MALCOLM PIRNIE

REMEDIAL ACTION WORK PLAN
HANNA FURNACE SITE

THE FORMER RAILROAD YARD AREA (SUBPARCEL 1)

DEVELOPMENT DOWNTOWN, INC.
BUFFALO, NEW YORK

FEBRUARY 2002

MALCOLM PIRNIE, INC.

P. O. Box 1938
Buffalo, New York 14219

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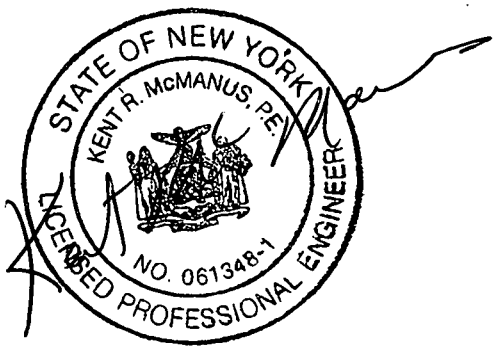

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EXECUTIVE SUMMARY

ES-1.0 INTRODUCTION

The Hanna Furnace Site is a vacant industrial property currently owned by the City of Buffalo. The site surrounds the eastern portion of the Union Ship Canal, and encompasses approximately 113 acres, including the Former Railroad Yard. The Former Railroad Yard Area occupies approximately 43 acres in the southern portion of the Hanna Furnace Site.

The Hanna Furnace Site has been characterized during several previous investigations. Based on the findings of those investigations, together with the size of the parcel, its historic use, and the City's current developmental needs and plans, the Hanna Furnace Site has been subdivided into four subparcels for future developmental considerations. This Remedial Action Work Plan has been prepared to support a voluntary cleanup of the Former Railroad Yard (Subparcel 1), which will allow for the future redevelopment of the Former Railroad Yard for commercial and industrial purposes.

ES-2.0 CONSTITUENTS OF POTENTIAL CONCERN

The environmental investigations found that the constituents of concern in the soils/fill include inorganic analytes and polyaromatic hydrocarbons (PAHs). With the exception of potentially elevated pH, groundwater was not significantly impacted by industrial activities at the site. The results of site investigations have indicated that the constituents of potential concern (COPCs) are:

- Polyaromatic hydrocarbons (PAHs), which were found in soils/fill across Subparcel 1. PAHs present at the site are almost exclusively limited to byproducts of incomplete combustion and impurities in petroleum products. The presence of PAHs at this site is consistent with its urban location and past use as a railroad yard.

- Metals and cyanide, which were found in soils/fill across Subparcel 1. The metals present at elevated concentrations relative to "background" concentrations include arsenic, chromium, copper, and zinc. Many of these metals are components of slag and are present in elevated concentrations as a result of slag deposited on the site.

- Elevated pH measured in groundwater collected from wells, borings, and test pits in the western portion of the Subparcel 1. The cause of the elevated pH may be lime used as a raw material in the pig iron manufacturing process or the material that was used as fill at the turn of the century prior to any construction at the site.

ES-3.0 THE CLEANUP PLAN

In order to eliminate potential exposure risks associated with direct contact with site fill material, the entire Subparcel 1 area will be covered as part of site redevelopment. The cover system will be placed directly on top of the regraded on-site fill material and will include clean soil for outdoor, vegetated areas; asphalt for roads and parking lots; or concrete for sidewalks, buildings and heavy use areas. Surface coverage over the entire redeveloped subparcel or portion thereof will be required as a pre-condition of occupancy. An Operation, Monitoring, and Maintenance (OM&M) Work Plan, designed to verify the performance of the cover system, is included in Appendix D and will be implemented following remediation of the site. Site use limitations will also be placed on the property limiting activities to commercial and light industrial uses.

Protection of on-site workers and the off-site community, which includes surrounding residents and businesses as well as potential future commercial and public users of the site during the redevelopment period, will be addressed through a Soil/Fill Management Plan (Appendix A), which includes health and safety requirements (Section 4.1 and Attachment V) and a Community Air Monitoring Plan (Section 4.2). The Soil/Fill Management Plan provides requirements for handling of soils/fill excavated during redevelopment (i.e., for foundation and subsurface utilities) and for placement of the cover system. The health and safety requirements establish protocols for use by on-site construction workers during invasive activities at the site. The Community Air Monitoring Plan establishes specific requirements for air monitoring and procedