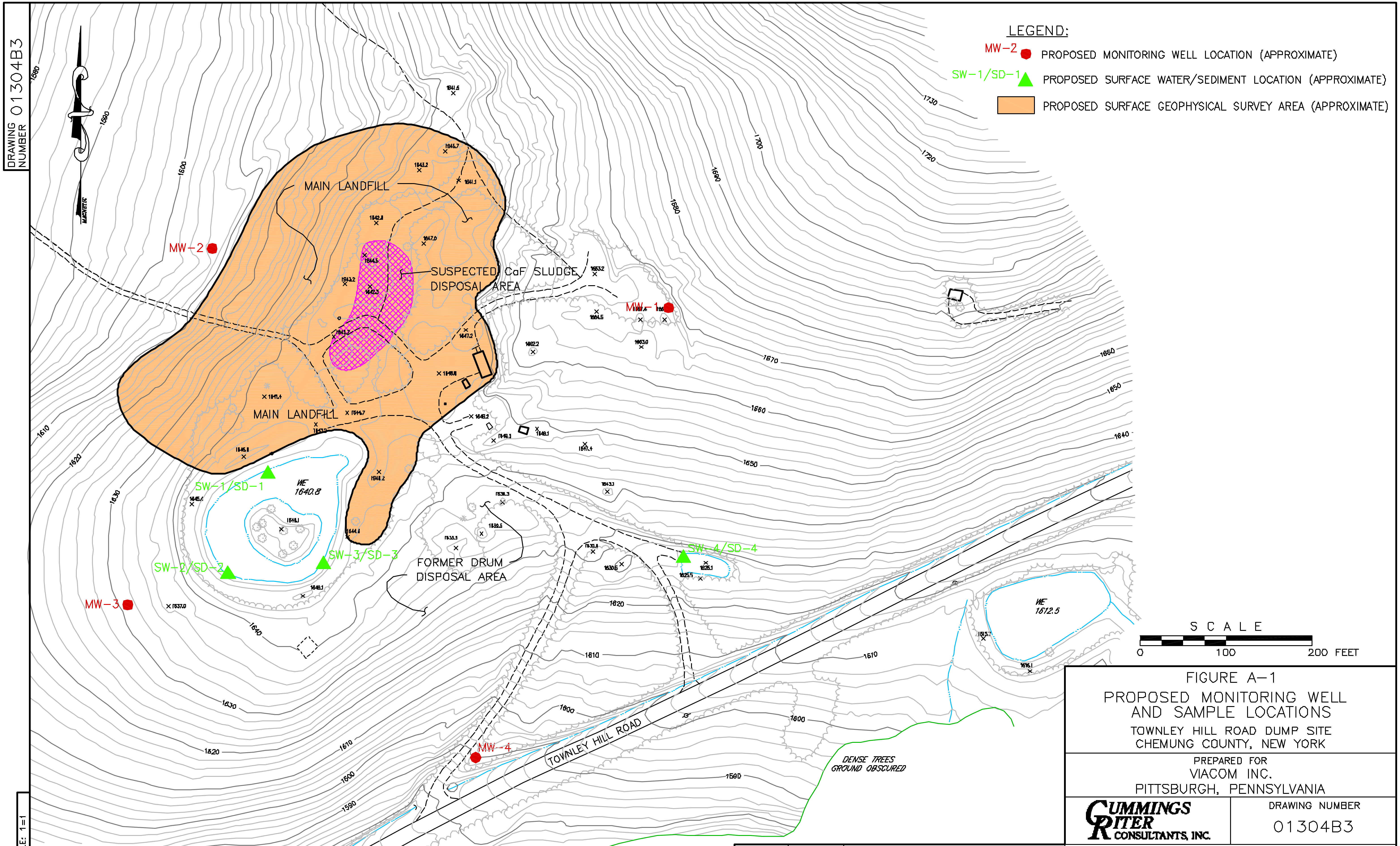


FIGURE A-1

PROPOSED MONITORING WELL
AND SAMPLE LOCATIONS

TOWNLEY HILL ROAD DUMP SITE
CHEMUNG COUNTY, NEW YORK

PREPARED FOR
VIACOM INC.
PITTSBURGH, PENNSYLVANIA

CUMMINGS RITER CONSULTANTS, INC.

DRAWING NUMBER
01304B3

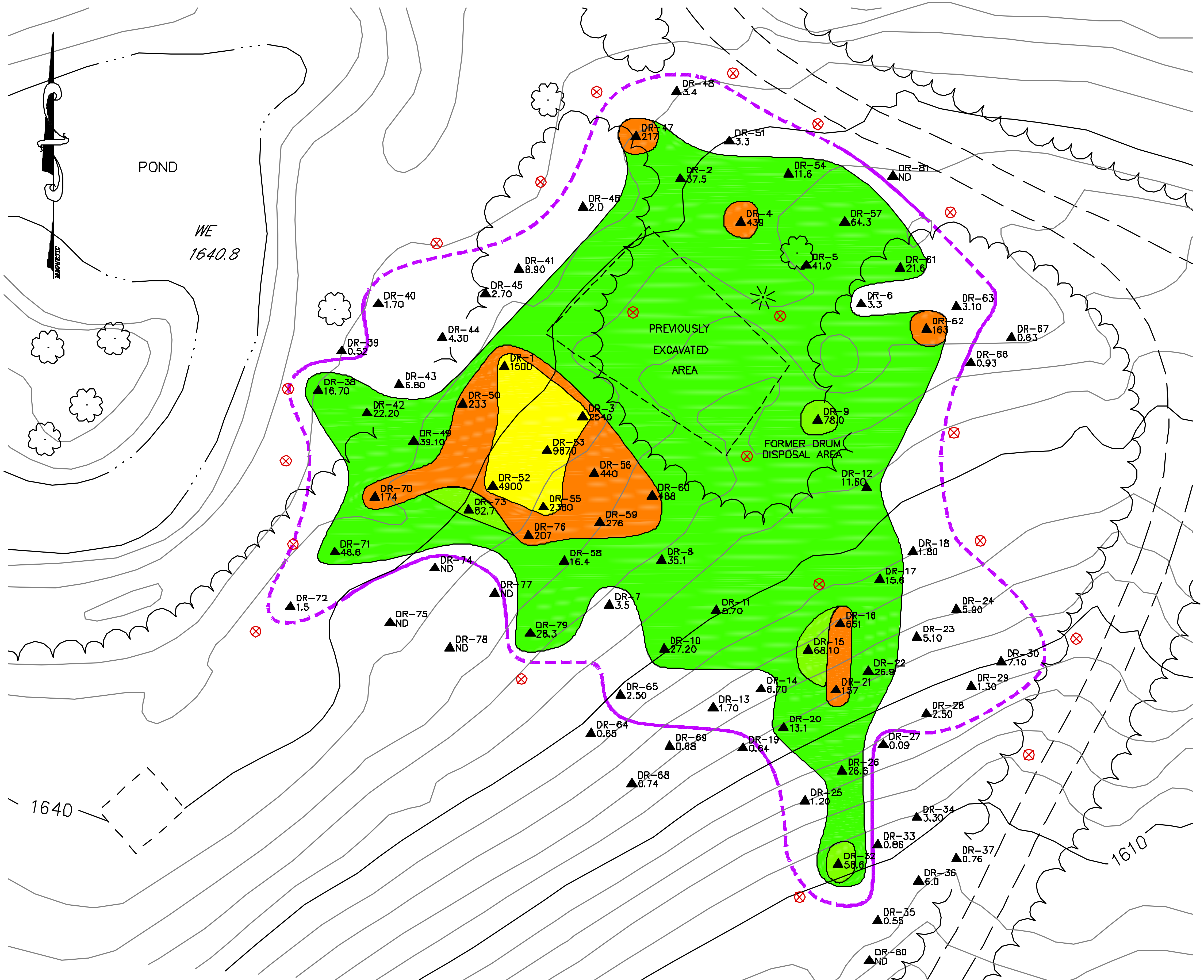
DRAWN BY:	T.N. Fitzroy	DATE:	8-06-01
CHECKED BY:	M.J. Valentine	DATE:	8-27-04
APPROVED BY:	M.J. Valentine	DATE:	8-27-04

REVISION	DATE	DESCRIPTION
1	11/19/04	GENERAL REVISIONS

REFRENCE:
TOWNLEY HILL ROAD SITE CATLIN, NEW YORK, CHEMUNG COUNTY;
FIGURE 4; TITLED "TEST PIT LOCATIONS MAIN LANDFILL"
PROJECT 8-08-006

PLOT SCALE: 1=1

DRAWING NUMBER 01304B6



LEGEND

▲ DR-33 0.86 NYSDEC FOCUSED RI SOIL SAMPLE LOCATION (WITH CADMIUM CONCENTRATION NOTED)

🟨 SURFACE SOILS >1000 PPM CADMIUM

🟧 SURFACE SOILS BETWEEN 100 AND 999 PPM CADMIUM

🟩 SURFACE SOILS BETWEEN 50 AND 99 PPM CADMIUM

🟩 SURFACE SOILS BETWEEN 10 AND 49 PPM CADMIUM

⊗ PROPOSED SOIL SAMPLE LOCATION (APPROXIMATE)

━ 1 PPM CADMIUM CONTOUR SURFACE SOILS (DASHED WHERE INFERRED)

SCALE IN FEET

0 30 60 FEET

REFRENCE:
TOWNLEY HILL ROAD SITE CATLIN, NEW YORK, CHEMUNG COUNTY;
FIGURE 4; TITLED "TEST PIT LOCATIONS MAIN LANDFILL"
PROJECT 8-08-006

PLOT SCALE: 1=1

REVISION	DATE	DESCRIPTION
1	11/19/04	ADDED 1 PPM CADMIUM CONTOUR

FIGURE A-2
PROPOSED SOIL SAMPLE LOCATIONS

TOWNLEY HILL ROAD DUMP SITE
CHEMUNG COUNTY, NEW YORK

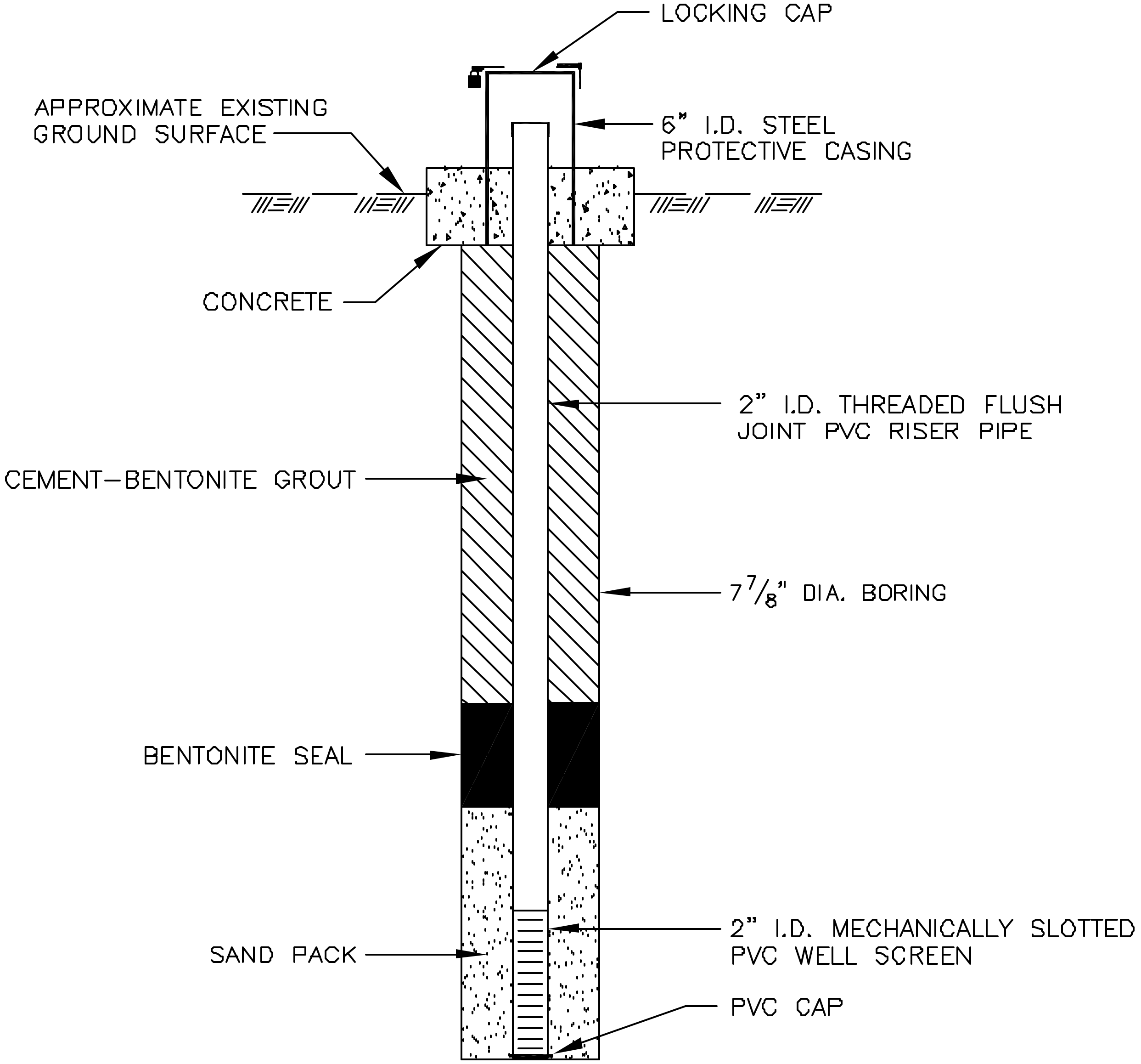
PREPARED FOR
VIACOM INC.
PITTSBURGH, PENNSYLVANIA

CUMMINGS RITER CONSULTANTS, INC.

DRAWING NUMBER
01304B6

DRAWN BY: *T.N. Fitzroy*	DATE: *8-10-01*
CHECKED BY: *M.J. Valentine*	DATE: *8-27-01*
APPROVED BY: *M.J. Valentine*	DATE: *8-27-01*

DRAWING NUMBER 01304A3



DRAWING NOT TO SCALE

FIGURE A–3

TYPICAL MONITORING WELL
INSTALLATION DETAIL

TOWNLEY HILL ROAD DUMP SITE
CHEMUNG COUNTY, NEW YORK

PREPARED FOR
VIACOM INC.
PITTSBURGH, PENNSYLVANIA

CUMMINGS RITER CONSULTANTS, INC.

DRAWING NUMBER
01304A3

			DRAWN BY: *T.E. McKEE*	DATE: *7–27–98*
			CHECKED BY *W.A. Baughman*	DATE: *8–20–98*
REVISION	DATE	DESCRIPTION	APPROVED BY: *W.A. Baughman*	DATE: *8–20–98*

ATTACHMENT A-1

STANDARD OPERATING PROCEDURES
FIELD EQUIPMENT

STANDARD OPERATING PROCEDURES
HNu PHOTOIONIZATION DETECTOR

1.0 INTRODUCTION

It is the responsibility of the instrument user to ensure that the instrument is calibrated and operating properly. When the instrument is scheduled for or requires maintenance, these functions should be conducted only by qualified individuals. Each user is responsible for completing a documentation form which includes instrument user, dates of use, instrument identification number, and project identification. Documentation of maintenance and calibration functions is discussed in the appropriate section.

The HNu, although a relatively simple instrument to use, can be incorrectly operated if the user is not thoroughly familiar with the instrument's operation. All users must complete the training for HNu operation prior to using the instrument in the field.

2.0 START UP/SHUT DOWN PROCEDURES

2.1 START UP PROCEDURES

- Attach the probe to the readout unit. Match the alignment key, then twist the connector clockwise until a distinct locking is felt.

- Turn the FUNCTION switch to the battery check position. Check to ensure that the indicator reads within or beyond the green battery arc on the scale plate. If the indicator is below the green arc, or if the red LED comes on, the battery must be charged prior to using.

- To zero the instrument, turn the FUNCTION switch to the STANDBY position and rotate the ZERO POTENTIOMETER until the meter reads zero. Wait 15 to 20 seconds to ensure that the zero adjustment is stable. If not, then readjust.

- Check to see that the SPAN POTENTIOMETER is set at the appropriate setting for the probe being used.

- Set the FUNCTION switch to the desired ppm range.

- Listen for the fan operation to verify fan function.

- Check instrument with an organic point source such as a magic marker prior to survey to verify instrument function.

2.2 SHUT DOWN PROCEDURES

- Turn FUNCTION switch to OFF.
- Disconnect the probe connector.
- Place the instrument on the charger.

2.3 USE

- Follow Section 2.1 for instrument start up.
- Select the anticipated concentration range.

- Place the measuring probe near the source that is to be measured. Adjust the range to obtain measurement, if necessary.
- Record the measurement. The measurement should include the appropriate factor based on concentration range used.
- Follow Section 2.2 for shut down procedure.

3.0 CALIBRATION PROCEDURE

3.1 CALIBRATION PROCEDURE NO. 1

Calibration Procedure No. 1 is for use when sampling bags are used to contain calibration gas.

- Run through start up procedures as per Section 2.1.
- Fill a sampling bag with HNu calibration gas of known contents.
- Allow sample bag contents to be drawn into the probe and check response in ppm.
- Adjust the span setting to obtain the correct reading.
- Remove the hose and close regulator valve. Allow the probe to draw in background (zero) air.
- The measurement should be zero. Adjust the zero setting if necessary.
- Repeat the steps above alternating between the calibration gas and zero air until the appropriate readings are obtained.
- Record span setting.
- If calibration cannot be accomplished the instrument requires maintenance.
- The following information is to be recorded on the daily log:
  - date inspected,
  - person who calibrated the instrument,
  - the instrument number (Serial No. or other I.D. No.),
  - the results of the calibration (ppm, probe ev, span pod setting), and
  - identification of the calibration gas (source, type, concentration).

After calibration, the HNu can be used.

3.2 CALIBRATION PROCEDURE NO. 2

This calibration is for HNu calibration cylinders equipped with a regulator.

- Run through start up procedures as per Section 2.1.
- Connect a sampling hose to the regulator outlet and the other end to the sampling probe of the HNu.
- Open the regulator valve.
- Take reading after 5 to 10 seconds.
- Adjust the span setting to obtain the correct reading.
- Remove the hose and close regulator valve. Allow the probe to draw in background (zero) air.

- The measurement should be zero. Adjust the zero setting if necessary.
- Repeat the steps above alternating between the calibration gas and zero air until the appropriate readings are obtained.
- Record span setting.
- If calibration cannot be accomplished the instrument requires maintenance.
- The daily log should be completed as in Calibration Procedure No. 1.

4.0 CLEANING PROCEDURES

4.1 CLEANING THE UV SOURCE WINDOW

The cleaning of the UV source window is described in this section.

- Turn the FUNCTION switch to the OFF position and disconnect the sensor/probe from the Read Out/Control Unit.

- Remove the exhaust screw located near the base of the probe. Grasp the end cap in one hand and the probe shell in the other. Separate the end cap and lamp housing from the shell.

- Loosen the screws on the top of the end cap and separate the end cap and ion chamber from the lamp and lamp housing, taking care that the lamp does not fall out of the lamp housing.

- Tilt the lamp housing with one hand over the opening such that the lamp slides out of the housing into your hand.

- The lamp window may now be cleaned with any of the following compounds using lense paper:
  - HNu cleaning compound--all lamps except the 11.7 eV,
  - Methanol--all lamps.

- Following cleaning, reassemble by first sliding the lamp back into the lamp housing. Place the ion chamber on top of the housing making sure the contacts are properly aligned.

- Place the end cap on top of the ion chamber and replace the two screws. Tighten the screws only enough to seal the O-ring. Do not overtighten.

- Line up the pins on the base of the lamp housing with pins inside the probe shell, and slide the housing assembly into the shell. It will only fit one way.

4.2 CLEANING THE IONIZATION CHAMBER

- Turn the FUNCTION switch to the OFF position and disconnect the sensor/probe from the Read Out/Control Unit.

- Remove the exhaust screws located near the base of the probes. Grasp the end cap in one hand and the probe shell in the other. Separate the end cap and lamp housing from the shell.

- Loosen the screws on the top of the end cap and separate the end cap and ion chamber from the lamp and lamp housing, taking care that the lamp does not fall out of the lamp housing.

- The ion chamber may now be cleaned according to the following sequence:
    - acetone rinse with agitation (10 minutes), then dry (preferably with oven at 100°C).
    - methanol rinse with agitation (10 minutes), then dry (preferably with oven at 100°C).

- Place the ion chamber on top of the housing making sure the contacts are properly aligned.

- Place the end cap on top of the ion chamber and replace the two screws. Tighten the screws only enough to seal the O-ring. Do not overtighten.

- Line up the pins on the base of the lamp housing with pins inside the probe shell, and slide the housing assembly into the shell. It will only fit one way.

5.0 TROUBLE SHOOTING PROCEDURES

The trouble shooting procedures are to be performed only by qualified individuals.

- No meter response in any switch position (including BATT CHK).
  - Broken Meter Movement: Tip instrument rapidly from side to side. Meter needle should move freely and return to zero.
  - Electrical Connection to Meter is Broken: Check all wires leading to meter and clean the contacts of quick-disconnects.
  - Battery is Completely Dead: Disconnect battery and check voltage with a volt-ohm meter.
  - If none of the above solve the problem, consult the manufacturer.

- Meter responds in BATT CHK position, but reads zero or near zero for all others.
  - Power Supply Defective: Check power supply voltages per the HNu owner's manual. If any voltage is out of specification, consult the manufacturer.

  - Input Transistor or Amplifier has Failed:
    a. rotate zero control; meter should deflect up/down as control is turned.
    b. open probe; both transistors should be fully seated in sockets.

  - Input Signal Connection Broken in Probe or Readout:
    a. check input connector on printed circuit board. The input connector should be firmly pressed down.
    b. check components on back side of printed circuit board. All connections should be solid and no wires should touch any other object.
    c. check all wires in readout for solid connections.

- Instrument responds correctly in BATT CHK and STBY, but not in measuring mode.
  - Check to See that Light Source is on:
    a. check high voltage power supply.
    b. open end of probe, remove lamp and check high voltage on lamp contact ring.
    c. if high voltage is present at all above points, light source has most likely failed. Consult the manufacturer.

- Instrument responds correctly in all positions, but signal is lower than expected.

  - Check span setting for correct value.
  - Clean window of light source.
  - Double check preparation of standards.
  - Check power supply 180V output.
  - Check for proper fan operation and fan voltage.

- Instrument responds in all switch positions, but is noisy (erratic meter movement).
  - Open circuit in feedback circuit. Consult the factory.
  - Open circuit in cable shield or probe shield. Consult the manufacturer.

- Instrument response is slow and/or irreproducible.
  - Fan operating improperly. Check fan voltage.
  - Check calibration and operation.

APPENDIX B

SAMPLING AND ANALYSIS PLAN
VOLUME II - QUALITY ASSURANCE PROJECT PLAN

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1.0 INTRODUCTION

On behalf of Viacom Inc. (Viacom), successor in interest to CBS Corporation and Westinghouse Electric Corporation, Cummings/Riter Consultants, Inc. (Cummings/Riter) has prepared this Sampling and Analysis Plan (SAP) to support remedial investigation activities to be conducted at a former waste disposal site located in the town of Catlin, Chemung County, New York known as the Townley Hill Road Dump Site (the Site) (see Figure 1 of the Work Plan). In 1997, the New York State Department of Environmental Conservation (NYSDEC) conducted a focused remedial investigation at the Site. In September 1998, NYSDEC issued a focused Remedial Investigation report that recommended a comprehensive remedial investigation/feasibility study (RI/FS) be conducted at the Site to investigate potential impacts to soil, sediment, and groundwater.

The SAP consists of two plans: the Field Sampling Plan (FSP), which is presented in Appendix A, and this Quality Assurance Project Plan (QAPP). This QAPP is to be used in conjunction with the FSP to support activities related to the performance of the RI/FS. This SAP has been prepared in general accordance with the U.S. Environmental Protection Agency's (USEPA) *Guidance for Conducting Remedial Investigations and Feasibility Studies under CERCLA* (EPA 540/G-89/004, October 1988).

The objective of this QAPP is to describe procedures for sample transportation, analysis, validation, and reporting. These procedures are to be followed during field activities conducted in support of the RI/FS conducted at the Site.

The Site is an inactive hazardous waste landfill where disposal activities reportedly operated in the 1950s and 1960s under a permit issued by the Chemung County Department of Health. The landfill was reportedly closed in 1967 by the Chemung County Department of Health. The Site background and description are summarized in Section 2.0 of the RI/FS Work Plan.

2.0 PROJECT DESCRIPTION

A detailed description of the Site is provided in the Work Plan.

2.1 CONSTITUENTS OF INTEREST

As described in the Work Plan, numerous samples of various types have been obtained from the Site area by NYSDEC and others between 1983 and the present. Some of these samples detected elevated levels of cadmium, lead, and certain semivolatile organic compounds (SVOCs).

For the RI, soil samples collected from the test pits, groundwater, surface water, and sediment samples will be analyzed for Target Compound List (TCL) volatile organic compounds (VOCs), SVOCs, and pesticides/polychlorinated biphenyls (PCBs) and Target Analyte List (TAL) inorganic parameters, plus fluoride. Aqueous samples collected for TAL analysis will be analyzed for the total fraction only. Analyses will be conducted using NYSDEC Analytical Services Protocol (ASP) Contract Laboratory Program (CLP) methods.

Soils collected in the vicinity of the former drum disposal area will be analyzed for cadmium and lead. Additionally, 10 percent of the soil samples collected in the vicinity of the former drum disposal area will be analyzed for the full TCL/TAL list, plus fluoride. Surface and subsurface soil samples collected from the test pits will be analyzed for TCL VOCs, SVOCs, PCBs, and TAL metals (plus fluoride). These analyses will similarly be conducted using NYSDEC ASP-CLP methods. Samples of waste collected from the test pits will be analyzed for Resource Conservation Recovery Act (RCRA) characteristics, including ignitability, corrosivity, reactivity, and toxic characteristic leaching procedures (TCLP) parameters using USEPA SW-846 methods.

Table B-1 presents a summary of the RI sampling program. Additionally, Table B-2 presents the sampling requirements for samples collected during the performance of the RI.

2.2 SCOPE OF WORK

The RI includes the collection of environmental data to support the evaluation of appropriate remedial alternatives for the Site. The field activities related to data collection during the RI phase are as follows:

- Surface geophysical surveying,
- Excavation of test trenches and test pits,
- Soil and waste sampling,
- Drilling and monitoring well installation,
- Water level measurement,
- Surface water and sediment sampling, and
- Groundwater sampling.

The sample analytical results will be used to characterize and delineate the extent of potential impacts to Site media. The project field collection procedures, analytical program, validation procedures, and reporting format are based on obtaining this information in a timely and effective manner.

3.0 PROJECT ORGANIZATION AND RESPONSIBILITY

This section provides a description of the RI/FS project organization and the responsibilities associated with each of the positions in this organization.

3.1 NYSDEC PROJECT MANAGER

Mr. Vivek Nattanmai is the Project Manager for NYSDEC. He will coordinate NYSDEC activities during the RI/FS. Mr. Nattanmai will be the point of contact for NYSDEC.

3.2 VIACOM PROJECT COORDINATOR

Mr. Leo M. Brausch, project consultant, will serve as the Project Coordinator for Viacom. Mr. Brausch will be the primary contact between Viacom and NYSDEC and will monitor the project performance, schedule, and budget.

3.3 OVERALL PROJECT MANAGEMENT

Cummings/Riter of Pittsburgh, Pennsylvania will provide the overall project management for this work. They will be assisted by Fagan Engineers, PC (Fagan) of Elmira, New York who will provide support in completion of field activities.

3.4 PROJECT MANAGER

Mr. William Baughman, P.G., will serve as the Cummings/Riter Project Manager. Mr. Baughman will be the primary contact between Cummings/Riter and Viacom. He will be responsible for interfacing with agency technical representatives (as necessary) and for review of agency submittals including the RI and FS reports. He will also be responsible for all Cummings/Riter technical, financial, and scheduling matters.

3.5 PROJECT SUPERVISOR

Mr. Matthew Valentine, P.G., will serve as the Cummings/Riter Project Supervisor. Mr. Valentine will direct the field sampling crews, interface with both the drilling and laboratory subcontractors, and be responsible for preparation of agency submittals.

3.6 QUALITY ASSURANCE OFFICER AND HEALTH AND SAFETY COORDINATOR

Mr. Kenneth Bird, C.I.H., will serve as the project Quality Assurance (QA) Officer and the Health and Safety Coordinator. He is responsible for reviewing the standard operating procedures and modifications to the Health and Safety Plan (HASP), as needed, based on field monitoring results. Mr. Bird will review field and laboratory data for compliance of the QA objectives (precision, accuracy, comparability, and completeness); and report any deficiencies to project management.

3.7 SITE SAFETY OFFICER

[To be determined.] The Site Safety Officer will be responsible for the implementation of the HASP and documenting any health and/or safety issues that arise during the completion of the RI/FS tasks.

3.8 PROJECT/FIELD TEAM MEMBERS

The field investigation will be completed as a collaborative effort using personnel from both Cummings/Riter and Fagan. Cummings/Riter will provide the on-site field team supervisor and oversight of drilling and well installation activities. Fagan personnel will assist in field investigation activities associated with soil sampling, test pit excavation, surface water and sediment sampling, and surveying.

3.9 OTHER CONTRACTORS

Other contractors who are being proposed for the work covered in the Work Plan include:

- Drilling and well installation services – [To be determined]; and
- Analytical services – Severn-Trent Laboratories (STL) of Harmarville, Pennsylvania.

The driller and analytical laboratory will be contracted directly by Viacom.

An analytical laboratory project manager will be identified and will be responsible for execution of the analytical testing program for the project. The name of the laboratory project manager will be provided prior to sample collection. They will be responsible for ensuring that their laboratory internal QA procedures are followed. They will be the point of contact for the Project Supervisor and project QA Officer.

A local earthwork contractor who is experienced in hazardous waste site investigation and remediation will be retained to perform the test pit excavations in the disposal area.

4.0 QUALITY ASSURANCE OBJECTIVES FOR MEASUREMENT DATA

4.1 DATA QUALITY OBJECTIVES

The data quality objectives (DQOs) related to the RI sampling program for the Site are:

- The data will be gathered or developed in accordance with procedures appropriate for characterization and delineation of suspected Site contaminants.
- The data will be of known or acceptable precision, accuracy, and completeness, within the limits of the methods.

In developing the DQOs, a series of planning steps were conducted based upon USEPA guidance (*Data Quality Objectives Process for Superfund,* September 1993) and the Consent Order to ensure that the type, quantity, and quality of environmental data are appropriate for their intended use.

4.2 QUALITY ASSURANCE OBJECTIVES

The following section addresses the QA objectives for precision and accuracy, completeness, representativeness, and comparability.

4.2.1 Completeness

Completeness is measured by the number of samples actually collected compared to the number of samples required for characterization, or the amount of valid data obtained compared to the amount of data that were expected under normal conditions. For this project, Viacom has defined "the number of samples required for characterization" and "the amount of data that were expected under normal conditions" as the total number of samples planned for each parameter. Based on the number and types of samples proposed, the completeness criteria for both the field and the laboratory will be 90 percent. Field completeness will be assessed by comparing the number of samples collected to the total number of samples planned. Laboratory completeness will be assessed by comparing the number of samples that have valid and complete analyses to the total number of samples planned.

4.2.2 Representativeness

Representativeness is the degree to which sample data represent a characteristic of a population, parameter variation at a sampling point, or an environmental condition. The sampling program described in the FSP was designed to collect groundwater samples that adequately reflect current conditions at the Site for RI/FS purposes.

Representativeness is also enhanced when all samples from a particular medium are collected using the same technique. Soil, surface water, sediment, and groundwater samples will be collected and water levels will be measured in accordance with the procedures in the FSP.

Representativeness is also achieved by ensuring that sampling equipment is properly decontaminated between sampling locations. Field equipment for sampling will be decontaminated between samples, unless the equipment is dedicated, to ensure that samples collected at subsequent locations are not subjected to cross-contamination.

4.2.3 Comparability

Comparability expresses the confidence with which one data set can be compared to another. To ensure that sample results are comparable to previous and future sample results, Cummings/Riter will institute several measures. Sample collection procedures will be required to follow the methods described in the FSP while laboratory analytical procedures will follow standard methods using defined ASP-CLP procedures.

4.2.4 Precision and Accuracy

Precision and accuracy are indicators of data quality. Generally, precision is a measure of the variability of a group of measurements compared to their mean value, and is determined by analyzing field duplicate samples. Accuracy is a measure of the bias in a measurement system. Analytical accuracy is assessed by analyzing spiked samples, while sampling accuracy is assessed by analyzing field and trip blank samples. Precision and accuracy objectives for laboratory and field sample analysis are described below, along with the type of samples to be collected for these determinations.

For parameters to be analyzed during the RI, the criteria for precision and accuracy are defined by the ASP-CLP Statement of Work (SOW). Quantitation limits (QL) for the TCL/TAL parameters are provided in Attachment B-1.

Four types of field quality control (QC) samples will be collected to determine precision and accuracy, i.e., field blank, field duplicate, trip blank, and matrix spike/matrix spike duplicate (MS/MSD) samples. Prior to installing the dedicated well pumps, one field equipment blank sample will be analyzed for each matrix type (groundwater) and for every batch of samples or every 20 samples analyzed, whichever is more frequent. Field blank samples will be analyzed to check for procedural contamination and ambient conditions at the Site that may result in sample contamination. Subsequent to installation in monitoring wells, field blanks will not be collected from dedicated equipment.

One duplicate groundwater sample will be collected for each 20 samples submitted for laboratory analysis. Duplicate samples will be analyzed to check sampling and analytical precision. An advisory limit of ±20 percent relative percent difference will be used for duplicate sample results that are greater than five times the QL (Attachment B-1). An advisory limit of ±QL will be used for duplicate sample results that are less than five times the QL.

For every cooler that contains water samples for VOC analysis, one trip blank sample will also be shipped and analyzed for VOCs. The trip blank sample accompanies the other samples to discern if any of the samples could have become contaminated during shipping and handling.

MS/MSD samples will be collected once for every 20 samples for VOCs in groundwater. MS/MSD samples are used to determine analytical accuracy. Percent recovery values for these samples will be compared to acceptance criteria in the ASP-CLP SOW.

Field measurements will be made for pH, specific conductance, and temperature. Water levels in monitoring wells will also be measured. Field measurement, calibration, and maintenance procedures are described in the FSP. Accuracy and precision criteria for field measurements are shown in Table B-3. Field instruments will be calibrated and verified against standards of known concentration to determine accuracy. Precision will be based on the standard deviation of a set of replicate measurements.

The accuracy of pH measurements will be assessed by performing two pH measurements on three standard buffer solutions. Each measurement must be within ±0.2 pH units of the standard. Precision is defined as within 0.3 pH units of the mean. Between measuring each replicate, the electrode will be withdrawn and rinsed with distilled water. This calibration will be performed at least at the beginning and end of each sampling event.

The accuracy of specific conductance measurements will be assessed by performing measurements on the calibration standards. Each measurement must be 15 percent of the standard. Calibration will be checked at the beginning and end of each sampling event.

Temperature will be measured using a thermocouple on the pH meter. Accuracy is considered ±10 percent of the standard value.

Static water levels in monitoring wells will be measured using an electronic water sounder accurate to 0.01 foot. The sounder will be calibrated with a steel tape before it is shipped to the Site.

5.0 CUSTODY PROCEDURES

Sample possession and handling will be traced from collection to the final disposition of the sample. "Custody" is maintained if a sample is:

- In the actual possession of an authorized person,
- In view of an authorized person after being in his possession,
- Locked or sealed up after being in possession of an authorized person, and
- In a secure storage room or similar area.

The following sections describe sample custody procedures for the field, laboratory, and project files.

5.1 FIELD SAMPLE CUSTODY PROCEDURES

Field chain-of-custody is necessary to maintain and document sample possession prior to and during shipping. The principal documents used to identify samples and document possession are chain-of-custody records (Attachment B-2).

Sample custody will begin when samples are collected. Each sample will be labeled with the following information: unique sample identification number, sample location, date and time of collection, and analyses to be performed. Specific procedures for sample identification and numbering are presented in the FSP. The labeled sample will be placed into an iced cooler in the possession of a sampler. A temperature check container will be included in each shipment.

Sampling personnel are responsible for initiating the chain-of-custody record and maintaining custody of samples until they are relinquished to another custodian or to the shipper. A line item on the field chain-of-custody record will be immediately filled out and initialed by the sampling personnel. When all line items are completed, or when the samples are prepared for final packaging before shipment, the sampling personnel will sign, date, and write the time on the form. Each individual who handles a sample and who subsequently assumes responsibility for the sample will sign the chain-of-custody form.

Sample containers will be packaged appropriately to prevent breakage during shipment and placed in a cooler. Chain-of-custody forms and any other required sample documentation will be enclosed in a waterproof plastic bag and enclosed in the cooler or hand-delivered to the laboratory courier. Each cooler will be securely taped shut with strapping tape. Custody seals will then be placed on the front and back of each cooler to detect unauthorized tampering with the samples before receipt by the laboratory. Field chain-of-custody procedures end when the laboratory receives the samples.

5.2 LABORATORY SAMPLE CUSTODY PROCEDURES

After receiving samples shipped from the Site, the project laboratory will maintain a custody record throughout sample preparation and analysis. Laboratory custody procedures for project samples undergoing analyses are specified in the ASP-CLP SOW.

The project samples will be stored at the laboratory for a period of time related to the type and nature of the samples. For example, maximum laboratory holding times for VOCs are six weeks. When the storage times have expired, the laboratory will dispose of the samples in accordance with applicable regulations.

5.3 PROJECT FILES

Viacom will be responsible for maintaining original documents in a designated secured area. Copies of field chain-of-custody forms and laboratory reports will be maintained in the Cummings/Riter project file located in Pittsburgh, Pennsylvania. Upon completion of the project, the records will be submitted to Viacom. The final project file will be maintained by Viacom, for the duration specified in the Order, in their offices in Pittsburgh, Pennsylvania. This file will consist of reports, correspondence, field notes, photographs, logbooks, field calibration data, field analytical data, laboratory data, data usability summary reports, data validation reports (if required), and data assessment reports.

6.0 SAMPLING PROCEDURES

Sample collection procedures and sample locations are described in the FSP. Viacom will notify NYSDEC at least 14 days in advance of sample collection activities.

7.0 CALIBRATION PROCEDURES AND FREQUENCY

Both laboratory and field equipment must be calibrated on a regular basis to ensure the accuracy of analyses. The following sections outline the procedures and frequency for equipment calibration for this project.

7.1 LABORATORY EQUIPMENT

The project laboratory will conduct chemical analyses on samples collected at the Site. The laboratory is required to follow equipment calibration procedures specified in the ASP-CLP SOW or the appropriate analytical methods specified in Table B-1. The ASP-CLP SOW provides the procedures and frequencies for initial and continuing calibrations and for evaluating calibration data.

7.2 FIELD EQUIPMENT

Field measurements will be made during groundwater sampling. Field measurements during groundwater sampling include pH, specific conductance, dissolved oxygen, oxygen-reduction potential, turbidity, temperature, and water level. Table B-4 lists the minimum calibration frequency for the measured field parameters. Calibration procedures for the field instruments are specified in the Standard Operating Procedures (SOPs) in Attachment A-1 of the FSP.

For most instruments, calibrations will be performed each sampling day. If the results of a calibration do not meet field QC acceptance criteria for accuracy, the instrument response will be adjusted to agree with the calibration standard, using the calibration procedures in the SOP. If acceptable calibration cannot be obtained, the associated data will be flagged “J” to indicate the data are estimated.

Calibration standards used by Cummings/Riter on this project will be either directly traceable to the National Institute of Standards and Technology or commercially prepared standards of certified accuracy. Lot numbers of commercially prepared standards will be recorded.

8.0 ANALYTICAL PROCEDURES

Analytical procedures are selected to meet the often conflicting requirements of sensitivity (low detection limit), specificity (correct chemical identification), and speed (interval between sampling and availability of results). A combination of field and laboratory analytical procedures will be followed during the RI at the Site.

The project laboratory (STL) will perform the analytical testing. Analytical methods include appropriate ASP-CLP procedures for organics and for inorganics. Samples of waste collected from the test pits will be analyzed for RCRA characteristics using USEPA SW-846 methods. Chemical analyses of groundwater samples will be conducted by the laboratory for parameters listed in Table B-1. Specific method quantitation limits are provided in Attachment B-1.

Field analyses for groundwater samples will include pH, specific conductance, dissolved oxygen, oxygen/reduction potential, turbidity, and temperature plus the water level in wells. Field parameters will be measured with standard commercial equipment. Specific methods are included with the SOPs in Attachment A-1 of the FSP.

9.0 INTERNAL QUALITY CONTROL CHECKS

An internal QC system is a set of routine internal procedures for assuring that the data output of a measurement system meets prescribed criteria for data quality. Inherent and implied in this control function is a parallel function of measuring and defining the quality of the data output. A well-designed internal QC program is capable of controlling and measuring the quality of the data in terms of precision and bias. Precision reflects the influence of the inherent variability in any measurement system. Bias represents a consistent error in the measurement system.

For samples collected at the Site, Viacom will use the internal QC measures described in the following sections to ensure a high degree of precision and accuracy.

9.1 FIELD QUALITY CONTROL CHECKS

As a check on field sampling QA/QC, trip blanks, field blanks, equipment rinsate samples, and field duplicates will be sent to the laboratory at specified frequencies. The frequencies at which these samples will be collected and the number of such samples are discussed in the following subsections.

Field QC checks also include regular and continuing calibration of measuring equipment. This equipment includes multi-parameter water quality meters for groundwater.

9.1.1 Trip Blanks

A trip blank for liquid samples is a sample bottle filled by the laboratory with analyte-free reagent water, handled like a sample but not opened, and returned to the laboratory for analysis. Trip blanks are analyzed for VOCs only and are used to determine if VOCs are introduced during sample handling and shipment. One trip blank will be included with each shipping cooler of VOC samples sent to the laboratory.

9.1.2 Equipment Rinsate and Field Blanks

Equipment rinsate samples are defined as analyte-free deionized water poured into or pumped through the sampling device, transferred to the sample bottle, then transported to the laboratory for analysis. These samples help determine whether sampling equipment was sufficiently decontaminated so as to prevent cross-contamination between samples. When dedicated sampling equipment is used, field blanks will be collected. Field blanks are collected by pouring analyte free water directly into clean sample bottles. This field blank is preserved and analyzed in the same manner as other samples. Equipment rinsate blanks will be collected if sampling equipment is decontaminated and moved between well locations. The equipment rinsate blanks will be analyzed for the same parameters as the sampled media. Both equipment rinsate and field blanks will be collected at a frequency of one for every 20 samples collected.

9.1.3 Field Duplicate Samples

A field duplicate is defined as two or more samples collected independently at a sampling location during a single act of sampling. Procedures for collecting field duplicate samples are described in Section 5.0 of the FSP.

Field duplicates will be indistinguishable by the laboratory from other samples. Therefore, one complete sample set will be identified with a "coded" or false identifier in the same format as other identifiers used for this sample matrix. Both the coded and the true identifiers will be recorded in the field notebook. On the chain-of-custody forms, the coded identifier will be used. These coded field duplicates are used to assess the representativeness of the sampling procedure as well as laboratory precision. One field duplicate sample will be collected for every 20 samples collected.

9.2 LABORATORY QUALITY CONTROL CHECKS

QC data are necessary to determine precision and accuracy of the analyses and to demonstrate the absence of interferences and contamination of glassware and reagents. The ASP-CLP methods to be followed for this project include the use of laboratory blanks, matrix spikes, initial and continuing calibrations and similar measures.

10.0 DATA REDUCTION, VALIDATION, AND REPORTING

The data reduction, validation, and reporting process includes the steps between the instrument or visual reading and the final complete report. Data reduction includes calculations for unit conversions, dilutions and similar factors and preparation of the initial report. To validate the data, someone other than the analyst reviews the data reduction procedures to determine the acceptability of the data and any necessary qualifiers. Reporting includes transcribing these validated data into the final report and interpreting them. Reduction and validation differ among analytical methods, but the reporting process is common to all data.

10.1 DATA REDUCTION

The project laboratory conducting analyses on environmental samples collected during the RI will be required to follow data reduction procedures specified in the ASP-CLP SOW and the methods identified in Table B-1.

Field parameters to be measured include the pH, temperature, specific conductance, dissolved oxygen, oxidation-reduction potential, and turbidity of groundwater and surface water samples and groundwater elevations. The field parameters will be measured by direct observation or by direct reading instruments. Results will be recorded directly on data sheets and no data reduction is required.

10.2 DATA USABILITY

This section outlines data usability procedures for both laboratory and field measurements.

10.2.1 Laboratory Measurements

A data usability evaluation will be performed on the analytical data in accordance with the procedures listed in the NYSDEC document, *Guidance for the Development of Data Usability Summary Reports*. If unusable data are present, third-party data validation may be conducted in accordance with applicable USEPA guidance, including Region II modifications, if any.

10.2.2 Field Measurements

Field data will be generated by qualified field personnel and immediately entered on the proper form or in a general field logbook. These data will be regularly reviewed for completeness, consistency, and proper procedures (such as calibration) by the Project Supervisor. If discrepancies are found, the appropriate corrective action, usually a remeasurement, will be taken promptly.

Calibration results will be checked to verify that initial and continuing calibrations meet the QC acceptance criteria for accuracy in Table B-3 and to determine that recalibration and reanalysis of samples occurred when these criteria were not met. Results of duplicate samples will be checked to verify that QC acceptance criteria for precision were met. Field blank results will also be reviewed as a check on equipment decontamination procedures and false positive results.

10.3 REPORTING

For all ASP-CLP analyses, the required laboratory data deliverable package will include the NYSDEC “Category B” package. CLP-like deliverables will be requested for the waste analyses using USEPA SW-846 methods. Field parameters for groundwater samples (pH, temperature, specific conductance, dissolved oxygen, oxidation-reduction potential, and turbidity, and depth to groundwater) will be recorded on sample collection forms.

Data generated in the field will be initially stored in a project file maintained by the Project Supervisor. As soon as possible, the file will be transferred to Cummings/Riter's Pittsburgh office and grouped with off-site laboratory reports and other data into the main project file. This file will be organized to allow ready identification and retrieval of desired information.

Quantitative information can be entered into databases. Databases will be printed out, checked against the original data sheets and corrected before use. Cummings/Riter will then use existing programs (and any necessary modifications) to produce data appendices. Any modified programs used to manipulate data will be tested before use with an actual or known data set. Completed data appendices will be checked against the original data sheets.

11.0 PERFORMANCE AND SYSTEMS AUDITS

Laboratory and fieldwork conducted as part of the Townley Hill Road RI/FS project may be subject to performance and systems audits. Performance audits check the operation of a specific study component such as a sampling method or an analytical procedure. Systems audits are broader and include a thorough evaluation of both laboratory and field quality assurance methods, such as data validation procedures, corrective action procedures, or sample custody procedures. Audits may be internal (conducted by QA personnel within the organization being audited) or external (conducted by NYSDEC or another outside agency).

Audits are randomly scheduled by QA personnel and are generally not announced beforehand. If QA personnel find what seems to be a systematic problem with a particular component of the sampling and analysis program, they will normally perform a series of audits on related activities to identify and correct the problem. Audit results are incorporated into the project reporting system, normally in the monthly report.

11.1 LABORATORY AUDITS

At the request of NYSDEC, Viacom will conduct an independent audit of the project laboratory to verify analytical capability and compliance with the SAP. The audit will be conducted sometime during the time the laboratory is analyzing samples. The project laboratory participates in the state Environmental Laboratory Accreditation Program (ELAP) and is a NYSDEC-accredited ASP-CLP laboratory.

11.2 FIELD AUDITS

Internal performance and systems audits of field activities at the Site will be coordinated by the project QA Officer. A field audit will be conducted at the request of NYSDEC to verify that the project sampling procedures are being correctly followed.

A checklist will be prepared based on information contained in the QAPP, FSP, and the HASP. Using the checklist, auditors will evaluate whether field personnel are operating in compliance with procedures specified in these plans, including:

- Initial and continuing equipment calibration,
- Field measurements,
- Sample collection,

- Sample labeling, handling, and custody,
- Data collection and recordkeeping,
- Equipment and personnel decontamination, and
- Health and safety monitoring.

Audit reports will be submitted to NYSDEC within 15 days of completion of the audit. The report will summarize the audit findings, including series deficiencies that adversely reflect the data. Any corrective action taken will also be included in the report.

12.0 PREVENTATIVE MAINTENANCE

Preventative maintenance (PM) includes inspecting, repairing, and adjusting equipment and instruments before deficiencies have a significant effect on performance. These techniques are a necessary part of the procedures for carrying out a particular operation with a particular type of equipment.

12.1 LABORATORY EQUIPMENT

The project laboratory will follow necessary PM actions detailed in its internal SOPs as well as PM required by the analytical methods. These include 1) the tuning and calibration (both initial and continuing) of machines, 2) the use of internal standards, and 3) related activities such as corrective action. Details of these requirements are included in the methods and the laboratory QAPP.

12.2 FIELD EQUIPMENT

Viacom and its consultants will perform regular PM of field equipment. Field monitoring equipment will be maintained and calibrated in accordance with the manufacturers recommended schedules and procedures. Field personnel will maintain records of service, calibration, and use. Instrument problems encountered in the field will be detailed in the field daily log and dealt with on site, if possible.

The primary PM technique for field analyses is the preliminary calibration of the equipment. This typically includes a battery check, zero adjustment, and a linearity (or high end) adjustment. Some special items, such as keeping the pH electrode tip wet and refilling it with electrolyte, are required for specific equipment. Failure to calibrate or maintain calibration during an analysis requires corrective action, as discussed in Section 14.2.

To minimize down time in the field, Cummings/Riter maintains an inventory of backup instruments and commonly stocks spare parts for field equipment. Spare parts and backup equipment can be shipped to any field site within 24 hours of request. Typical spare parts for these instruments include D-cell batteries, replacement probes, and maintenance kit (including O-rings and gaskets) included with the instrument. Cummings/Riter also maintains agreements with instrument rental companies to ensure availability of backup instruments.

13.0 SPECIFIC ROUTINE PROCEDURES USED TO ASSESS DATA PRECISION, ACCURACY AND COMPLETENESS

The QA objectives described in Section 4.0 are the goals Viacom believes are necessary to satisfactorily complete RI field investigations at the Site. This section discusses the means for assessing whether objectives have been met. The assessment is a part of the data handling process in Section 10.0.

13.1 LABORATORY RESULTS

The precision of laboratory results will be determined primarily by calculating the relative percent difference (RPD) for duplicate samples. These will include field duplicates, laboratory duplicates, and MS/MSD samples. The laboratory will determine the accuracy of results by calculating percent recovery values for MS/MSD samples. In addition, the laboratory will use laboratory blanks, calibration standards, and internal standards to establish analytical accuracy, as detailed in the methods. Completeness of laboratory results will be determined by comparing the number of validated, usable results to the number of samples planned.

13.2 FIELD RESULTS

The precision of field results will be determined by the use of replicate measures. Accuracy of field results will be determined by evaluating instrument response to suitable standards, such as purchased standard solutions for pH. Completeness for field data will be determined by comparing the number of acceptable measurements with the number specified in the FSP.

13.3 CALCULATIONS

The primary statistic used for estimating precision is RPD for duplicate measurements. RPD is calculated as follows:

$$RPD = \frac{\left|X_1 - X_2\right|}{(X_1 + X_2)/2} \times 100$$

where X_1 and X_2 are the results of duplicate measurements and $|X_1 - X_2|$ is the absolute value of the difference in the two measurements.

If there are three or more replicates, the percent relative standard deviation (% RSD) will be calculated as a measure of precision:

$$\% RSD = (SD / \overline{X}) \times 100$$

where $\overline{X}$ is the average of the data points (X_1, X_2, . . . X_n) and SD is the standard deviation of the individual measurements.

Accuracy can be estimated by calculating the percent difference (%D) between an instrument response and a known standard:

$$\% D = (S - X) / S \times 100$$

where S is the concentration of a known standard and X is the measured instrument response. This determination of accuracy can be used for both laboratory and field measurements.

Alternatively, accuracy can be measured as percent recovery (%R) from the analytical results of surrogate or analyte compounds spiked into a sample:

$$\% R = (M - N) / S \times 100$$

where M is the measured analyte concentration in the spiked sample, N is the concentration of the analyte in the original sample, and S is the analyte concentration spiked into the original sample. This measurement of accuracy is most appropriate for laboratory results.

Percent completeness (%C) is a measure of 1) the number of samples actually collected compared to the number of samples required for characterization and 2) the amount of valid data obtained compared to the amount of data expected under normal conditions. In most cases, the "number of samples required for characterization" and the "amount of data expected under normal conditions" is the same as the number of samples planned, N. Thus, percent completeness can be defined as:

$$\% C = V / N \times 100$$

where V is the number of valid results and N is the total number of samples planned.

Percent completeness can also be measured as the percent of samples planned that were actually collected:

$$\%C = C / N \times 100$$

where C is the number of samples collected and N is the total number of samples planned.

14.0 CORRECTIVE ACTION

Corrective action will be initiated whenever statistical measures indicate exceedance of a control unit. These situations may be identified during performance or system audits or by the analysts/samplers themselves. Corrective action may take place in the laboratory or in the field.

14.1 LABORATORY CORRECTIVE ACTION

If QC audits identify a noncompliance, the problem will be reported to the USEPA. Frequently, problems with analyses result from matrix effects, which make results questionable (estimates, qualified as "J") or unusable (rejected, qualified as "R"). The laboratory and the project QA Officer will jointly determine the acceptability of data and the appropriate corrective action. Corrective actions may include:

- Reanalyzing samples if holding time criteria permit,
- Resampling and analyzing the samples,
- Evaluating and amending sampling and analytical procedures, and
- Accepting data and acknowledging a level of uncertainty.

14.2 FIELD CORRECTIVE ACTION

Field analyses will be conducted for groundwater and surface water samples. Corrective actions for problems with field analyses will usually be resolved within Cummings/Riter, with occasional input from NYSDEC and/or Viacom. A typical instance would be a pH meter that fails the battery check. The operator will put in a new battery or recharge it and resume calibration. A total failure of an instrument can usually be resolved by sending another instrument to the site by overnight carrier and repeating the analyses the next day.

During the field investigations, any problems that affect the collection of samples and monitoring data will be documented and recorded in a field log by the person who identified the problem. Serious problems that affect the overall project objectives will be brought to the attention of the Project Manager. The Project Manager will notify the Viacom Project Coordinator. The Project Manager, Project Supervisor, or their designees are responsible for identifying the causes of the problems and developing a solution.

REFERENCES

New York State Department of Environmental Conservation, 1998, “Focused Remedial Investigation Report, Townley Hill Road Dump Site,” September.

USEPA, 1988, *Guidance for Conducting Remedial Investigations and Feasibility Studies Under CERCLA,* EPA ID No. 540/G-89/004, October.

TABLES

TABLE B-1

SUMMARY OF SAMPLING PROGRAM

SAMPLE MATRIX	PARAMETERS[(a)]	SAMPLES	FIELD DUPLICATES	MS/MSD SAMPLES	EQUIPMENT RINSATE BLANKS[(b)]	TRIP BLANKS[(c)]
Soil (Geoprobe® borings)	Cadmium Lead	80[(d)]	4[(d)]	4[(d)]	4[(d)]	--
	Full TCL/TAL Fluoride	4	--[(e)]	--[(e)]	--[(e)]	--
Soil – Test Pits	Full TCL/TAL Fluoride	30	2	2	1	--
Waste	RCRA Characteristics	3	--	--	--	--
Surface Water	Full TCL/TAL Fluoride	8	1	1	1	1
Sediment	Full TCL/TAL Fluoride	8	1	1	1	--
Groundwater	Full TCL/TAL Fluoride	8	2	2	2	2

(a) Parameters include: Full TCL/TAL includes VOCs, SVOCs, pesticides/PCBs, and TAL inorganics.
RCRA characteristics include ignitability, corrosivity, and reactivity, and toxicity characteristic leaching procedure (TCLP) VOCs, SVOCs, PCB/pesticides, and metals.

(b) Equipment rinsate blanks will not be collected if disposable sampling tools are used.

(c) One trip blank will be shipped with each container submitted to the laboratory for VOC analyses. The total number of trip blanks in the table is an estimate.

(d) Samples to be analyzed sequentially. Actual number of analyses will depend on results, with a maximum of 80 samples. The numbers of actual QC samples will be prorated according to the actual number of field samples.

(e) Samples to be analyzed in same Sample Delivery Group as soils from test pits.

TABLE B-2

SAMPLE CONTAINERS, VOLUMES, PRESERVATIVES, AND HOLDING TIMES

PARAMETER	CONTAINER	CONTAINER VOLUME	NO. OF CONTAINERS	PRESERVATIVES	HOLDING TIME (1)
SOILS/WASTE:					
Cadmium Lead	glass	4 oz	1	Ice	6 months
TCL SVOCs	glass	4 oz (2)	1	Ice	10 days to extraction; 40 days analysis from extraction
TCL Pesticides/PCBs	glass	4 oz(2)	1	Ice	10 days to extraction; 40 days analysis from extraction
Herbicides	glass	4 oz (2)	1	Ice	14 days to extraction; 40 days analysis from extraction
TAL Inorganics	glass	4 oz(2)	1	Ice	6 months except for CN at 12 days and Hg at 26 days
Fluoride	glass	4 oz(2)	1	Ice	28 days
RCRA Hazard Analysis	glass	4 oz	2	Ice	14 days for reactivity
TCLP VOCs	glass	4 oz	1	None	14 days to TCLP extract; 14 days to analysis
TCLP SVOCs	glass	16 oz (3)	1	None	14 days to TCLP extract; 7 days to extraction and 40 days for analysis from extraction
TCLP Pesticides/Herbicides	glass	16 oz (3)	1	None	14 days to TCLP extract; 7 days to extraction and 40 days for analysis from extraction
TCLP Inorganics	glass	16 oz (3)	1	None	14 days to TCLP extract; 6 months for analysis; except Hg at 26 days

TABLE B-2
(Continued)

PARAMETER	CONTAINER	CONTAINER VOLUME	NO. OF CONTAINERS	PRESERVATIVES	HOLDING TIME (1)
AQUEOUS:					
TCL VOCs	glass	40 ml septa	3	HCl	10 days
TCL SVOCs	glass	1000 ml	3	Ice	5 days to extract; 40 days for analysis from extraction
TCL Pesticides/PCBs	glass	1000 ml	3	Ice	5 days to extract; 40 days for analysis from extraction
Herbicides	glass	1000 ml	3	Ice	7 days to extract; 40 days for analysis from extraction
TAL Inorganics (metals)	plastic	1000 ml	1	HNO_3	6 months except for Hg 26 days
Cyanide	plastic	500 ml	1	NaOH	12 days
Fluoride	plastic	250 ml	1	Ice	28 days

---

(1) Holding time is calculated from the Verified Time of Sample Receipt (VTSR) at the laboratory. CLP samples must be received by the laboratory within 48 hours of sample collection.

(2) Volumes can be combined into two 8-oz glass containers.

(3) All analyses can be performed from one 16-oz glass container. The following analyses do not require CLP methodology: Fluoride, Herbicides, TCLP, RCRA characteristics. The holding times listed are method-specific holding times.

TABLE B-3

FIELD QC ACCEPTANCE CRITERIA FOR ACCURACY AND PRECISION

PARAMETER	ACCURACY[a]	PRECISION
pH	±0.2 pH unit	±0.3 pH unit
Specific Conductance	±5 percent	±10 percent
Temperature	±1°C	NS[b]
Dissolved Oxygen	NS	±5 percent
Turbidity	NS	>7 NTUs: ±5 percent <7 NTUs: ±10 percent

---

a. Accuracy measured against a standard of known concentration.

b. NS = Not Specified.

TABLE B-4

CALIBRATION FREQUENCY FOR FIELD PARAMETERS

PARAMETER	CALIBRATION STANDARDS	CALIBRATION FREQUENCY[(a)]	CONTINUING CALIBRATION
Ph	Ph 4, Ph 7, & Ph 10	Daily	None
Specific Conductance	100 + 1000 umhos/cm	Daily	None
Water Level	Measured Steel Tape	Once During Project	None
Organic Vapors	100 ppm Isobutylene Gas	Daily	None

---

a. Where applicable, instruments will be checked against calibration standards at the beginning of each sampling day (before any field measurements) of the sampling event.

FIGURE

DRAWING NUMBER 01304A4

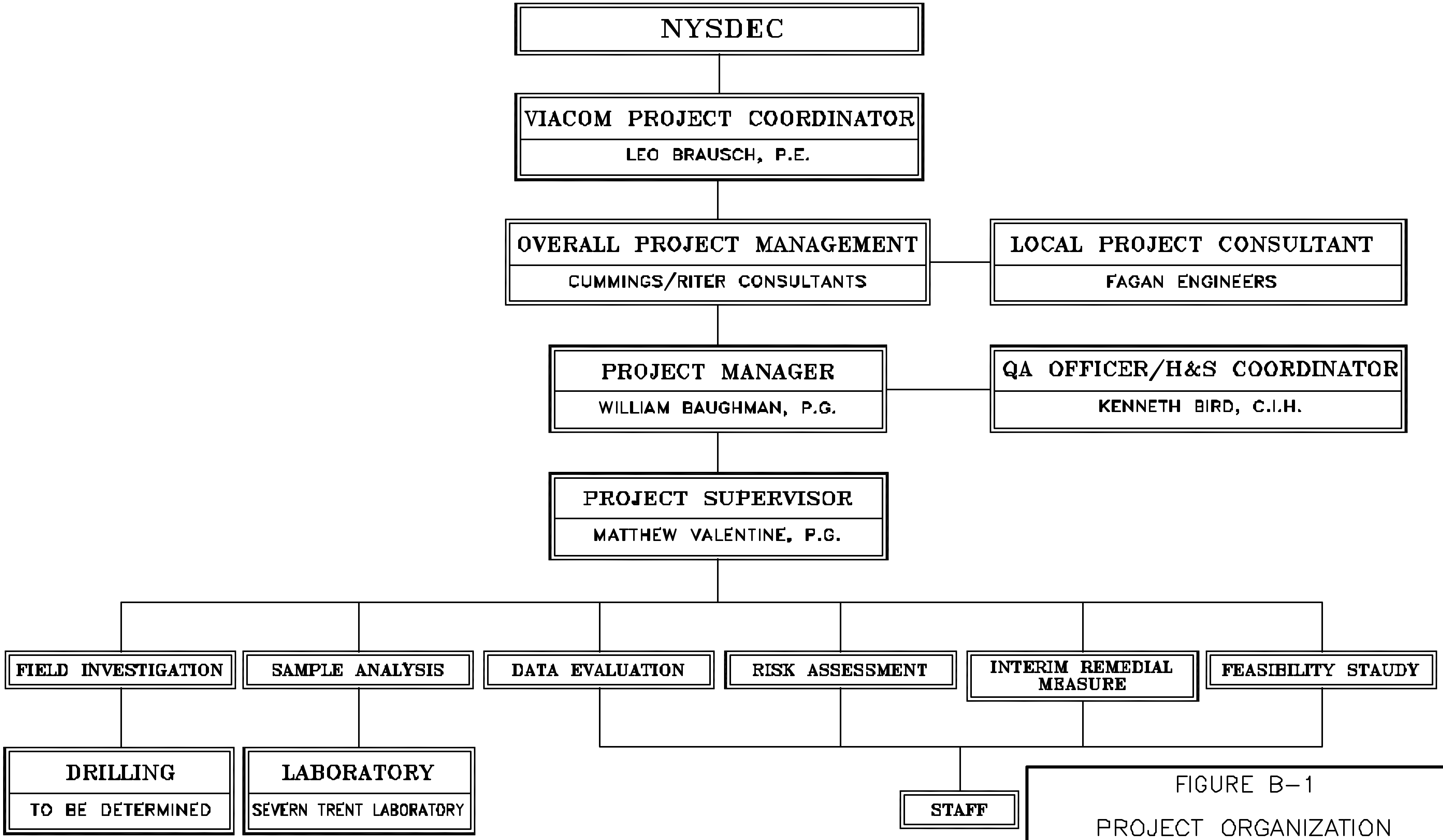

FIGURE B-1

PROJECT ORGANIZATION

TOWNLEY HILL ROAD DUMP SITE
CHEMUNG COUNTY, NEW YORK

PREPARED FOR
VIACOM INC.
PITTSBURGH, PENNSYLVANIA

CUMMINGS RITER CONSULTANTS, INC.

DRAWING NUMBER
01304A4

REVISION	DATE	DESCRIPTION

DRAWN BY: *T.N. Fitzroy* DATE: *08-10-01*
CHECKED BY: *M.J. Valentine* DATE: *11-19-04*
APPROVED BY: *W.A. Baughman* DATE: *11-19-04*

ATTACHMENT B-1

QUANTITATION LIMITS

USEPA CONTRACT LABORATORY PROGRAM

STATEMENT OF WORK
FOR
ORGANICS ANALYSIS

Multi-Media, Multi-Concentration

OLM04.2
May 1999

Exhibit C - Target Compound List and Contract Required Quantitation Limits

Table of Contents

1.0 VOLATILES TARGET COMPOUND LIST AND CONTRACT REQUIRED QUANTITATION LIMITS

	Volatiles	CAS Number	Quantitation Limits			
			Water µg/L	Low Soil µg/Kg	Med. Soil µg/Kg	On Column (ng)
1.	*Dichlorodifluoromethane*	*75-71-8*	*10*	*10*	*1200*	*(50)*
2.	Chloromethane	74-87-3	10	10	1200	(50)
3.	Vinyl Chloride	75-01-4	10	10	1200	(50)
4.	Bromomethane	74-83-9	10	10	1200	(50)
5.	Chloroethane	75-00-3	10	10	1200	(50)
6.	*Trichlorofluoromethane*	*75-69-4*	*10*	*10*	*1200*	*(50)*
7.	1,1-Dichloroethene	75-35-4	10	10	1200	(50)
8.	*1,1,2-Trichloro-1,2,2-trifluoroethane*	*76-13-1*	*10*	*10*	*1200*	*(50)*
9.	Acetone	67-64-1	10	10	1200	(50)
10.	Carbon Disulfide	75-15-0	10	10	1200	(50)
11.	*Methyl Acetate*	*79-20-9*	*10*	*10*	*1200*	*(50)*
12.	Methylene Chloride	75-09-2	10	10	1200	(50)
13.	*trans-1,2-Dichloroethene*	*156-60-5*	10	10	1200	(50)
14.	*Methyl tert-Butyl Ether*	*1634-04-4*	*10*	*10*	*1200*	*(50)*
15.	1,1-Dichloroethane	75-34-3	10	10	1200	(50)
16.	*cis-1,2-Dichloroethene*	*156-59-2*	10	10	1200	(50)
17.	2-Butanone	78-93-3	10	10	1200	(50)
18.	Chloroform	67-66-3	10	10	1200	(50)
19.	1,1,1-Trichloroethane	71-55-6	10	10	1200	(50)
20.	*Cyclohexane*	*110-82-7*	*10*	*10*	*1200*	*(50)*
21.	Carbon Tetrachloride	56-23-5	10	10	1200	(50)
22.	Benzene	71-43-2	10	10	1200	(50)
23.	1,2-Dichloroethane	107-06-2	10	10	1200	(50)
24.	Trichloroethene	79-01-6	10	10	1200	(50)
25.	*Methylcyclohexane*	*108-87-2*	*10*	*10*	*1200*	*(50)*
26.	1,2-Dichloropropane	78-87-5	10	10	1200	(50)
27.	Bromodichloromethane	75-27-4	10	10	1200	(50)
28.	cis-1,3-Dichloropropene	10061-01-5	10	10	1200	(50)
29.	4-Methyl-2-pentanone	108-10-1	10	10	1200	(50)
30.	Toluene	108-88-3	10	10	1200	(50)
31.	trans-1,3-Dichloropropene	10061-02-6	10	10	1200	(50)
32.	1,1,2-Trichloroethane	79-00-5	10	10	1200	(50)
33.	Tetrachloroethene	127-18-4	10	10	1200	(50)
34.	2-Hexanone	591-78-6	10	10	1200	(50)
35.	Dibromochloromethane	124-48-1	10	10	1200	(50)

1.0 VOLATILES TARGET COMPOUND LIST AND CONTRACT REQUIRED QUANTITATION LIMITS (Con't)

	Volatiles	CAS Number	Quantitation Limits Water µg/L	 Low Soil µg/Kg	 Med. Soil µg/Kg	 On Column (ng)
36.	*1,2-Dibromoethane*	*106-93-4*	*10*	*10*	*1200*	*(50)*
37.	Chlorobenzene	108-90-7	10	10	1200	(50)
38.	Ethylbenzene	100-41-4	10	10	1200	(50)
39.	Xylenes (total)	1330-20-7	10	10	1200	(50)
40.	Styrene	100-42-5	10	10	1200	(50)
41.	Bromoform	75-25-2	10	10	1200	(50)
42.	*Isopropylbenzene*	*98-82-8*	*10*	*10*	*1200*	*(50)*
43.	1,1,2,2-Tetrachloroethane	79-34-5	10	10	1200	(50)
44.	*1,3-Dichlorobenzene*	*541-73-1*	*10*	*10*	*1200*	*(50)*
45.	*1,4-Dichlorobenzene*	*106-46-7*	*10*	*10*	*1200*	*(50)*
46.	*1,2-Dichlorobenzene*	*95-50-1*	*10*	*10*	*1200*	*(50)*
47.	*1,2-Dibromo-3-chloropropane*	*96-12-8*	*10*	*10*	*1200*	*(50)*
48.	*1,2,4-Trichlorobenzene*	*120-82-1*	*10*	*10*	*1200*	*(50)*

2.0 SEMIVOLATILES TARGET COMPOUND LIST AND CONTRACT REQUIRED QUANTITATION LIMITS

	Semivolatiles	CAS Number	Quantitation Limits			
			Water µg/L	Low Soil µg/Kg	Med. Soil µg/Kg	On Column (ng)
49.	*Benzaldehyde*	*100-52-7*	*10*	*330*	*10000*	*(20)*
50.	Phenol	108-95-2	10	330	10000	(20)
51.	bis-(2-Chloroethyl) ether	111-44-4	10	330	10000	(20)
52.	2-Chlorophenol	95-57-8	10	330	10000	(20)
53.	2-Methylphenol	95-48-7	10	330	10000	(20)
54.	2,2'-oxybis(1-Chloropropane)[1]	108-60-1	10	330	10000	(20)
55.	*Acetophenone*	*98-86-2*	*10*	*330*	*10000*	*(20)*
56.	4-Methylphenol	106-44-5	10	330	10000	(20)
57.	N-Nitroso-di-n propylamine	621-64-7	10	330	10000	(20)
58.	Hexachloroethane	67-72-1	10	330	10000	(20)
59.	Nitrobenzene	98-95-3	10	330	10000	(20)
60.	Isophorone	78-59-1	10	330	10000	(20)
61.	2-Nitrophenol	88-75-5	10	330	10000	(20)
62.	2,4-Dimethylphenol	105-67-9	10	330	10000	(20)
63.	bis(2-Chloroethoxy) methane	111-91-1	10	330	10000	(20)
64.	2,4-Dichlorophenol	120-83-2	10	330	10000	(20)
65.	Naphthalene	91-20-3	10	330	10000	(20)
66.	4-Chloroaniline	106-47-8	10	330	10000	(20)
67.	Hexachlorobutadiene	87-68-3	10	330	10000	(20)
68.	*Caprolactam*	*105-60-2*	*10*	*330*	*10000*	*(20)*
69.	4-Chloro-3-methylphenol	59-50-7	10	330	10000	(20)
70.	2-Methylnaphthalene	91-57-6	10	330	10000	(20)
71.	Hexachlorocyclo-pentadiene	77-47-4	10	330	10000	(20)
72.	2,4,6-Trichlorophenol	88-06-2	10	330	10000	(20)
73.	2,4,5-Trichlorophenol	95-95-4	25	830	25000	(50)

---

[1] Previously known by the name bis(2-Chloroisopropyl)ether.

2.0 SEMIVOLATILES TARGET COMPOUND LIST AND CONTRACT REQUIRED QUANTITATION LIMITS (Con't)

			Quantitation Limit			
	Semivolatiles	CAS Number	Water µg/L	Low Soil µg/Kg	Med. Soil µg/Kg	On Column (ng)
74.	*1,1'-Biphenyl*	*92-52-4*	*10*	*330*	*10000*	*(20)*
75.	2-Chloronaphthalene	91-58-7	10	330	10000	(20)
76.	2-Nitroaniline	88-74-4	25	830	25000	(50)
77.	Dimethylphthalate	131-11-3	10	330	10000	(20)
78.	2,6-Dinitrotoluene	606-20-2	10	330	10000	(20)
79.	Acenaphthylene	208-96-8	10	330	10000	(20)
80.	3-Nitroaniline	99-09-2	25	830	25000	(50)
81.	Acenaphthene	83-32-9	10	330	10000	(20)
82.	2,4-Dinitrophenol	51-28-5	25	830	25000	(50)
83.	4-Nitrophenol	100-02-7	25	830	25000	(50)
84.	Dibenzofuran	132-64-9	10	330	10000	(20)
85.	2,4-Dinitrotoluene	121-14-2	10	330	10000	(20)
86.	Diethylphthalate	84-66-2	10	330	10000	(20)
87.	Fluorene	86-73-7	10	330	10000	(20)
88.	4-Chlorophenyl-phenyl ether	7005-72-3	10	330	10000	(20)
89.	4-Nitroaniline	100-01-6	25	830	25000	(50)
90.	4,6-Dinitro-2-methylphenol	534-52-1	25	830	25000	(50)
91.	N-Nitroso diphenylamine	86-30-6	10	330	10000	(20)
92.	4-Bromophenyl-phenylether	101-55-3	10	330	10000	(20)
93.	Hexachlorobenzene	118-74-1	10	330	10000	(20)
94.	*Atrazine*	*1912-24-9*	*10*	*330*	*10000*	*(20)*
95.	Pentachlorophenol	87-86-5	25	830	25000	(50)
96.	Phenanthrene	85-01-8	10	330	10000	(20)
97.	Anthracene	120-12-7	10	330	10000	(20)
98.	Carbazole	86-74-8	10	330	10000	(20)
99.	Di-n-butylphthalate	84-74-2	10	330	10000	(20)
100.	Fluoranthene	206-44-0	10	330	10000	(20)
101.	Pyrene	129-00-0	10	330	10000	(20)
102.	Butylbenzylphthalate	85-68-7	10	330	10000	(20)
103.	3,3'-Dichlorobenzidine	91-94-1	10	330	10000	(20)
104.	Benzo(a)anthracene	56-55-3	10	330	10000	(20)
105.	Chrysene	218-01-9	10	330	10000	(20)

2.0 SEMIVOLATILES TARGET COMPOUND LIST AND CONTRACT REQUIRED QUANTITATION LIMITS (Con't)

			Quantitation Limits			
	Semivolatiles	CAS Number	Water µg/L	Low Soil µg/Kg	Med. Soil µg/Kg	On Column (ng)
106.	bis(2-Ethylhexyl) phthalate	117-81-7	10	330	10000	(20)
107.	Di-n-octylphthalate	117-84-0	10	330	10000	(20)
108.	Benzo(b)fluoranthene	205-99-2	10	330	10000	(20)
109.	Benzo(k)fluoranthene	207-08-9	10	330	10000	(20)
110.	Benzo(a)pyrene	50-32-8	10	330	10000	(20)
111.	Indeno(1,2,3-cd)-pyrene	193-39-5	10	330	10000	(20)
112.	Dibenzo(a,h)-anthracene	53-70-3	10	330	10000	(20)
113.	Benzo(g,h,i)perylene	191-24-2	10	330	10000	(20)

3.0 PESTICIDES/AROCLORS TARGET COMPOUND LIST AND CONTRACT REQUIRED QUANTITATION LIMITS[2]

	Pesticides/Aroclors	CAS Number	Quantitation Limits		
			Water µg/L	Soil µg/Kg	On Column (pg)
114.	alpha-BHC	319-84-6	0.050	1.7	5
115.	beta-BHC	319-85-7	0.050	1.7	5
116.	delta-BHC	319-86-8	0.050	1.7	5
117.	gamma-BHC (Lindane)	58-89-9	0.050	1.7	5
118.	Heptachlor	76-44-8	0.050	1.7	5
119.	Aldrin	309-00-2	0.050	1.7	5
120.	Heptachlor epoxide[3]	*1024-57-3*	0.050	1.7	5
121.	Endosulfan I	959-98-8	0.050	1.7	5
122.	Dieldrin	60-57-1	0.10	3.3	10
123.	4,4'-DDE	72-55-9	0.10	3.3	10
124.	Endrin	72-20-8	0.10	3.3	10
125.	Endosulfan II	33213-65-9	0.10	3.3	10
126.	4,4'-DDD	72-54-8	0.10	3.3	10
127.	Endosulfan sulfate	1031-07-8	0.10	3.3	10
128.	4,4'-DDT	50-29-3	0.10	3.3	10
129.	Methoxychlor	72-43-5	0.50	17	50
130.	Endrin ketone	53494-70-5	0.10	3.3	10
131.	Endrin aldehyde	7421-93-4	0.10	3.3	10
132.	alpha-Chlordane	5103-71-9	0.050	1.7	5
133.	gamma-Chlordane	5103-74-2	0.050	1.7	5
134.	Toxaphene	8001-35-2	5.0	170	500
135.	Aroclor-1016	12674-11-2	1.0	33	100
136.	Aroclor-1221	11104-28-2	2.0	67	200
137.	Aroclor-1232	11141-16-5	1.0	33	100
138.	Aroclor-1242	53469-21-9	1.0	33	100
139.	Aroclor-1248	12672-29-6	1.0	33	100
140.	Aroclor-1254	11097-69-1	1.0	33	100
141.	Aroclor-1260	11096-82-5	1.0	33	100

---

[2] There is no differentiation between the preparation of low and medium soil samples in this method for the analysis of pesticides/Aroclors.

[3] Only the exo-epoxy isomer (isomer B) of heptachlor epoxide is reported on the data reporting forms (Exhibit B).

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
	Fluoride	100

ATTACHMENT B-2

BLANK FIELD FORMS

CUMMINGS
RITER
CONSULTANTS, INC.

Date ____________________
Day of Week ____________________
No. ____________________
Sheet __________ of __________

FIELD ACTIVITY REPORT

Project Name: **Project No.**

Field Activity:

CRC Personnel On Site:

Description on Daily Activities and Events:

Pay Quantities:

Project Changes/Unusual Observations:

Weather Conditions:
a.m.
p.m.

Health & Safety PPE:

Air Monitoring Results:

Contractor(s):

Field Representative: **Date:**

CUMMINGS
RITER
CONSULTANTS, INC.

TEST PIT LOG

PROJECT NAME ______ PROJECT NO. ______ PAGE ____ OF ______

FIELD ENG./GEO. ______ DATE ______ TEST PIT NO. ______

ELEVATION ______

COORD. (N) ______ DEPTH TO GWL. ______ DATE/TIME ______

(E) ______ DEPTH TO GWL. ______ DATE/TIME ______

DEPTH ( )	SAMPLE NO. AND TYPE	SOIL PROFILE	DESCRIPTION	USCS SYMBOL	REMARKS

NOTES:

CUMMINGS RITER CONSULTANTS, INC.

SOIL SAMPLE
FIELD COLLECTION REPORT

Project Name ______________________ Project No. ______________________

Date Collected ___/___/___ Time Collected ______________________

Collected By ______________________
Cummings/Riter Consultants

SAMPLE(S) LOCATION SKETCH (use reverse if necessary)

Sample I.D. No.	Depth of Sample	Soil Description (Color, Composition, Staining, Odor, Field Measurements[1])

Sampling Method ______________________

Composite Sample? Y ☐ N ☐ Composite Sample I.D. No. ______________

Describe Compositing ______________________

SAMPLE TYPES COLLECTED

Type[2]	Volume	Per Sample?		Per Composite?	
		Y ☐	N ☐	Y ☐	N ☐
		Y ☐	N ☐	Y ☐	N ☐
		Y ☐	N ☐	Y ☐	N ☐
		Y ☐	N ☐	Y ☐	N ☐

Number of Containers ______________

Date Received by Lab ___/___/___ Laboratory ______________________

Weather Conditions ______________________

Remarks ______________________

---

1. Organic vapor analysis, pocket penetrometer, etc.
2. Metals, VOA, organics, etc.

CUMMINGS RITER CONSULTANTS, INC.

WATER SAMPLE COLLECTION REPORT

PROJECT ______________________ SAMPLE ID ______________________

PROJECT NO. ______________________ WELL NO. ______________________

SAMPLE DATE ________ / ________ / ________ SAMPLED BY ______________________

SAMPLE TIME (START/END) ________ / ________ SAMPLE SEQUENCE NO. ______________________

SAMPLE COLLECTION EQUIPMENT ______________________

DEPTH TO WATER PRIOR TO PURGING/SAMPLING (FT) ________ / ________

RECHARGE TIME ______________________ MEASURED FROM ☐ TOC ☐ TOR ☐ GS

FIELD MEASUREMENTS

pH	Standard Units	
Specific Conductance	umho/cm	
Water Temperature	°__	
Dissolved Oxygen	ppm	
Redox	mV	
Turbidity	NTU	

METER CALIBRATION PERFORMED? N ☐ Y ☐ DATE ______________________

WATER APPEARANCE, IMMISCIBLE PHASES OR ODORS: ______________________

SAMPLING FLOW RATE: ______________________

SAMPLE TYPES COLLECTED

PARAMETER	VOLUME	# CONTAINERS	FIELD FILTERED?		PRESERVED?	
			Y ☐	N ☐	Y ☐ _____	N ☐
			Y ☐	N ☐	Y ☐ _____	N ☐
			Y ☐	N ☐	Y ☐ _____	N ☐
			Y ☐	N ☐	Y ☐ _____	N ☐
			Y ☐	N ☐	Y ☐ _____	N ☐
			Y ☐	N ☐	Y ☐ _____	N ☐
			Y ☐	N ☐	Y ☐ _____	N ☐
			Y ☐	N ☐	Y ☐ _____	N ☐
			Y ☐	N ☐	Y ☐ _____	N ☐

NUMBER OF CONTAINERS ______________________ FILTRATION METHOD ______________________

LABORATORY ______________________ DELIVERED VIA ______________________ DATE ________

WEATHER CONDITIONS ______________________

COMMENTS ______________________

CUMMINGS RITER CONSULTANTS, INC.

WELL PURGING RECORD
LOW-FLOW SAMPLING METHOD

SITE: ____________________ **TUBING DIAMETER:** ____________________ inches

PROJECT NO.: ____________________ **DEPTH TO WATER:** ____________________ ft TOR

SAMPLING DEVICE: ____________________ **DEPTH TO PUMP:** ____________________ ft TOR

DATE: ______ / ______ / ______ **FEET OF WATER IN LINE:** ____________________ feet

WELL I.D.: ____________________ **VOLUME OF WATER IN LINE:** ____________________ gallons

(0.005 gal/ft for 3/8” tubing, 0.0023 gal/ft for ¼” tubing)

ELAPSED TIME (min)	**DEPTH TO WATER (ft TOR)**	**pH (s.u.)**	**SPECIFIC CONDUCTANCE (/)**	**TEMPER-ATURE (°C)**	**DISSOLVED OXYGEN (ppm)**	**TURBIDITY (NTU)**	**REDOX (mV)**

PURGE START TIME: __________ **PURGE END TIME:** __________ **TOTAL VOLUME PURGED:** ~__________ gal

APPROXIMATE PURGE RATE: ________________ ml/min **PURGED/SAMPLED BY:** ____________________

WEATHER CONDITIONS: ____

COMMENTS: ____

____

CUMMINGS RITER
CONSULTANTS, INC.

Chain of Custody Record

Page ______ of ______
Lab Quote # __________

Project Name: ______________________________
Project Location: ______________________________
Project Number: ______________________________
Sampled By: (print)

Results To: ______________________________
Company: ______________________________
Address: ______________________________
____
Phone: ______________________________

Invoice To: ______________________________
Company: ______________________________
Address: ______________________________
____
Phone: ______________________________

Lab ID	Sample Identification	Date	Time	Grab	Composite	Sample Matrix	No. of Bottles	Analyses										Preservatives				Remarks
																		HCL	HNO3	H2SO4	NaOH	

Turnaround Time Required: Normal ___ Rush ___	**1. Relinquished By: (signature)**	**Date**	**Time**	**1. Received By: (signature)**
Sample Disposal: Return to Client ___ Disposal by Lab ___	**2. Relinquished By: (signature)**	**Date**	**Time**	**2. Received By: (signature)**
Known Hazard (flammable/toxic): Yes (comment below) ___ No ___	**3. Relinquished By: (signature)**	**Date**	**Time**	**3. Received By: (signature)**

Special Instructions/Comments:
____
____
____
____

Sample Condition Upon Receipt:
____
____
____
____

CUMMINGS
RITER
CONSULTANTS, INC.

EQUIPMENT CALIBRATION LOG

PROJECT NAME: ______________________________

PROJECT NUMBER: ______________________________

DATE: ______________ Performed By: ______________

INSTRUMENT TYPE: ______________________________

INSTRUMENT MODEL NUMBER: ______________________________

INSTRUMENT SERIAL NUMBER: ______________________________

DESCRIPTION OF CALIBRATION PROCEDURE:

STANDARD pH OR CONCENTRATION	**INSTRUMENT READING**

REMARKS: ______________________________

CUMMINGS
RITER
CONSULTANTS, INC.

EQUIPMENT CALIBRATION LOG

PROJECT NAME: ____________________

PROJECT NUMBER: ____________________

DATE: ________________ Performed By: ________________

INSTRUMENT TYPE: Hnu - Photoionization Detector - 10.2 eV Lamp

INSTRUMENT MODEL NUMBER: PI-101

INSTRUMENT SERIAL NUMBER: ____________________

DESCRIPTION OF CALIBRATION PROCEDURE:

a) Turn function switch to BATT to check battery.
b) Turn function switch to STANDBY - set dial to read zero with zero knob.
c) Connect the analyzer to the regulator and cylinder containing isobutylene/air mixture with a clean piece of tubing. (Do not use cylinder with < 30 psig.)
d) Turn the function switch to the 0-200 ppm range. Adjust the span to obtain calibration reading based on the concentration of isobutylene in the calibration gas. The concentration in the isobutylene of calibration gas is multiplied by 0.54 to obtain instrument reading. A calibration gas with an isobutylene concentration of 100 ppm provides on instrument reading of 54 ppm (i.e. 100 ppm x 0.54 = 54).
e) Recheck zero setting (Step B). If readjustment is necessary, repeat Step C.
f) Check operation and reaction with a permanent marker.
NOTE: Calibration was performed in atmospheric conditions similar to anticipated use area.

STANDARD pH OR CONCENTRATION	**INSTRUMENT READING**

REMARKS: ____________________

Span setting:

Background:

Calibration gas Lot #:

Calibration gas isobutylene concentration: _____ ppm.

CUMMINGS
RITER
CONSULTANTS, INC.

EQUIPMENT CALIBRATION LOG

PROJECT NAME: ______________________________

PROJECT NUMBER: ______________________________

DATE: ______________ Performed By: ______________

INSTRUMENT TYPE: ______________________________

INSTRUMENT MODEL NUMBER: ______________________________

INSTRUMENT SERIAL NUMBER: ______________________________

DESCRIPTION OF CALIBRATION PROCEDURE:
Temperature and conductance are factory calibrated. Check conductance accuracy with solution of known conductance and recalibrate, if necessary.
To recalibrate conductance, remove black plug revealing the adjustment potentiometer screw. Add standard solution to cup, discard and refill. Repeat procedure until the digital display indicates the same value. Twice in a row. Adjust the potentiometer until the digital display indates the known value of conductance. To increase the digital display reading, turn the adjustment potentiometer screw counterclockwise (clockwise to decrease).
To standardized the pH electrode and meter, place the pH electrode in the 7.0 buffer bottle. Adjust the “ZERO” potentiometer on the face of the tester so that the digital display indicates 7.00. Then place the pH electrode in the 4.0 or 10.0 buffer bottle (depending on were you expect the actual measurement to be). Adjust the “SLOPE” potentiometer on the face of the tester so that the digital display indicates the value of the buffer chosen.
NOTE: The is interaction between the “ZERO” and “SLOPE” adjustments; therefore, the pH calibration procedure was repeated several times.
Record obtained standard values below.

STANDARD pH OR CONCENTRATION	**INSTRUMENT READING**

REMARKS: ______________________________

____

____

____

____

____

APPENDIX C

HEALTH AND SAFETY PLAN

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APPENDIX C
HEALTH AND SAFETY PLAN

1.0 INTRODUCTION

On behalf of Viacom Inc. (Viacom), successor in interest to CBS Corporation and Westinghouse Electric Corporation (Westinghouse), Cummings/Riter Consultants, Inc. (Cummings/Riter) has prepared this Health and Safety Plan (HASP) to support activities to be conducted at a former waste disposal site located in the town of Catlin, Chemung County, New York known as the Townley Hill Road Dump Site (the Site) (see Figure 1 of the Work Plan). In 1997, the New York State Department of Environmental Conservation (NYSDEC) conducted a focused remedial investigation at the Site. In September 1998, NYSDEC issued a Focused Remedial Investigation (RI) Report that recommended a comprehensive remedial investigation/feasibility study (RI/FS) be conducted at the Site to investigate potential impacts to soil, sediment, and groundwater.

This HASP has been prepared in general accordance with the U.S. Environmental Protection Agency's (USEPA) *Guidance for Conducting Remedial Investigations and Feasibility Studies under CERCLA* (EPA 540/G-89/004, October 1988). The purpose of the HASP is to protect project personnel, Site workers, and the public from potential environmental exposures.

1.1 PROJECT DESCRIPTION

This section provides the Site description and history including a physical description of the Site. A more detailed discussion of the Site is presented in the RI/FS Work Plan. The information included in this section was modified from the Focused RI Report (NYSDEC, 1998).

1.2 SITE LOCATION AND DESCRIPTION

The Site is an inactive hazardous waste landfill (New York State Registry No. 8-08-006) which occupies an approximate 10-acre portion of a larger 28-acre property located on

Townley Hill Road in the Town of Catlin, Chemung County, New York. The area is rural with small population centers along the Post Creek Valley to the northwest. The Site is within the Susquehanna River basin. An unnamed tributary to Post Creek passes within 500 feet of the Site, Post Creek itself is approximately 1,700 feet northwest of the fill area, and a private residence is situated approximately 700 feet east of the former drum disposal area. The Site is unfenced, although a suspended steel cable across the driveway restricts vehicle access. Figure 2 of the Work Plan presents a Site plan map.

1.3 SITE HISTORY

The Site is currently owned by Northwoods Hunting Inc. of Ridgeway, Ontario (Northwoods). During the period of operation (approximately late 1950s until 1967), the Site was owned by Mr. Joseph Lobell and subsequently, beginning in 1964, by Mr. John Mandzak. The Site was reportedly used for disposal of municipal waste under a permit issued by the Chemung County Department of Health. The Site also reportedly received miscellaneous debris, including tires, junk automobiles, 55-gallon drums, and calcium fluoride sludge (Engineering-Science, 1988). According to NYSDEC, approximately 300 drums containing an incinerator ash-like waste material were also disposed of at the Site.

Calcium fluoride sludge was reportedly buried in eight-foot trenches to the east of the Site access road (Engineering-Science, 1988). This sludge reportedly consisted of "waste treatment plant sludge intermittently containing traces of lead phosphate and cadmium" from the Westinghouse Industrial & Government Tube Division manufacturing facility in Horseheads, New York. According to available Westinghouse records, an unknown quantity of calcium fluoride sludge from its Horseheads plant was disposed of in bulk at the "Madzac property" (presumably the Townley Hill Road Dump Site) between 1964 and 1967.

On October 16, 1967, the Site was closed by the Chemung County Health Department due to complaints of odors and open burning. Beginning in 1969, most of the debris was removed by the new owner, Mr. James Case. The Site was also covered with topsoil and revegetated.

In April 1980, the Site was identified by NYSDEC as an inactive hazardous waste disposal site and placed on the Registry of Inactive Hazardous Waste Disposal Sites in New York. In 1983 and 1984, NYSDEC sampled the contents of the drums and analyzed these drum samples for metals by the Extraction Procedure (EP) to determine if these materials were characteristic hazardous waste under New York and Federal Resource Conservation and Recovery Act (RCRA) regulations. Results from the 1984 sampling event indicated an exceedance of the threshold EP toxicity concentrations for cadmium and lead. The Site was subsequently classified as a “Class 2” site in December 1986.

In July 1988, NYSDEC conducted an interim remedial measure (IRM) in which it removed approximately 300 drums containing ash waste and approximately 100 cubic yards (cy) of soil impacted by cadmium. Following the IRM, several Site investigations were conducted from 1990 through 1997, including the collection of numerous surface and subsurface soil samples. These investigations are discussed in Section 2.4 of the RI Work Plan.

1.4 ABBREVIATIONS AND CONVENTIONS

Abbreviations for some chemical names and other terms which are frequently used in the text are as follows:

• Health and Safety Plan	HASP
• Site Health and Safety Officer	SHSO
• Parts per million	ppm
• U.S. Environmental Protection Agency	USEPA
• Volatile organic compounds	VOCs

2.0 PROGRAM ORGANIZATION AND ADMINISTRATION

The RI/FS will be conducted in a manner such that the health and safety of field personnel and the public are protected. The work will be performed by Cummings/Riter and related subcontractors. The RI/FS project manager and Site health and safety officer (SHSO) will be responsible for seeing that RI/FS work is carried out in accordance with the safety procedures described herein. It is their responsibility to implement the applicable measures defined in this HASP.

The HASP will be implemented through an integrated team effort of the following key project staff:

- **WILLIAM A. BAUGHMAN – PROJECT MANAGER**
  Mr. Baughman will be the primary contact between Cummings/Riter and Viacom. He will be responsible for interfacing with the agency technical representatives (as necessary) and for review of agency submittals including the RI and FS Reports. He will also be responsible for technical, financial, and scheduling matters.

- **MATTHEW J. VALENTINE – PROJECT SUPERVISOR**
  Mr. Valentine will direct the field sampling crews, interface with both the drilling and laboratory subcontractors, and be responsible for preparation of agency submittals.

- **KENNETH J. BIRD – HEALTH AND SAFETY COORDINATOR AND QUALITY ASSURANCE OFFICER**
  Mr. Bird is responsible for reviewing the standard operating procedures and modifications to the HASP, as needed, based on field monitoring results. Mr. Bird will review field and laboratory data for compliance of the quality assurance (QA) objectives (precision, accuracy, comparability, and completeness); and report any deficiencies to project management.

- **ON-SITE HEALTH AND SAFETY OFFICER – TO BE DETERMINED**
  Responsible for executing HASP requirements on Site during the RI/FS.

- **OTHER RI/FS CONTRACTORS**
  Other RI/FS contractors will assign qualified individuals to be responsible for health and safety during RI/FS activities.

The RI/FS SHSO will normally be the Cummings/Riter staff member on Site or, if necessary, another Cummings/Riter staff member will be designated by the project manager, if the SHSO is not present on Site. The SHSO will have the required training (Section 5.0) and experience to implement the HASP.

3.0 MEDICAL SURVEILLANCE

Cummings/Riter personnel performing field work will be required to participate in a medical surveillance program prior to the initiation of field activities. Certification of conformance with Occupational Safety and Health Administration (OSHA) 1910.120 will be maintained in the project files. Other project participants will similarly need to be participants in a medial surveillance program pursuant to OSHA 1910.120, or provide a notarized statement that they are not subject to the medical surveillance requirement (e.g., do not work in respiratory protection for a minimum of 30 days per year).

4.0 HAZARD ASSESSMENT

An evaluation of conditions at the Site has been made to determine the potential effects upon Site personnel and the general public during the field activities. This qualitative evaluation is based on the following:

- Nature of potential constituents;
- Presence of potential constituents at specific work areas;
- Anticipated levels of constituents;
- Potential for personnel and public exposure during various Site activities; and
- Effects of potential constituents on human health.

The hazard associated with exposure varies directly with the amount of constituents to which an individual is exposed and the length of exposure. Exposure potential is defined as the probability of a worker or the public receiving harmful exposures.

4.1 FIELD INVESTIGATION ACTIVITIES

The potential hazard for personnel performing investigation activities varies from slight to moderate depending upon the activity. Field activities to be performed for this investigation include:

- Surface geophysical surveying,
- Soil sampling,
- Test pit excavation,
- Drilling,
- Well installation,
- Surface water, sediment, and groundwater sampling, and
- Land surveying.

Most of these tasks were performed previously at the Site. Because these tasks were performed safely before, potential exposure is considered low to moderate during soil and water sampling, well installation, and test pit excavation work. It is noted that these activities may occur within or adjacent to areas of known impact.

Previous results from these areas indicate that the primary substances of concern and concentration range reported in soil are as follows:

- Cadmium – Not detected to 9,870 milligrams per kilogram (mg/kg);
- Lead – Not detected to 671 mg/kg;
- Chrysene – Not detected to 0.250 mg/kg;
- Benzo(a)anthracene – Not detected to 0.260 mg/kg; and
- Benzo(a)pyrene – Not detected to 0.240 mg/kg.

Several other semivolatile compounds were detected at trace levels (less than 0.06 mg/kg). Groundwater, sediment, and surface water are expected to contain lower (if detectable) concentrations of these compounds. These media have not been sampled previously.

Because airborne lead and cadmium concentrations cannot be measured with real-time instruments, a total dust concentration can be conservatively used to control employee exposure. Using the following factors, a controlling dust concentration of 0.13 milligrams per cubic meter (mg/m^3) was calculated:

- Safety factor of 4,
- OSHA permissible exposure limit (PEL) for lead and cadmium, and
- Maximum soil sample listed previously.

This indicates that if airborne dust concentration at the property with the highest lead concentration does not exceed 0.13 mg/kg, lead or cadmium concentration will not exceed the OSHA PEL. Because dust measurements will be obtained while the exposure assessment is being performed, respiratory protection is not required if total dust measurements are below 0.13 mg/m^3. If higher soil lead concentrations are determined, a revised total dust criterion will be developed.

Survey activities will not disturb the ground surface. Physical hazards, many associated with excavation and drilling activities, will also be present on Site. The potential physical hazards will be reduced by adherence to accepted safety practices and by daily inspection of the backhoe and drill rig (or other equipment) by the specific subcontractors performing the work.

The disturbance of soil in select areas will have moderate potential exposures. Air monitoring (Section 8.0) will be performed to evaluate potential health and safety hazards. Workers will not enter test pits deeper than two feet.

Small aliquots of acids (e.g., hydrochloric acid) will be used as sample preservatives. The acids are diluted with the water samples. Samplers will be potentially exposed to the acids while filling sample containers. Protective equipment (i.e., gloves) will be worn as listed in Section 7.3.

Decontamination solutions will be used in small quantities. Gloves will be worn during decontamination. Potential inhalation exposure to methanol is expected to be less than one minute per sample. Decontamination will occur at an outside area. A material safety data sheet for methanol is provided in Attachment C-1.

Based on the results of past sampling and analysis, several RI/FS activities in select areas will require protective equipment. Through the use of protective clothing and equipment, air monitoring, decontamination procedures, and other standard procedures listed in this plan, exposures will be minimized.

4.2 RI/FS ACTIVITIES

The specific tasks to be performed during the RI/FS at the Site are as follows:

- Project planning;
- Community relations;
- Field investigation (as listed in Section 4.1);
- Sample analysis;
- Analytical support and data validation;
- Data evaluation/Geographic Information System (GIS) setup;
- Qualitative risk assessment;
- RI Report preparation;
- Remedial alternatives screening;
- Remedial alternatives evaluation; and
- FS Report preparation.

Each of the work scope tasks is discussed in the RI/FS Work Plan. Sampling and analysis procedures for the relevant tasks will be conducted in accordance with the Site Sampling and Analysis Plan (Appendices A and B to the Work Plan).

5.0 TRAINING

Project field personnel will have received 40 hours of training in accordance with OSHA 29 Code of Federal Regulations (CFR) 1910.120. In addition, the SHSO will conduct brief Site-specific training sessions (“tailgate meetings”). Training sessions may cover the following topics:

- Site history;
- Compounds identified on Site;
- Explanation of acute and chronic effects of toxic chemicals identified at the Site;
- Site requirements for personnel protection (respirators, etc.); effectiveness and limitations;
- Prohibited actions or procedures in designated work zones;
- Safety precautions and buddy system;
- Work tasks;
- Accident preventive procedures;
- Decontamination procedures;
- Work zones and Site control procedures;
- Health and safety personnel and organization;
- Air monitoring program; and
- Symptoms and treatment of heat- or cold-related illness.

Subcontractors on Site will be required to have documented training in accordance with OSHA requirements. Documentation of the training will be submitted to the project manager and will be placed in the project files. Subcontractors will receive the Site-specific training described above from the appropriate safety representative.

6.0 WORK AREAS AND PRACTICES

6.1 WORK AREAS

The field activities will not be confined to one contiguous area but will be spread out. Thus, the Site will be divided into several zones. Each test pit excavation and drilling location will be a distinct zone. A 25-foot radius around each location will be used to establish the work zone. If contaminants are likely to be encountered, the zone will be considered an exclusion zone. An exclusion zone is defined by the USEPA as an area where contamination does or could occur. The primary RI/FS activities performed in the exclusion zones will be soil sampling, test pit excavations, and sampling. The drilling locations are anticipated to be outside the areas of known impact. Anyone entering an exclusion zone will be required to wear the appropriate protective equipment when work activities are occurring.

A contamination-reduction zone may also be established on the Site. A contamination-reduction zone is an area where equipment and personnel are decontaminated so that the possibility of the support zones becoming contaminated is minimized. Support zones are areas in which no hazardous conditions exist under ambient conditions.

6.2 WORK PRACTICES

Standard safety practices will be enforced for this project. Personnel entering an exclusion or contamination reduction zone will not be permitted to do the following:

- Work alone;
- Smoke, eat, or drink in the zones;
- Enter test pits deeper than two feet;
- Work without proper lighting; and
- Work without appropriate protective equipment.

These practices will be reviewed during the initial training session (Section 5.0).

7.0 PERSONAL PROTECTIVE EQUIPMENT

Equipment for personnel protection will be based on USEPA levels of protection (A, B, C, and D) as specified in the Standard Operation Safety Guides (USEPA, 1984). In general, project personnel will be wearing Level D protective equipment. If necessary, upgrades in personal protective equipment (PPE) may be performed based on the results of field screening methods (e.g., air monitoring). PPE will be compatible with and provide protection from the class of compounds known to be on Site, and any additional compounds identified during the investigation. The PPE will provide respiratory protection and skin and eye protection for personnel operating in the designated exclusion and contamination reduction zones. PPE selection will also be based on task-specific conditions.

The following sections provide a description of the minimum PPE for initial use based on task and location. The initial PPE requirements are based on maximum concentrations reported in soil and groundwater in areas to be investigated and the PPE worn to collect this data. Past activities were safely performed. The results of the air monitoring program (Section 8.0) may require changes (upgrade/downgrade) in the protection required. Potential changes could be more or less PPE, depending upon the type and concentration of contaminants detected.

Personnel in Site work areas identified as presenting no toxic hazards will be required to wear the following basic work clothing:

- Steel-toe boots, and
- Eye protection.

This equipment will be used in support areas whenever intrusive sampling activities are being conducted in other portions of the Site.

7.1 SOIL SAMPLING

Personnel handling contaminated or potentially contaminated drilling equipment, soil, fluids, or groundwater must wear the following PPE, in addition to the basic work clothing:

- Hard hat (during test pit excavation and drilling),
- Latex or nitrile inner gloves, and
- Heavy-duty rubber or other low-permeability outer gloves.

Leather outer work gloves may also be worn (in lieu of low-permeability outer gloves) when handling sampling tools or drilling equipment.

Initially, the PPE will be equivalent to USEPA Level D for skin and respiratory protection. Subsequent selection of respiratory protection equipment (Section 8.0) will be based on air monitoring data (as applicable).

7.2 TEST PIT EXCAVATION AND DRILLING/WELL INSTALLATION

Personnel handling contaminated or potentially contaminated excavation/drilling equipment, soil, fluids, or groundwater must wear the following PPE, in addition to the basic work clothing:

- Hard hat (during test pit excavation and drilling), and
- Latex or nitrile inner gloves, and
- Heavy-duty rubber or other low-permeability outer gloves.

Initially, the PPE will be equivalent to USEPA Level D for skin and respiratory protection. Subsequent selection of respiratory protection equipment (Section 8.0) will be based on air monitoring data (as applicable). Hearing protection will be worn during the operation of the drill rig.

7.3 GROUNDWATER AND SURFACE WATER/SEDIMENT SAMPLING

Previous samples of groundwater/surface water/sediment samples have not been collected at the Site. Therefore, initial worker protection, for the majority of sampling activities, will include basic work clothes and nitrile gloves. Air monitoring will be conducted to determine if upgraded PPE is required. Waterproof overboots or waders will be worn if samplers are in contact with surface water.

8.0 AIR MONITORING

Although volatile organic compounds (VOCs) have not been reported as a concern in the historical activities at the Site, air quality monitoring will be conducted as part of the RI field activities. Collected air monitoring data will serve as input to decisions regarding worker protection measures, routine work procedures, and emergency events.

Organic vapors (OVs) will be monitored with a photoionization analyzer (10.2 eV). Because some of the substances (metals) can be a concern as an airborne dust, dust monitoring will be conducted with a Mini-Ram or equivalent. Monitoring will be performed during test pit excavation, drilling, and sampling activities.

Because dust monitors measure dust concentrations (not metals), a hazard assessment using maximum soil concentrations was performed as described in Section 4.0. The hazard assessment determined that the initial trigger level will be 0.13 mg/m^3.

The action levels and required responses to OV and dust monitoring are as follows:

- **LEVEL I**
  OV not above background (<1 part per million [ppm]), dust measurements below 0.13 mg/m^3. No respiratory protection required.

- **LEVEL II**
  OV measurements of above background, work will stop. A determination of the substances causing the measurements will be performed. Based upon this assessment, additional PPE may be required. In this case, an addendum will be prepared by the Health and Safety Coordinator (HSC). Levels of OV above background are not expected.

  Dust concentrations of above 0.13 mg/m^3 and less than 1.0 mg/m^3, workers will be required to use full-face, air-purifying respirators with an OV cartridge and particulate filter (or equivalent). Dust levels above 0.13 mg/m^3 are not expected.

- **LEVEL III**
  Work will stop if dust concentrations are above 1.0 mg/m^3. The use of dust suppression measures will be implemented. If work is to continue when dust is at these levels, a hazard assessment will be performed by the HSC prior to continuing. The findings of the assessment will be used to determine the PPE requirements for dust conditions above 1.0 mg/m^3.

Although organic substances have not been identified as substances of concern at the Site, OV concentrations will be measured in the worker breathing zone during soil sampling, test pit excavation, and drilling for the purpose of monitoring well installation. Background will be determined upwind of the work area on a daily basis. The photoionization detector (PID) will be calibrated daily in accordance with the manufacturer's instructions. Standard operating procedures for an HNu PID are provided in Attachment A-1 of the Site Field Sampling Plan (Appendix A of the Work Plan). As an additional precaution, work will be suspended if OV concentrations exceed background for a sustained period (one minute) in the worker breathing zone (Level II).

9.0 DECONTAMINATION

Personnel decontamination will occur when the potential for the spread of contamination exists. A decontamination station will be established in the contamination reduction zone. The decontamination station will consist of the following:

- Glove wash/rinse, and
- Removal of disposable clothing.

If leather work gloves are worn, these will be managed as disposable clothing.

Decontamination fluids and disposable clothing will be placed in containers for off-Site disposal. Decontamination of heavy equipment (e.g., drill rig) will be performed at a temporary decontamination pad constructed using plastic with wooden framing.

10.0 RESPIRATORY PROTECTION PROGRAM

As respirators are required, a respiratory protection program that meets OSHA Standard 29 CFR 1910.134 will be implemented for Cummings/Riter personnel. The training required by OSHA covers maintenance and cleaning of respirators. Each individual will be responsible for his or her own respirator.

Cummings/Riter personnel will use Mine Safety Appliances Company (MSA) respiratory equipment. The air-purifying cartridges will be the high-efficiency OV type. Subcontractors will use the respiratory equipment that they have been trained to use.

Respirators will be stored in a clean, sanitary area, protected against mechanical damage, dust, heat, extreme cold, excessive moisture, or damage by chemical contact.

11.0 HEAT/COLD STRESS

Depending on when the field activities take place, hot and cold weather conditions are a concern for employee health and safety.

Various control measures shall be employed if heat stress becomes a problem. These include:

- Provision for liquids to replace body fluids;
- Establishment of a work regimen that allows for rest periods to cool down; and
- Training of workers in the prevention of heat stress.

Cold-related problems may also occur during this project. Employees will be instructed to dress warmly and to avoid getting wet. They will also receive instruction in the recognition of symptoms of cold-related problems (e.g., frostbite).

12.0 REPORTS AND RECORD KEEPING

Records of health and safety activities will be maintained in accordance with OSHA requirements. The records will document air monitoring levels, PPE worn, incidents, and training.

12.1 LOGS AND REPORTS

Logs and reports covering the implementation of the HASP will be maintained. The documentation will include training logs, daily logs, incident reports, and medical and training certificates.

- **TRAINING LOGS** (shall be completed for both initial training and refresher training)
  - employee signature,
  - topics covered,
  - test score,
  - date,
  - time, and
  - signature of trainer(s).

- **DAILY LOGS**
  - date,
  - area (Site-specific) checked,
  - employees in a particular area,
  - equipment utilized by employees and job function,
  - protective clothing and devices worn by employees,
  - area air monitoring results,
  - perimeter air monitoring results, and
  - SHSO signature and date.

- **INCIDENT REPORT**

  Describing injuries, off-Site release or accident as listed in Section 13.1.

- **MEDICAL CERTIFICATES**

  Documenting that a Site employee is in a medical surveillance program and medically able to perform assigned tasks (Section 3.0).

- **TRAINING CERTIFICATES**
  Documenting that employees have received training in accordance with OSHA.

12.2 RECORD KEEPING

Health and safety records will be maintained after completion of the project. Employees will have access to these records as required under state and federal regulations.

13.0 EMERGENCY RESPONSE

Emergency response procedures have been developed to cover extraordinary conditions that may occur during sampling and analysis activities.

13.1 GENERAL RESPONSE CONSIDERATIONS

Emergencies must be dealt with in a manner that minimizes the health and safety risks to Site personnel and the public. Site personnel will not be required to perform emergency-related tasks for which they have not received training.

The following procedures shall be implemented in the event of an emergency:

- First aid or other appropriate initial action will be administered by those closest to the accident/event. This assistance will be coordinated by the ranking individual on Site and will be conducted in a manner so that those rendering assistance are not placed in a situation of unacceptable risk. The primary concern is to avoid placing a greater number of workers in jeopardy.

- Employees shall immediately report accidents and unusual events to:
  - SHSO,
  - Project manager, and
  - Viacom project coordinator.

- The SHSO will decide if off-Site assistance and/or medical treatment are required, and shall be responsible for alerting off-Site authorities and arranging for their assistance.

- The SHSO will provide to the above personnel an Incident Report (Section 12.0) which includes the following:
  - A description of the incident (including date, time, and duration);
  - Date, time, and name of all persons/agencies notified and their response;
  - List of workers who may have been directly or indirectly affected by the incident;
  - List of individuals who may have observed incident; and
  - A description of corrective actions implemented or other resolution of the incident.

- All workers on Site are responsible for conducting themselves in a mature, calm manner in the event of an accident/unusual event. All personnel must conduct themselves in a manner to avoid spreading the danger to themselves and to surrounding workers.

13.2 RESPONSIBILITIES

The SHSO or a designated substitute shall have responsibility for directing response activities in the event of an emergency. He/she will do the following:

- Assess the situation;
- Determine required response measures;
- Notify appropriate response teams;
- Determine and direct on-Site personnel during the emergency; and
- With the Viacom project coordinator, contact and coordinate with government agencies.

The SHSO or a designated substitute shall coordinate response activities with those of public agencies.

Initially, the SHSO or other designated personnel shall be responsible for implementing the emergency response procedures for all personnel and visitors on Site.

- **IMMEDIATE EMERGENCY PHONE NUMBER**

All Emergency Response	911

- **EMERGENCY SUPPORT**

Viacom Project Coordinator (Office)	724-444-0377
Cummings/Riter Office	412-241-4500
Qualisys (Cummings/Riter medical consultants)	800-874-4676
NYSDEC (Division of Environmental Remediation)	518-402-9812

Workers requiring transportation to off-Site emergency medical providers are to be transported via ambulance service. The Site is located in a rural setting on Townley Hill Road, approximately one-half mile west of Breed Hollow Road in Chemung County, New York. Cummings/Riter personnel will have cellular phones for use during emergencies.

If a spill occurs that results in the release of hazardous substances outside the Site perimeter, the federal government has the authority (under the National Oil and Hazardous Substances Contingency Plan) to initiate response activities which are directed by a federal on-scene coordinator (OSC). In the event that such a release occurs, Viacom response activities will be initiated immediately, and will be coordinated with those of the OSC.

13.3 EMERGENCY RESPONSE EQUIPMENT

Before Site operations are initiated, the following emergency equipment will be stored in field vehicles on Site:

- First-aid kit;
- Eye-wash bottles;
- Chemical fire extinguishers, Type ABC, 20 pounds;
- List of persons and phone numbers for emergency notification; and
- Water for washing hands and face.

Other equipment used for the routine implementation of the worker health and safety protection and monitoring programs will be made available as needed to support any emergency response activity.

13.4 ACCIDENTS AND NON-ROUTINE EVENTS

Several types of emergencies are outlined in the following subsections. These are not intended to cover all potential situations, and the corresponding response procedures should not be followed blindly. Every accident is a unique event that must be dealt with by trained personnel working in a calm, controlled manner. In the event of an accident/ unusual event, the prime consideration is to provide the appropriate initial response to assist those in jeopardy without placing additional personnel at an unnecessary risk.

The vast majority of worker injuries on hazardous waste sites are non-chemical in nature. The injuries tend to be sprains, rashes, and lacerations which must be treated promptly. Follow-up care is extremely important to assure that a minor injury or illness does not become aggravated by Site conditions. Employees shall be instructed to report all injuries and illnesses to the SHSO.

13.4.1 Worker Injury

If a person working in an impacted area is physically injured, Red Cross first-aid procedures shall be followed. Depending on the severity of the injury, emergency medical response may be sought. If the employee can be moved, he will be taken to the edge of the work area (on a stretcher, if needed) where impacted clothing can be removed, emergency first aid administered, and transportation to a local emergency medical facility awaited. Directions to the nearest hospital are as follows:

> St. Joseph's Hospital is the identified hospital for the Site. The directions to the hospital are as follows: Exit Site to left (east) on Townley Hill Road, travel approximately one-half mile and turn right onto Breed Hollow Road. Bear left at "T" onto Eacher Hollow Road. At "T" turn right onto Hibbard Road. Turn left onto Sing-Sing Road past the airport and right on Chambers Road to the interchange on Route 17. Take NY Route 17 east, exit at Church Street (Highway 56) to west, proceed four blocks to hospital on left (555 East Market Street).

If a worker can only be moved by emergency medical personnel, the SHSO will decide what PPE is required to be worn by emergency personnel.

If the injury to the worker is chemical in nature (e.g., overexposure), the following first-aid procedures are generally instituted as soon as possible:

- **EYE EXPOSURE**
  If impacted solid or liquid gets into the eyes, wash eyes immediately at the emergency eye-wash station using large amounts of water and lifting the lower and upper lids occasionally. Obtain medical attention immediately.

- **SKIN EXPOSURE**
  If impacted solid or liquid gets on the skin, take appropriate actions (i.e., do not use water if substance is water reactive). Obtain medical attention immediately if symptoms warrant.

- **INHALATION**
  If a person inhales large amounts of OV, move him to fresh air at once. If breathing has stopped, perform artificial respiration. Keep the affected person warm and at rest. Obtain medical attention as soon as possible.

- **INGESTION**
  If impacted solid or liquid is swallowed, medical attention shall be obtained immediately.

The SHSO shall inform the project manager and the Viacom project coordinator of the injury/accident, and a written report detailing the accident, its causes, and consequences shall be submitted to the project manager and Viacom project coordinator within two working days of the incident resolution.

13.4.2 Fires

In the event of a fire at the Site, the SHSO shall, at a minimum, take the following actions:

- Evacuate all unnecessary personnel from the area to an upwind location, if possible;
- Attempt, using properly protected and trained personnel, to extinguish fire using portable fire extinguishers or by smothering;
- Request emergency response assistance (ambulance, fire, hospital, poison control center) as needed for any injuries or exposures to hazardous chemicals; and
- Notify the project manager and Viacom project coordinator of the incident.

13.5 SITE EMERGENCY

Procedures for emergency evacuation will be established for work areas even though the contaminants being handled and the procedures employed make this an extremely unlikely occurrence.

ATTACHMENT C-1

MATERIAL SAFETY DATA SHEETS

Genium Publishing Corporation
One Genium Plaza
Schenectady, NY 12304-4690 USA
(518) 377-8854

Material Safety Data Sheets Collection:

Sheet No. 7
Nitric Acid

Issued: 10/88 Revision: D, 9/92

Section 1. Material Identification

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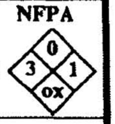
Nitric Acid (HNO_3) Description: A solution of nitrogen dioxide in water commercially available in many concentrations. Derived by oxidation of ammonia by catalytic process (heated platinum catalyst); or by direct synthesis, combining atmospheric nitrogen and oxygen in an electric arc (an expensive process, thus largely abandoned). HNO_3 is usually found in conjunction with nitrogen dioxide, which is considered more hazardous. Used in fertilizer production (ammonium nitrate), in photoengraving, steel etching, explosives (TNT, nitroglycerin, trinitrophenol); manufacture of metallic nitrates, sulfuric acid, aqua regia and oxalic acid, jewelry, various dyes and dyestuffs, pharmaceuticals; as a laboratory reagant, in metallurgy (*mainly* as a pickling agent) and the printing industy.
Other Designations: CAS No. 7697-37-2, aqua fortis, aqua regia, azotic acid, engravers nitrate, hydrogen nitrate, red fuming nitric acid (RFNA), white fuming nitric acid (WFNA).
Manufacturer: Contact your supplier or distributor. Consult latest *Chemical Week Buyers' Guide*(73) for suppliers list.

Cautions: Nitric acid is a corrosive, strong oxidizer that causes irritation or severe burns to the skin, eyes, and respiratory tract. Exposures to high levels of the concentrated acid can be fatal. Increases the flammability of combustibles. Use extreme caution when handling HNO_3.

					NFPA
R	2	HMIS		*Fuming* nitric acid	
I	4	H	3*		
S	4	F	0		
K	0	R	1		
		PPE**			
R	2	HMIS		*> 40%* nitric acid	
I	4	H	3*		
S	4	F	0		
K	0	R	1		
		PPE**			
R	2	HMIS		*≤ 40%* nitric acid	
I	3	H	3*		
S	3	F	0		
K	0	R	0		
		PPE**			

* Chronic effects ** See Sec. 8

Section 2. Ingredients and Occupational Exposure Limits

Nitric acid, various %. Commercially available in nearly all concentrations; most common are 56 and 68%. RFNA (85%), WFNA (97.5%).

1991 OSHA PELs
8-hr TWA: 2 ppm (5 mg/m^3)
15-min STEL: 4 ppm (10 mg/m^3)

1990 IDLH Level
100 ppm

1990 NIOSH REL
8-hr TWA: 2 ppm (5 mg/m^3)
15-min STEL: 4 ppm (10 mg/m^3)

1992-93 ACGIH TLVs
TWA: 2 ppm (5.2 mg/m^3)
STEL: 4 ppm (10 mg/m^3)

1990 DFG (Germany) MAK
2 ppm (5 mg/m^3)
Category I: local irritants
Peak Exposure Limit: 2 ppm
5 min momentary value, 8 per shift

1985-86 Toxicity Data*
Man, unreported route, LD_{Lo}: 110 mg/kg; toxic effects not yet reviewed
Rat, oral, TD_{Lo}: 5275 g/kg administered from 1 to 21 days of pregnancy caused post-implantation mortality and specific developmental abnormalities of the musculoskeletal system.
Rat, inhalation, LC_{50}: 67 ppm (NO_2)/4 hr; toxic effects not yet reviewed

* See NIOSH, *RTECS* [QU5775000 (nitric acid), QU5900000 (RFNA), QU6000000 (WFNA)], for additional reproductive and toxicity data.

Section 3. Physical Data

Boiling Point: 186.8 °F (86 °C)
Melting Point: -43.6 °F (-42 °C)
Vapor Pressure: 67% HNO_3 = 6.8 mm Hg at 68 °F (20 °C); 95 to 98% = 113 at 100.4 °F (38 °C)
Saturated Vapor Density (Air = 1.2 kg/m^3): 1.212 kg/m^3 or 0.0757 lb/ft^3 (67 % HNO_3)
pH: 1

Molecular Weight: 63.02
Density: 1.50269 at 77/39.2 °F (25/4 °C)
Water Solubility: Soluble (releases heat)
Ionization Potential: 11.95 eV

Appearance and Odor: Transparent, clear to yellow, fuming liquid with an acrid, suffocating odor which darkens to a brownish color on aging and exposure to light. "Fuming" nitric acid is red-brown in color.

Section 4. Fire and Explosion Data

Flash Point: Noncombustible	**Autoignition Temperature:** Noncombustible	**LEL:** None reported	**UEL:** None reported

Extinguishing Media: For small fires (< 40% HNO_3), use dry chemical, carbon dioxide (CO_2), water spray, or regular foam. For large fires, use water spray, fog, or regular foam. For small fires (> 40% HNO_3), use water spray, dry chemical, or soda ash. For large fires, flood area with water (*do not* get inside HNO_3 containers). Apply water from as far a distance as possible.
Unusual Fire or Explosion Hazards: HNO_3 is noncombustible but is an oxidizer which increases fire involving combustibles and can initiate an explosion. It releases flammable hydrogen gas in contact with many metals.
Special Fire-fighting Procedures: Because fire may produce toxic thermal decomposition products, wear a self-contained breathing apparatus (SCBA) with a full facepiece operated in pressure-demand or positive-pressure mode. Structural firefighters' protective clothing is not effective for fires involving nitric acid. Acid-resistant clothing is needed. Apply cooling water to sides of containers until well after fire is out. Stay away from ends of tanks. For massive fire in cargo area, use monitor nozzles or unmanned hose holders; if impossible, withdraw from area and let fire burn. *Do not* release runoff from fire control methods to sewers or waterways.

Section 5. Reactivity Data

Stability/Polymerization: Nitric acid decomposes in air and in contact with light and organic matter. Hazardous polymerization cannot occur.
Chemical Incompatibilities: Nitric acid reacts explosively with combustibles, organics or readily oxidizable materials such as wood, turpentine, metal powder and hydrogen sulfide, carbides, cyanides, and alkalies; causes spattering with strong bases; is corrosive to paper, cloth and most metals (except aluminum, gold, platinum, thorium, and tantalum. Will also attack some forms of plastics, rubber, and coatings. There are at least 150 chemicals and chemical combinations which are incompatible with nitric acid. HNO_3 reacts with water to produce heat and toxic corrosive fumes. Refer to *Genium* references 126 and 159 for further detail. **Conditions to Avoid:** Avoid exposure to moisture, heat, and incompatibles.
Hazardous Decomposition Products: Thermal oxidative decomposition of HNO_3 produces nitrogen peroxide and toxic, irritating nitrogen oxides.

Section 6. Health Hazards Data

Carcinogenicity: The IARC,(164) NTP,(169) and OSHA(164) do not list nitric acid as a carcinogen.
Summary of Risks: Nitric acid is very corrosive to the skin, eyes, digestive and respiratory tract or any tissue it comes in contact with. 58 to 68% (nitric acid) vapors are moderately irritating and can't be tolerated at high concentrations. 95% (nitric acid) vapors cause severe irritation at very low levels and the liquid causes 2nd and 3rd degree burns on short contact with skin or eyes. Vapor inhalation may cause pulmonary edema (fluid in lungs) leading to death. HNO_3 vapor or mist can slowly corrode teeth when chronically exposed. **Medical Conditions Aggravated by Long-Term Exposure:** Chronic respiratory diseases. **Target Organs:** Eyes, skin, respiratory tract, teeth.

Continue on next page

ection 6. Health Hazard Data, continued

rimary Entry Routes: Inhalation, ingestion, skin and eye contact. **Acute Effects:** Inhalation symptoms may take several hours and include throat d nose irritation, cough, chest pain, difficulty breathing, salivation, giddiness, nausea, muscular weakness, ulceration of nasal mucous membranes, lmonary edema, and chemical pneumonia. Skin contact is moderately irritating to severely corrosive depending on % of nitric acid. Burns may netrate deeply causing ulcers. Skin may be stained yellowish brown. Dilute solutions cause irritation and tend to harden the epithelium (outer skin yer) without destroying it. HNO_3 liquid causes yellow discoloration of the eyes and severe burns which may result in permanent damage, i.e., sight ss. Ingestion produces immediate pain and digestive tract burns followed by throat swelling, convulsions, risk of stomach perforation (causing a rigid domen) and possible coma. **Chronic Effects:** Repeated inhalation of low concentrations may cause chronic bronchitis, tooth erosion, and/or ppetite loss. Repeated exposure to $NO_{(x)}$ such as produced by thermal decomposition of HNO_3 is implicated in chronic lung diseases.

IRST AID

yes: *Do not* allow victim to rub or keep eyes tightly shut. Gently lift eyelids and flush immediately and continuously with flooding amounts of water ntil transported to an emergency medical facility. Consult a physician immediately. **Skin:** *Quickly* remove contaminated clothing (*do not force emoval if stuck to skin*). Rinse with flooding amounts of water for at least 15 min. Apply a 5% triethanolamine solution to affected area. Wash xposed area with soap and water. For reddened or blistered skin, consult a physician. **Inhalation:** Remove exposed person to fresh air and support reathing as needed. **Ingestion:** Never give anything by mouth to an unconscious or convulsing person. Contact a poison control center. Unless the oison control center advises otherwise, have that *conscious and alert* person drink 1 to 2 glasses of water to dilute followed by lime milk or milk of agnesia. Do not induce vomiting. *Do not* give sodium bicarbonate or attempt to neutralize the acid.

fter first aid, get appropriate in-plant, paramedic, or community medical support.

ote to Physicians: Observe for several hours since symptoms such as pulmonary edema may be delayed.

ection 7. Spill, Leak, and Disposal Procedures

pill/Leak: Immediately notify safety personnel, isolate and ventilate area, deny entry, and stay upwind. Cleanup personnel should wear fully-ncapsulating vapor-protective clothing. Use water spray to cool and disperse vapor. Keep combustibles away from spilled material. For small spills, ke up with earth, sand, vermiculite, or other absorbent, noncombustible material and place in dry containers for disposal. For large spill, flush with ater to containment area and neutralize with agricultural (slaked) lime, sodium bicarbonate, crushed limestone, soda ash, or lime. Report any release excess of 1000 lb. Control runoff and dike for disposal. Follow applicable OSHA regulations (29 CFR 1910.120).

isposal: Contact your supplier or a licensed contractor for detailed recommendations. Follow applicable Federal, state, and local regulations.

PA Designations

isted as a SARA Toxic Chemical (40 CFR 372.65)

isted as a SARA Extremely Hazardous Substance (40 CFR 355), TPQ: 1000 lb

isted as a RCRA Hazardous Waste (40 CFR 261.22): No. D001, Characteristic of corrosivity

isted as a CERCLA Hazardous Substance* (40 CFR 302.4): Final Reportable Quantity (RQ), 1000 lb (454 kg) [* per CWA, Sec. 311(b)(4)]

OSHA Designations

Listed as an Air Contaminant (29 CFR 1910.1000, Table Z-1-A)

Listed as a Process Safety Hazardous Chemical (29 CFR 1910.119), TQ: 500 lb

ection 8. Special Protection Data

oggles: Wear protective eyeglasses or chemical safety goggles, per OSHA eye- and face-protection regulations (29 CFR 1910.133). Because contact ens use in industry is controversial, establish your own policy. **Respirator:** Seek professional advice prior to respirator selection and use. Follow SHA respirator regulations (29 CFR 1910.134) and, if necessary, wear a MSHA/NIOSH-approved respirator. Select respirator based on its suitability o provide adequate worker protection for given working conditions, level of airborne contamination, and presence of sufficient oxygen. For < 50 ppm, se any supplied-air respirator operated in a continuous-flow mode. For < 100 ppm, use any supplied-air respirator or SCBA with a full facepiece. For mergency or nonroutine operations (cleaning spills, reactor vessels, or storage tanks), wear an SCBA. *Warning! Air-purifying respirators do not rotect workers in oxygen-deficient atmospheres.* If respirators are used, OSHA requires a written respiratory protection program that includes at least: nedical certification, training, fit-testing, periodic environmental monitoring, maintenance, inspection, cleaning, and convenient, sanitary storage areas. **ther:** Wear acid-proof gloves, boots, aprons, and gauntlets to prevent skin contact. **Ventilation:** Provide general and local exhaust ventilation systems o maintain airborne concentrations below OSHA PELs (Sec. 2). Local exhaust ventilation is preferred because it prevents contaminant dispersion into he work area by controlling it at its source.(103) **Safety Stations:** Make available in the work area emergency eyewash stations, safety/quick-drench howers, and washing facilities. **Contaminated Equipment:** Separate contaminated work clothes from street clothes. Launder contaminated work lothing before wearing. Remove this material from your shoes and clean personal protective equipment. **Comments:** Never eat, drink, or smoke in ork areas. Practice good personal hygiene after using this material, especially before eating, drinking, smoking, using the toilet, or applying cosmetics.

ection 9. Special Precautions and Comments

torage Requirements: Prevent physical damage to containers. Store in aluminum, stainless steel, or glass containers on a cement floor in a cool, dry, ell-ventilated area away from incompatibles (Sec. 5). Dike around storage tanks with large kirbs or stills to retain the acid in event of leakage. Keep eutralization agents on hand and install a fire hydrant in storage area. (See NFPA Code 43A). **Engineering Controls:** To reduce potential health azards, use sufficient dilution or local exhaust ventilation to control airborne contaminants and to maintain concentrations at the lowest practical level. **Administrative Controls:** Consider preplacement and periodic medical exams of exposed workers that emphasize the eyes, skin, respiratory tract and eeth. Pulmonary function tests (FEV< FVC) are helpful. Educate workers about the hazardous properties of nitric acid.

Transportation Data (49 CFR 172.101)

DOT Shipping Name: *, †, ‡, §, ¥, ψ, ϕ
DOT Hazard Class: 8

ID No.: UN1826 (*†), UN1796 (‡§), UN2031 (¥ψ), UN2032 (ϕ)
DOT Packing Group: I (†§¥ϕ), II (*‡ψ)

DOT Packaging Label: Corrosive (*‡¥ψ), Corrosive, Oxidizer (†§), Corrosive, Oxidizer, Poison (ϕ)
Special Provisions (172.102): B2, T12, T27 (*); T12, T27 (†); B2, T12, T27 (‡); T12, T27 (§); B12, B53, T9, T27 (¥); B2, B12, B53, T9, T27(ψ); 2, B9, B32, B74, T38, T43, T45(ϕ)

* Nitrating acid mixtures spent, < 50% HNO_3
† Nitrating acid mixtures spent, > 50% HNO_3
‡ Nitrating acid mixtures, < 50% HNO_3
§ Nitrating acid mixtures, > 50% HNO_3
¥ Nitric acid other than red fuming, > 70% HNO_3
ψ Nitric acid other than red fuming, < 70% HNO_3
ϕ Nitric acid, red fuming.

Packaging Authorizations
a) Exceptions: None
b) Non-bulk Packaging: 173.158 (*†‡§¥ψ), 173.227 (ϕ)
c) Bulk Packaging: 173.242 (*‡ψ), 173.243 (†§¥), 173.244(ϕ)

Quantity limitations
a) Passenger Aircraft or Railcar: Forbidden
b) Cargo Aircraft Only: 30L (*‡ψ), 2.5L (†§¥), Forbidden (ϕ)

Vessel Stowage Requirements
a) Vessel stowage: D
b) Other: 40(*); 40, 66, 89 (†); 40 (‡); 40, 66, 89 (§); 110, 111 (¥); 110, 111 (ψ); 40, 66, 74, 89, 90, 95 (ϕ)

MSDS Collection **References:** 26, 73, 89, 100, 101, 103, 124, 126, 127, 132, 136, 139, 140, 148, 149, 153, 159, 162, 163, 164, 167, 168, 171, 174, 175

Prepared by: M Gannon, BA; **Industrial Hygiene Review:** PA Roy, MPH, CIH; **Medical Review:** W Silverman, MD

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Material Safety Data Sheets Collection:

Sheet No. 30A
Hydrochloric Acid
Issued: 10/77 Revision: C, 9/92 Erratum: 5/93

Section 1. Material Identification

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Hydrochloric Acid (HCl) Description: An aqueous solution of hydrogen chloride. Derived by dissolving hydrogen chloride gas in water at various concentrations. Hydrochloric acid is also formed as a byproduct from oxychlorination and/or oxyhydrochlorination of organic materials. Used in metal pickling and cleaning (boiler and heat exchange equipment scale removal), ore reduction, processing (corn syrup, hydrolyzing starch), dye and dye intermediate production, electroplating, leather tanning, in fertilizer, artificial silk, and paint pigment production, refining soaps and edible fats and oils, petroleum extraction, toilet bowl cleaners; as an alcohol denaturant, a chemical intermediate and solvent in organic synthesis, and in the photographic, textile, and rubber industries.
Other Designations: CAS No. 7647-01-0, Caswell No. 486, chlorohydric acid, Muriatic acid, spirits of salt.
Manufacturer: Contact your supplier or distributor. Consult latest *Chemical Week Buyers' Guide*(73) for a suppliers list.

Cautions: Hydrochloric acid is highly corrosive and causes serious skin and eye burns as well as acute and chronic respiratory problems.

R 1
I 4
S 4
K 0

NFPA

HMIS
H 2*
F 0
R 0
PPE†
* Chronic effects
† Sec. 8

Section 2. Ingredients and Occupational Exposure Limits

Hydrochloric acid; ~38% (commercial), 20% ("azeotrope"). Trace impurities include ammonia, arsenic, iron, sulfate, free Cl-, and heavy metals.

1991 OSHA PEL
Ceiling: 5 ppm (7 mg/m³)

1990 IDLH Level
100 ppm

1990 NIOSH REL
Ceiling: 5 ppm (7 mg/m³)

1992-93 ACGIH TLV
Ceiling: 5 ppm (7.5 mg/m³)

1990 DFG (Germany) MAK
Ceiling: 5 ppm (7 mg/m³)
Category 1: local irritants
Peak Exposure Limit: 10 ppm, 5 min momentary value/8 per shift

1985-86 Toxicity Data*
Human, inhalation, LC_{Lo}: 1300 ppm/30 min; toxic effects not yet reviewed
Rabbit, oral, LD_{50}: 900 mg/kg; toxic effects not yet reviewed
Rat, inhalation, TC_{Lo}: 450 mg/m³/1 hr (1 day prior to pregnancy) produced fetotoxicity (except death) & specific developmental abnormalities (homeostasis).
Rabbit, eye: 100 mg rinse caused mild irritation.

*See NIOSH, *RTECS* (MW4025000), for additional irritation, reproductive, and toxicity data.

Section 3. Physical Data

Boiling Point: -120.64 °F (-84.8 °C)*
Vapor Pressure: 4 atm at 64 °F (17.8 °C)
Vapor Density (Air = 1): 1.257
Surface Tension: 23 at 244.68 (118.16 °C)
Molecular Weight: 36.46
Odor Threshold: 0.1 to 5 ppm
Ionization Potential: 12.74 eV

Freezing Point: 1.1 °F (-17.14 °C) for 10.81%, -51.16 °F (-46.2 °C) for 31.24%
Density: 1.194 at -14.8 °F (-26 °C)
Water Solubility: Soluble, 823 g/L at 32 °F (0 °C); 561 g/L at 140 °F (60 °C).
Other Solubilities: Soluble in alcohol, benzene, and ether; insoluble in hydrocarbons.
pH: 1N (0.1), 0.1N (1.1), 0.01N (2.02), 0.001N (3.02), 0.0001N (4.01)
Refraction Index (1N solution): 1.34168 at 64.4 °F (18 °C/D)

Appearance and Odor: Colorless liquid that fumes in air and has a strong pungent odor. Can be slightly yellow from traces of iron, chlorine, or organic matter. Forms a constant boiling azeotrope at 20 % HCl, 108.58 °C and 760 mm Hg.

* Decomposes at 3239.6 °F (1782 °C).

Section 4. Fire and Explosion Data

Flash Point: Noncombustible	**Autoignition Temperature:** None reported	**LEL:** None reported*	**UEL:** None reported*

Extinguishing Media: Use extinguishing agents suitable for surrounding fire.
Unusual Fire or Explosion Hazards: *Extreme heat or contact with many metals liberates hydrogen gas which has explosion limits of 4 to 75%.
Special Fire-fighting Procedures: Because fire may produce toxic thermal decomposition products, wear a self-contained breathing apparatus (SCBA) with a full facepiece operated in pressure-demand or positive-pressure mode. Structural firefighter's protective clothing is *ineffective* for fires involving hydrochloric acid. Stay away from ends of tanks. Cool tanks with water spray until well after fire is out. *Do not* release runoff from fire control methods to sewers or waterways.

Section 5. Reactivity Data

Stability/Polymerization: Hydrochloric acid has high thermal stability (decomposes at 3239.6 °F/1782 °C). Hazardous polymerization does not occur unless exposed to aldehydes or epoxides.
Chemical Incompatibilities: Polymerizes on contact with aldehydes or epoxides; attacks most metals (except mercury, silver, gold, platinum, tantalum, and some alloys), some plastics, rubber, and coatings; reacts explosively with alcohols + hydrogen cyanide, potassium permanganate, tetraselenium tetranitride; ignites on contact with fluorine, hexalithium disilicide, metal acetylides or carbides (cesium acetylide, rubidium acetylide); and is incompatible with acetic anhydride, 2-amino ethanol, ammonium hydroxide, calcium phosphide, chlorosulfonic acid, 1,1-difluoroethylene, ethylene diamine, ethylene imine, oleum, perchloric acid, ß-propiolacetone, propylene oxide, sodium hydroxide, silver perchlorate + carbon tetrachloride, sulfuric acid, uranium phosphide, acetate, calcium carbide, magnesium bromide, mercuric sulfate, and chlorine + dinitroaniline.
Conditions to Avoid: Avoid contact with incompatibles.
Hazardous Products of Decomposition: Thermal oxidative decomposition of HCl produces toxic chloride fumes and explosive hydrogen gas.

Section 6. Health Hazard Data

Carcinogenicity: The IARC,(164) NTP,(169) and OSHA(164) do not list HCl as a carcinogen.
Summary of Risks: HCl is a highly corrosive liquid and depending on concentration and duration of exposure, symptoms range from irritation to ulcerations and permanent injury. **Target Organs:** Eyes, skin, respiratory tract, and liver (in animals). **Primary Entry Routes:** Inhalation, skin and eye contact. **Medical Conditions Aggravated by Long-Term Exposure:** Respiratory disorders.

Continue on next page

Section 6. Health Hazard Data, *continued*

Acute Effects: Inhalation of vapors or mists is corrosive to the respiratory tract and can cause tracheal and bronchial epithelium necrosis (tissue death), cough, choking, ulceration. Liquid aspiration can cause pulmonary edema, lung collapse, emphysema and damage to the pulmonary blood vessels. Skin contact with HCl solutions causes burns and ulcerations. Permanent eye damage may result from splashes. Ingestion is unlikely but if it occurs, symptoms include gray tongue color, corrosion of mucous membranes, esophagus, and stomach, nausea, vomiting, intense thirst, diarrhea, difficulty swallowing, circulatory collapse and possible death. **Chronic Effects:** Repeated or prolonged exposure can cause dermatitis, conjunctivitis, gastritis, photosensitization, tooth erosion, and repeated exposure to mists from heated-metal pickling solutions can cause nose and gum bleeds, ulceration of oral or nasal mucosa, and "renders facial skin so tender that shaving is painful."(133)

FIRST AID

Eyes: *Do not* allow victim to rub or keep eyes tightly shut. Gently lift eyelids and flush immediately and continuously with flooding amounts of water until transported to an emergency medical facility. Consult a physician immediately. **Skin:** *Quickly* remove contaminated clothing. Rinse with flooding amounts of water for at least 15 min. Treat skin with a 5% triethanolamine solution. For reddened or blistered skin, consult a physician. **Inhalation:** Remove exposed person to fresh air and support breathing as needed. **Ingestion:** Never give anything by mouth to an unconscious or convulsing person. Contact a poison control center. Unless the poison control center advises otherwise, have that *conscious and alert* person drink 1 to 2 glasses of water to dilute. *Do not* induce vomiting!

After first aid, get appropriate in-plant, paramedic, or community medical support.

Note to Physicians: Consider a chest x-ray in acute overexposure.

Section 7. Spill, Leak, and Disposal Procedures

Spill/Leak: Notify safety personnel, isolate and ventilate area, deny entry, and stay upwind. Neutralize spills with crushed limestone, soda ash, lime, or sodium bicarbonate. After neutralizing, take up small spills with earth, sand, vermiculite, or other absorbent, noncombustible material and place in suitable containers for disposal; flush large spills to containment area and reclaim (if possible) or await disposal. Follow applicable OSHA regulations (29 CFR 1910.120). **Environmental Transport:** In soil, HCl will infiltrate moving faster in the presence of moisture. It may dissolve some soil matter, particularly those of a carbonate base will be neutralized to some degree and will be transported to groundwater. **Ecotoxicity Values:** Chronic plant toxicity = 100 ppm; injurious to irrigatable crops at 350 mg/L; trout, LC_{100}, 10 mg/L/24 hr shrimp, LC_{50}, 100 to 330 ppm/starfish, LC_{50}, 100 to 330 mg/L/48 hr; shore crab, LC_{50}, 240 mg/L/48 hr. **Disposal:** Neutralize to between 5.5 & 8.5 before disposal. Contact your supplier or a licensed contractor for detailed recommendations. Follow applicable Federal, state, and local regulations.

EPA Designations

Listed as a RCRA Hazardous Waste (40 CFR 261.23, *0.01N solution or higher*): No. D002, Characteristic of corrosivity
Listed as a CERCLA Hazardous Substance* (40 CFR 302.4): Final Reportable Quantity (RQ), 5000 lb (2270 kg) [* per CWA, Sec. 311 (b)(4)]
SARA Extremely Hazardous Substance (40 CFR 355), TPQ: Not listed
Listed as a SARA Toxic Chemical (40 CFR 372.65)

OSHA Designations

Listed as an Air Contaminant (29 CFR 1910.1000, Table Z-1-A)

Section 8. Special Protection Data

Goggles: Wear chemical safety goggles, per OSHA eye- and face-protection regulations (29 CFR 1910.133). Because contact lens use in industry is controversial, establish your own policy. **Respirator:** Seek professional advice prior to respirator selection and use. Follow OSHA respirator regulations (29 CFR 1910.134) and, if necessary, wear a MSHA/NIOSH-approved respirator. For < 50 ppm, use a cartridge respirator with acid gas cartridges, or any supplied-air respirator (SAR) or SCBA. For < 100 ppm, use any chemical cartridge respirator with a full facepiece and cartridge that protects against HCl inhalation, or any SAR or SCBA with a full facepiece. For emergency or nonroutine operations (cleaning spills, reactor vessels, or storage tanks), wear an SCBA. *Warning! Air-purifying respirators do not protect workers in oxygen-deficient atmospheres.* If respirators are used, OSHA requires a written respiratory protection program that includes at least: medical certification, training, fit-testing, periodic environmental monitoring, maintenance, inspection, cleaning, and convenient, sanitary storage areas. **Other:** Wear chemically protective gloves, boots, aprons, and gauntlets to prevent skin contact. Polycarbonate, butyl rubber, polyvinyl chloride, and chlorinated polyethylene are recommended materials for PPE. Polyvinyl alcohol is not recommended. **Ventilation:** Provide general and local exhaust ventilation systems to maintain airborne concentrations below the OSHA PEL (Sec. 2). Local exhaust ventilation is preferred because it prevents contaminant dispersion into the work area by controlling it at its source.(103) **Safety Stations:** Make available in the work area emergency eyewash stations, safety/quick-drench showers, and washing facilities. **Contaminated Equipment:** Separate contaminated work clothes from street clothes. Launder contaminated work clothing before wearing. Remove this material from your shoes and clean personal protective equipment. **Comments:** Never eat, drink, or smoke in work areas. Practice good personal hygiene after using this material, especially before eating, drinking, smoking, using the toilet, or applying cosmetics.

Section 9. Special Precautions and Comments

Storage Requirements: Prevent physical damage to containers. Store in a cool, dry, well-ventilated area on a cement floor away from direct sunlight and heat sources. Use decanting pumps or pouring frames to minimize spillage during loading and unloading operations.

Engineering Controls: To reduce potential health hazards, use sufficient dilution or local exhaust ventilation to control airborne contaminants and to maintain concentrations at the lowest practical level. HCl should be manufactured in closed systems. Pay close attention to leak detection. Aqueous scrubbers are used to control hydrogen chloride emissions from vent stacks and other sources. Workers shouldn't enter tanks previously containing HCl until they have been cleaned.

Administrative Controls: Consider preplacement and periodic medical exams of exposed workers with emphasis on the eyes, skin, and respiratory tract. Pulmonary function tests (FEV, FVC) are useful in determining lung disorders. Conduct difficult operations in fume hoods.

Transportation Data (49 CFR 172.101)

DOT Shipping Name: Hydrochloric acid, solution
DOT Hazard Class: 8
ID No.: UN1789
DOT Label: Corrosive
DOT Packing Group: II
Special provisions (172.102): A3, A6, B2, B15, N41, T9, T27

Packaging Authorizations
a) Exceptions: 173.154
b) Non-bulk Packaging: 173.202
c) Bulk Packaging: 173.242

Quantity limitations
a) Passenger, Aircraft, or Railcar: 1 L
b) Cargo Aircraft Only: 30 L

Vessel Stowage Requirements
a) Vessel Stowage: C
b) Other: 8

***MSDS Collection* References:** 26, 73, 89, 100, 101, 103, 124, 126, 127, 132, 133, 136, 139, 148, 149, 153, 159, 163, 164, 167, 168, 171, 174, 180
Prepared by: M Gannon, BA; **Industrial Hygiene Review:** DJ Wilson, CIH; **Medical Review:** AC Darlington, MPH, MD

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Material Safety Data Sheets Collection:

Sheet No. 354
Methyl Alcohol

Issued: 11/77 Revision: D, 11/91

Section 1. Material Identification

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Methyl alcohol (CH_3OH) Description: Derived from destructive distillation of wood, oxidation of hydrocarbons, or high-pressure catalytic synthesis from hydrogen and carbon dioxide or carbon monoxide. Used as a solvent in manufacturing industrial chemicals and chemical pharmaceuticals, a raw material for making formaldehyde and methyl esters, a softening agent for pyroxylin plastics, a dehydrator for natural gas, a feedstock for manufacturing synthetic proteins by continuous fermentation, an octane booster in gasoline, an extractant for animal and vegetable oils; in antifreeze for automotive radiators, air brakes, gasoline, and diesel oil; and in denaturing ethanol.

Other Designations: CAS No. 67-56-1, carbinol, Columbian spirits, methanol, methyl hydroxide, methylol, monohydroxymethane, pyroxylic spirit, wood alcohol, wood naphtha, wood spirit.

Manufacturer: Contact your supplier or distributor. Consult latest *Chemical Week Buyers' Guide*[(73)] for a suppliers list.

Cautions: Methyl alcohol is moderately toxic by ingestion and mildly toxic by inhalation and skin absorption. It is flammable, volatile, and a dangerous fire hazard.

R 1
I 2
S 1*
K 4
* Skin absorption

NFPA
3
1 0
-

HMIS
H 2
F 3
R 0
PPG†
† Sec. 8

Section 2. Ingredients and Occupational Exposure Limits

Methyl alcohol, ca 100%

1990 OSHA PELs (Skin)
8-hr TWA: 200 ppm (260 mg/m^3)
15-min STEL: 250 ppm (310 mg/m^3)

1990 IDLH Level
25,000 ppm

1991-92 ACGIH TLVs (Skin)
TWA: 200 ppm (262 mg/m^3)
STEL: 250 ppm (328 mg/m^3)

1990 DFG (Germany) MAK
200 ppm (260 mg/m^3)

1990 NIOSH RELs (Skin)
TWA: 200 ppm (260 mg/m^3)
Ceiling: 250 ppm (325 mg/m^3)

1985-86 Toxicity Data*
Human, inhalation, TC_{Lo}: 300 ppm caused eye (visual field change), CNS (headache), and pulmonary effects
Human, oral, LD_{Lo}: 428 mg/kg causes CNS (headache) and pulmonary (respiratory change) effects
Rat, oral, TD_{Lo}: 7500 mg/kg administered continuously to the female during the 17th to 19th day of gestation produced behavioral effects on newborns
Rat, inhalation, TC_{Lo}: 20,000 ppm/7 hr administered continuously to the female during the 1st to 22nd day of gestation produced specific developmental abnormalities

* See NIOSH, *RTECS* (PC1400000), for additional toxicity data.

Section 3. Physical Data

Boiling Point: 148 °F (64.5 °C)
Freezing Point: -144.04 °F (-97.8 °C)
Vapor Pressure: 29 mm Hg at 68 °F (20 °C)
Vapor Density (air = 1): 1.11
Viscosity: 0.00593 P at 68 °F (20 °C)
Molecular Weight: 32.05
Density: 0.7924 at 68 °F (20 °C)
Water Solubility: Soluble
Other Solubilities: Soluble in ethanol, ether, benzene, ketones, and most organic solvents

Appearance and Odor: Clear, colorless, volatile liquid with a slight alcohol odor when pure, a disagreeably pungent odor when crude, and a low 10-ppm odor threshold.

Section 4. Fire and Explosion Data

Flash Point: 54 °F (12 °C), CC	**Autoignition Temperature:** 878 °F (470 °C)	**LEL:** 6% v/v	**UEL:** 36.5% v/v

Extinguishing Media: For small fires, use dry chemical, carbon dioxide (CO_2), water spray, or alcohol-resistant foam. For large fires, use water spray, fog, or alcohol-resistant foam. Do not scatter material with any more water than needed to extinguish fire.

Unusual Fire or Explosion Hazards: Methyl alcohol is a dangerous fire hazard when exposed to heat, flame, or oxidizers. It is explosive in its vapor form when exposed to heat or flame. Vapors may travel to an ignition source and flash back.

Special Fire-fighting Procedures: Since fire may produce toxic thermal decomposition products, wear a self-contained breathing apparatus (SCBA) with a full facepiece operated in pressure-demand or positive-pressure mode. Also, wear full protective clothing. Structural firefighters' protective clothing is *ineffective* for fires involving methyl alcohol. If possible without risk, remove container from fire area. Apply cooling water to sides of fire-exposed container until fire is well out. Stay away from ends of tanks. Leave area immediately if you hear a rising sound from venting safety device or see any tank discoloration due to fire. Be aware of runoff from fire control methods. Do not release to sewers or waterways.

Section 5. Reactivity Data

Stability/Polymerization: Methyl alcohol is stable at room temperature in closed containers under normal storage and handling conditions. Hazardous polymerization cannot occur.

Chemical Incompatibilities: Methyl alcohol is incompatible with beryllium dihydride, metals (such as potassium or magnesium), oxidants (such as barium perchlorate, bromine, chlorine, hydrogen peroxide, and sodium hypochlorite), potassium tertbutoxide, carbon tetrachloride + metals; reacts explosively with chloroform + heat, and diethyl zinc; and reacts violently with alkyl aluminum salts, acetyl bromide, chloroform + sodium hydroxide, cyanuric chloride, and nitric acid.

Conditions to Avoid: Avoid vapor inhalation and contact with oxidizers and other incompatibles.

Hazardous Products of Decomposition: Thermal oxidative decomposition of methyl alcohol can produce carbon oxides (CO and CO_2), possible formaldehyde (HCHO) and acrid smoke, and irritating fumes.

Section 6. Health Hazard Data

Carcinogenicity: In 1990 reports, the IARC, NTP, and OSHA do not list methyl alcohol as a carcinogen.
Summary of Risks: Methyl alcohol is toxic mainly to the nervous system, particularly optic nerves, where damage can progress to permanent blindness. Poisoning may also result in metabolic acidosis. Methyl alcohol oxidizes in the body to form formaldehyde and formic acid. These derivatives are believed responsible for many of methyl alcohol's poisonous and toxic effects. Since it is eliminated slowly from the body, methyl alcohol is considered a cumulative poison. The fatal ingestion dose is 100 to 250 ml, although death is reported from less than 33 ml.
Medical Conditions Aggravated by Long-Term Exposure: None reported
Target Organs: Eyes, central nervous system, skin, and digestive tract.
Primary Entry Routes: Inhalation, ingestion, skin absorption.
Acute effects: Inhalation can cause irritation of eyes and nose, headache, fatigue, nausea, visual impairment (optic nerve neuropathy or visual field changes) or complete and possibly permanent blindness, acidosis, convulsions, circulatory collapse, respiratory failure, and death. Ingestion can cause gastrointestinal (GI) irritation followed by the symptoms described for inhalation and possible kidney impairment. Skin contact results in a feeling of coldness, dryness, and cracking possibly leading to dermatitis. Methyl alcohol can absorb through skin and may cause headache, fatigue, and visual disturbances. Eye contact causes irritation and watering of eyes, inflamed lids, and painful sensitization to light.
Chronic Effects: Chronic inhalation or skin absorption may produce visual impairment or complete blindness.

FIRST AID

Eyes: Gently lift the eyelids and flush immediately and continuously with flooding amounts of water until transported to an emergency medical facility. Do not let victim rub or keep eyes tightly shut. Consult a physician immediately.
Skin: *Quickly* remove contaminated clothing. Since methyl alcohol is volatile and flammable, carefully dispose of contaminated clothing. Rinse with flooding amounts of water for at least 15 min. For reddened or blistered skin, consult a physician. Wash affected area with soap and water.
Inhalation: Remove exposed person to fresh air and support breathing as needed.
Ingestion: Never give anything by mouth to an unconscious or convulsing person. If ingested, have that *conscious and alert* person drink 1 to 2 glasses of water, then induce vomiting.
After first aid, get appropriate in-plant, paramedic, or community medical support.
Note to Physicians: Consider administering 10% ethanol in D5W intravenously to maintain ethyl alcohol blood level at 100 mg/dl. Check formic acid in urine and measure blood pH and plasma bicarbonate. After ingestion, there is typically an 18- to 48-hr latency period before clinical toxicity

Section 7. Spill, Leak, and Disposal Procedures

Spill/Leak: Notify safety personnel, isolate area, deny entry, and stay upwind. Shut off all ignition sources—no flares, smoking, or flames in hazard area. Cleanup personnel should wear fully encapsulating, vapor-protective clothing for spills or leaks with no fire. Water spray may reduce vapor, but not prevent ignition in closed spaces. For small spills, use nonsparking tools to take up with earth, sand, vermiculite, or other absorbent, noncombustible material and place in suitable containers for later disposal. For large spills, dike far ahead of spill and await disposal. Follow applicable OSHA regulations (29 CFR 1910.120).
Environmental Degradation: Aquatic toxicity rating: TLm 96, over 1000 ppm.
Disposal: Contact your supplier or a licensed contractor for detailed recommendations. Follow applicable Federal, state, and local regulations.

EPA Designations
Listed as a RCRA Hazardous Waste (40 CFR 261.33): Hazardous Waste No. U154
CERCLA Hazardous Substance (40 CFR 302.4): Not listed
SARA Extremely Hazardous Substance (40 CFR 355): Not listed
SARA Toxic Chemical (40 CFR 372.65): Not listed

OSHA Designations
Listed as an Air Contaminant (29 CFR 1910.1000, Table Z-1-A)

Section 8. Special Protection Data

Goggles: Wear protective eyeglasses or chemical safety goggles, per OSHA eye- and face-protection regulations (29 CFR 1910.133). Since contact lens use in industry is controversial, establish your own policy.
Respirator: Seek professional advice prior to respirator selection and use. Follow OSHA respirator regulations (29 CFR 1910.134) and, if necessary, wear a NIOSH-approved respirator. Select the respirator based on its suitability to provide adequate worker protection for the given working conditions, level of airborne contamination, and presence of sufficient oxygen. For emergency or nonroutine operations (cleaning spills, reactor vessels, or storage tanks), wear an SCBA. *Warning! Air-purifying respirators do not protect workers in oxygen-deficient atmospheres.*
Other: Wear impervious gloves, boots, aprons, and gauntlets to prevent all skin contact.
Ventilation: Provide general and local explosion-proof exhaust ventilation systems to maintain airborne concentrations below the OSHA PELs (Sec. 2). Local exhaust ventilation is preferred since it prevents contaminant dispersion into the work area by controlling it at its source.(103)
Safety Stations: Make available in the work area emergency eyewash stations, safety/quick-drench showers, and washing facilities.
Contaminated Equipment: Separate contaminated work clothes from street clothes. Launder contaminated work clothing before wearing. Remove this material from your shoes and clean personal protective equipment.
Comments: Never eat, drink, or smoke in work areas. Practice good personal hygiene after using this material, especially before eating, drinking, smoking, using the toilet, or applying cosmetics.

Section 9. Special Precautions and Comments

Storage Requirements: Avoid physical damage to containers. Store in cool, dry, well-ventilated flammables storage area, away from strong oxidizers and other incompatibles. To prevent static sparks, electrically ground all equipment used in methyl alcohol storage, manufacture, and transportation. Use nonsparking tools.
Engineering Controls: To reduce potential health hazards, use sufficient dilution or local exhaust ventilation to control hazardous airborne contaminants and to maintain concentrations at the lowest practical level.
Other Precautions: Consider preplacement and periodic medical examinations of exposed workers emphasizing neurological, kidney, liver, and visual function. Practice good personal hygiene and housekeeping procedures. If respirators are used, institute a respiratory protection program that includes regular training, maintenance, inspection, and evaluation.

Transportation Data (49 CFR 172.101, .102)

DOT Shipping Name: Methyl alcohol
DOT Hazard Class: Flammable liquid
ID No.: UN1230
DOT Label: Flammable liquid
DOT Packaging Exceptions: 173.118
DOT Packaging Requirements: 173.119

IMO Shipping Name: Methanol
IMO Hazard Class: 3.2
ID No.: UN1230
IMO Label: Flammable Liquid, Poison
IMDG Packaging Group: II

MSDS Collection **References:** 26, 38, 73, 89, 100, 101, 103, 124, 126, 127, 132, 133, 136, 140, 143, 146, 148, 149, 153, 159, 163
Prepared by: M Gannon, BA; **Industrial Hygiene Review:** DJ Wilson, CIH; **Medical Review:** AC Darlington, MD, MPH; **Edited by:** JR Stuart, MS

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Material Safety Data Sheets Collection:

Sheet No. 467
Automotive Gasoline, Lead-free

Issued: 10/81 **Revision: A, 9/91**

Section 1. Material Identification

Automotive Gasoline, Lead-free, Description: A mixture of volatile hydrocarbons composed mainly of branched-chain paraffins, cycloparaffins, olefins, naphthenes, and aromatics. In general, gasoline is produced from petroleum, shale oil, Athabasca tar sands, and coal. Motor gasolines are made chiefly by cracking processes, which convert heavier petroleum fractions into more volatile fractions by thermal or catalytic decomposition. Widely used as fuel in internal combustion engines of the spark-ignited, reciprocating type. Automotive gasoline has an octane number of approximately 90. A high content of aromatic hydrocarbons and a consequent high toxicity are also associated with a high octane rating. Some gasolines sold in the US contain a minor proportion of tetraethyllead, which is added in concentrations not exceeding 3 ml per gallon to prevent engine "knock." However, methyl-tert-butyl ether (MTBE) has almost completely replaced tetraethyllead.

Other Designations: CAS No. 8006-61-9, benzin, gasoline, gasolene, motor spirits, natural gasoline, petrol.

Manufacturer: Contact your supplier or distributor. Consult latest *Chemical Week Buyers' Guide*[73] for a suppliers list.

R	1
I	2
S	2*
K	4

* Skin absorption

NFPA

HMIS

H	2
F	3
R	1
PPG†	

† Sec. 8

Cautions: Inhalation of automotive gasoline vapors can cause intense burning in throat and lungs, central nervous system (CNS) depression, and possible fatal pulmonary edema. Gasoline is a dangerous fire and explosion hazard when exposed to heat and flames.

Section 2. Ingredients and Occupational Exposure Limits

Automotive gasoline, lead-free*

1990 OSHA PELs
8-hr TWA: 300 ppm, 900 mg/m^3
15-min STEL: 500 ppm, 1500 mg/m^3

1990-91 ACGIH TLVs
TWA: 300 ppm, 890 mg/m^3
STEL: 500 ppm, 1480 mg/m^3

1990 NIOSH REL
None established

1985-86 Toxicity Data†
Man, inhalation, TC_{Lo}: 900 ppm/1 hr; toxic effects include sense organs and special senses (conjunctiva irritation), behavioral (hallucinations, distorted perceptions), lungs, thorax, or respiration (cough)
Human, eye: 140 ppm/8 hr; toxic effects include mild irritation
Rat, inhalation, LC_{50}: 300 g/m^3/5 min

* A typical modern gasoline composition is 80% paraffins, 14% aromatics, and 6% olefins. The mean benzene content is approximately 1%. Other additives include sulfur, phosphorus, and MTBE.

† See NIOSH, *RTECS* (LX3300000), for additional toxicity data.

Section 3. Physical Data

Boiling Point: Initially, 102 °F (39 °C); after 10% distilled, 140 °F (60 °C); after 50% distilled, 230 °F (110 °C); after 90% distilled, 338 °F (170 °C); final boiling point, 399 °F (204 °C)

Vapor Density (air = 1): 3.0 to 4.0

Density/Specific Gravity: 0.72 to 0.76 at 60 °F (15.6 °C)

Water Solubility: Insoluble

Appearance and Odor: A clear (gasoline may be colored with dye), mobile liquid with a characteristic odor recognizable at about 10 ppm in air.

Section 4. Fire and Explosion Data

Flash Point: -45 °F (-43 °C)	**Autoignition Temperature:** 536 to 853 °F (280 to 456 °C)	**LEL:** 1.3% v/v	**UEL:** 6.0% v/v

Extinguishing Media: Use dry chemical, carbon dioxide, or alcohol foam as extinguishing media. Use of water may be ineffective to extinguish fire, but use water spray to knock down vapors and to cool fire-exposed drums and tanks to prevent pressure rupture. Do not use a solid stream of water since it may spread the fuel.

Unusual Fire or Explosion Hazards: Automobile gasoline is an OSHA Class IB flammable liquid and a dangerous fire and explosion hazard when exposed to heat and flames. Vapors can flow to an ignition source and flash back. Automobile gasoline can also react violently with oxidizing agents.

Special Fire-fighting Procedures: Isolate hazard area and deny entry. Since fire may produce toxic fumes, wear a self-contained breathing apparatus (SCBA) with a full facepiece operated in pressure-demand or positive-pressure mode, and full protective clothing. When the fire is extinguished, use nonsparking tools for cleanup. Be aware of runoff from fire control methods. Do not release to sewers or waterways.

Section 5. Reactivity Data

Stability/Polymerization: Automotive gasoline is stable at room temperature in closed containers under normal storage and handling conditions. Hazardous polymerization cannot occur.

Chemical Incompatibilities: Automotive gasoline can react with oxidizing materials such as peroxides, nitric acid, and perchlorates.

Conditions to Avoid: Avoid heat and ignition sources.

Hazardous Products of Decomposition: Thermal oxidative decomposition of automotive gasoline can produce oxides of carbon and partially oxidized hydrocarbons.

Section 6. Health Hazard Data

Carcinogenicity: In 1990 reports, the IARC list gasoline as a possible human carcinogen (Group 2B). Although the IARC has assigned an overall valuation to gasoline, it has not assigned an overall evaluation to specific substances within this group (inadequate human evidence).
Summary of Risks: Gasoline vapors are considered moderately poisonous. Vapor inhalation can cause central nervous system (CNS) depression nd mucous membrane and respiratory tract irritation. Brief inhalations of high concentrations can cause a fatal pulmonary edema. Reported esponses to gasoline vapor concentrations are: 160 to 270 ppm causes eye and throat irritation in several hours; 500 to 900 ppm causes eye, nose, and throat irritation, and dizziness in 1 hr; and 2000 ppm produces mild anesthesia in 30 min. Higher concentrations are intoxicating in 4 to 10 minutes. If large areas of skin are exposed to gasoline, toxic amounts may be absorbed. Repeated or prolonged skin exposure causes dermatitis. Certain individuals may develop hypersensitivity. Ingestion can cause CNS depression. Pulmonary aspiration after ingestion can cause severe pneumonitis. In adults, ingestion of 20 to 50 g gasoline may produce severe symptoms of poisoning.
Medical Conditions Aggravated by Long-Term Exposure: None reported.
Target Organs: Skin, eye, respiratory and central nervous systems.
Primary Entry Routes: Inhalation, ingestion, skin contact.
Acute Effects: Acute inhalation produces intense nose, throat, and lung irritation; headaches; blurred vision; conjunctivitis; flushing of the face; mental confusion; staggering gait; slurred speech; and unconsciousness, sometimes with convulsions. Ingestion causes inebriation (drunkenness), vomiting, dizziness, fever, drowsiness, confusion, and cyanosis (a blue to dark purplish coloration of skin and mucous membrane caused by lack of oxygen). Aspiration causes choking, cough, shortness of breath, increased rate of respiration, excessively rapid heartbeat, fever, bronchitis, and pneumonitis. Other symptoms following acute exposure include acute hemorrhage of the pancreas, fatty degeneration of the liver and kidneys, and passive congestion of spleen.
Chronic Effects: Chronic inhalation results in appetite loss, nausea, weight loss, insomnia, and unusual sensitivity (hyperesthesia) of the distal extremities followed by motor weakness, muscular degeneration, and diminished tendon reflexes and coordination. Repeated skin exposure can cause blistering, drying, and lesions.

FIRST AID

Eyes: Gently lift the eyelids and flush immediately and continuously with flooding amounts of water until transported to an emergency medical facility. Consult a physician immediately.
Skin: *Quickly* remove contaminated clothing. Rinse with flooding amounts of water for at least 15 min. For reddened or blistered skin, consult a physician. Wash affected area with soap and water.
Inhalation: Remove exposed person to fresh air and support breathing as needed.
Ingestion: Never give anything by mouth to an unconscious or convulsing person. If ingested, *do not induce vomiting* due to aspiration hazard. Give conscious victim a mixture of 2 tablespoons of activated charcoal mixed in 8 oz of water to drink. Consult a physician immediately.
After first aid, get appropriate in-plant, paramedic, or community medical support.

Section 7. Spill, Leak, and Disposal Procedures

Spill/Leak: Notify safety personnel, evacuate all unnecessary personnel, remove heat and ignition sources, and provide maximum explosion-proof ventilation. Cleanup personnel should protect against vapor inhalation and liquid contact. Use nonsparking tools. Take up small spills with sand or other noncombustible adsorbent. Dike storage areas to control leaks and spills. Follow applicable OSHA regulations (29 CFR 1910.120).
Aquatic Toxicity: Bluegill, freshwater, LC_{50}, 8 ppm/96 hr.
Disposal: Contact your supplier or a licensed contractor for detailed recommendations. Follow applicable Federal, state, and local regulations.

EPA Designations

RCRA Hazardous Waste (40 CFR 261.21): Characteristic of ignitability
CERCLA Hazardous Substance (40 CFR 302.4): Not listed
SARA Extremely Hazardous Substance (40 CFR 355): Not listed
SARA Toxic Chemical (40 CFR 372.65): Not listed

OSHA Designations

Listed as an Air Contaminant (29 CFR 1910.1000, Table Z-1-A)

Section 8. Special Protection Data

Goggles: Wear protective eyeglasses or chemical safety goggles, per OSHA eye- and face-protection regulations (29 CFR 1910.133). Since contact lens use in industry is controversial, establish your own policy.
Respirator: Seek professional advice prior to respirator selection and use. Follow OSHA respirator regulations (29 CFR 1910.134) and, if necessary, wear a NIOSH-approved respirator. There are no specific NIOSH recommendations. However, for vapor concentrations not immediately dangerous to life or health, use chemical cartridge respirator equipped with organic vapor cartridge(s), or a supplied-air respirator. For emergency or nonroutine operations (cleaning spills, reactor vessels, or storage tanks), wear an SCBA. *Warning! Air-purifying respirators do not protect workers in oxygen-deficient atmospheres.*
Other: Wear impervious gloves, boots, aprons, and gauntlets to prevent prolonged or repeated skin contact. Materials such as neoprene or polyvinyl alcohol provide excellent/good resistance for protective clothing. Note: Resistance of specific materials can vary from product to product.
Ventilation: Provide general and local explosion-proof exhaust ventilation systems to maintain airborne concentrations below the OSHA PELs (Sec. 2). Local exhaust ventilation is preferred since it prevents contaminant dispersion into the work area by controlling it at its source.(103)
Safety Stations: Make available in the work area emergency eyewash stations, safety/quick-drench showers, and washing facilities.
Contaminated Equipment: Remove this material from your shoes and equipment. Launder contaminated clothing before wearing.
Comments: Never eat, drink, or smoke in work areas. Practice good personal hygiene after using this material, especially before eating, drinking, smoking, using the toilet, or applying cosmetics.

Section 9. Special Precautions and Comments

Storage Requirements: Store in closed containers in a cool, dry, well-ventilated area away from heat and ignition sources and strong oxidizing agents. Protect containers from physical damage. Avoid direct sunlight. Storage must meet requirements of OSHA Class IB liquid. Outside or detached storage preferred.
Engineering Controls: Avoid vapor inhalation and skin or eye contact. Consider a respiratory protection program that includes regular training, maintenance, inspection, and evaluation. Indoor use of this material requires explosion-proof exhaust ventilation to remove vapors. Only use gasoline as a fuel source due to its volatility and flammable/explosive nature. Practice good personal hygiene and housekeeping procedures. Wear clean work clothing daily.

Transportation Data (49 CFR 172.101, .102)

DOT Shipping Name: Gasoline (*including casing-head and natural*)
DOT Hazard Class: Flammable liquid
ID No.: UN1203
DOT Label: Flammable liquid
DOT Packaging Exceptions: 173.118
DOT Packaging Requirements: 173.119

IMO Shipping Name: Gasoline
IMO Hazard Class: 3.1
ID No.: UN1203
IMO Label: Flammable liquid
IMDG Packaging Group: II

MSDS Collection **References:** 26, 73, 89, 100, 101, 103, 124, 126, 127, 132, 133, 136, 138, 140, 143, 146, 153, 159
Prepared by: M Allison, BS; **Industrial Hygiene Review:** DJ Wilson, CIH; **Medical Review:** W Silverman, MD; **Edited by:** JR Stuart, MS

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Phone: (518) 402-9818 • **FAX:** (518) 402-9819
Website: www.dec.state.ny.us

Erin M. Crotty
Commissioner

December 15, 2004

Mr. Leo M. Brausch
Project Engineer/Consultant
Viacom Inc.
11 Stanwix Street
Pittsburgh, PA 15222-1384

RE: RI/FS Work Plan, Townley Hill Road Dump Site, ID No. 8-08-006

Dear Mr. Brausch:

The RI/FS work plan dated November 29, 2004 submitted by you has been reviewed and found to be acceptable except for the following two (2) comments:

1. Please refer to Field Sampling Plan, Page A-9. The surface soil samples should be collected from 0-2 inches instead of 0-6 inches to evaluate potential exposure.

2. The Health and Safety Plan should include the NYSDOH Community Air Monitoring Plan.

Please submit a response letter indicating that you will collect the surface soil sample from 0-2 inches and enclose a copy of the Community Air Monitoring Plan that will be followed during the field work. Since the comments are minor, the work plan need not be revised. The response letter submitted by you will be attached to the work plan. Please submit an electronic copy of the work plan on a compact disc, preferably in Adobe Acrobat format.

Please schedule the field work to be conducted at the site and provide a minimum of two (2) weeks notice to us prior to starting the field work. If you have any questions or need additional information, please contact me at 518-402-9812.

Sincerely,

Vivek Nattanmai

Vivek Nattanmai, P.E.
Project Manager
Remedial Bureau D
Division of Environmental Remediation

cc: D. McNaughton, NYSDOH, Rochester

V. Nattanmai

Viacom Inc.
11 Stanwix Street
Pittsburgh, PA 15222-1384

Environmental Affairs

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December 30, 2004

Vivek Nattanmai, P.E.
New York State Department of Environmental Conservation
Division of Environmental Remediation
625 Broadway
Albany, NY 12233-7013

Re: Townley Hill Road Site, Chemung County, New York, NYSDEC Site 8-08-006

Dear Mr. Nattanmai:

Viacom Inc. (Viacom) has received the New York State Department of Environmental Conservation (NYSDEC) letter dated December 15, 2004 approving the revised *Work Plan, Remedial Investigation and Feasibility Study* (RI/FS) for the Townley Hill Road site in Caitlin, New York. With respect to the two comments made in that NYSDEC letter, please be apprised as follows:

- The surface soil samples will be collected from a depth of 0 to 2 inches below the ground surface, rather than 0 to 6 inches as had been described in the Field Sampling Plan (Appendix A), page 9.
- Viacom has prepared a Community Air Monitoring Plan (CAMP) to complement the air monitoring described in the Health and Safety Plan (Appendix C). A copy of this CAMP is enclosed.

Pursuant to your request, the enclosed compact disc provides the RI/FS Work Plan as Adobe Acrobat files. A copy of the CAMP and this letter are included on that disc.

Viacom looks forward to completing the negotiation of the administrative order on consent (AOC) for the performance of the RI/FS. We will schedule the RI field work as soon as the AOC is executed.

We trust that this submittal satisfies your requirements at this time. If you have questions regarding this submittal or related project matters, please do not hesitate to contact me.

Respectfully submitted,

Leo M. Brausch
Project Engineer/Consultant

LMB:

cc (w/CAMP):
M. Valentine, Cummings/Riter Consultants, Inc.
Stan Criss, Fagan Engineers, P.C.

cc (w/o enclosures):
M. G. Graham, Esquire
W. D. Wall, Esquire

COMMUNITY AIR MONITORING PLAN

To complement the air quality monitoring specified in Section 8.0 of the Health and Safety Plan (HASP), a Community Air Monitoring Plan (CAMP) will be implemented to provide a measure of protection for off-site receptors and for on-site workers not directly involved with the work from potential airborne releases as a direct result of remedial investigation (RI) activities. Additionally, the data developed by the CAMP will help to confirm that RI activities do not act to spread contamination off-site via airborne pathways.

PARTICULATE MONITORING

Because heavy metals are the primary constituents of interest at the Townley Hill Road site, the CAMP will focus on particulate monitoring. Continuous particulate monitoring will be conducted during ground-intrusive activities, including test pitting and the installation of soil borings and monitoring wells. During these ground-intrusive activities, particulate concentrations will be monitored at the upwind and downwind perimeters of the exclusion zone at temporary particulate monitoring stations. The particulate monitoring will be performed using real-time monitoring equipment capable of measuring particulate matter less than 10 micrometers in size (PM-10) and capable of integrating over a period of 15 minutes for comparison to the airborne particulate action level. The equipment will be equipped with an audible alarm to indicate exceedence of the action level. In addition, fugitive dust migration will be visually assessed during work activities.

ACTION LEVELS

Action levels for particulate monitoring will be as follows:

- If the downwind PM-10 particulate level is 100 micrograms per cubic meter ($\mu g/m^3$) greater than background (upwind perimeter) for the 15-minute period or if significant airborne dust is observed leaving the work area, dust suppression techniques will be employed. Work may continue with dust suppression techniques, provided that downwind PM-10 particulate levels do not exceed 150 $\mu g/m^3$ above the upwind level and provided that no significant visible dust is migrating from the work area.

- If, after implementation of dust suppression techniques, downwind PM-10 particulate levels are greater than 150 μg/m^3 above the upwind level, work will be stopped and work procedures reevaluated. Work can resume provided that dust suppression measures and other controls are successful in reducing the downwind PM-10 particulate concentration to within 150 μg/m^3 of the upwind level and in preventing visible dust migration.

DUST SUPPRESSION

Dust suppression measures will include water spraying, as needed, during test pit excavation or in work areas subject to vehicular traffic. If water spraying is required, only potable water will be used. Spraying will be sufficient to control dust, but not excessive to the point of causing soil erosion. The water used will not contain additives such as calcium chloride, and dust-controlling foams or oils will not be employed.

OTHER AIR MONITORING

Volatile organic compounds (VOCs) have not been found at elevated concentration in prior investigations of the Townley Hill Road site. As a precaution, the air monitoring for worker protection defined in the HASP (Section 8.0) includes airborne VOC monitoring using real-time, direct-reading instruments. If that monitoring shows the presence of elevated airborne VOC concentrations, the CAMP will be expanded to include VOC monitoring at the downwind boundary of the active work area(s).

REPORTING

Data generated from the CAMP monitoring will be maintained with other site records and made available to the New York State Department of Environmental Conservation and the New York State Department of Health upon request.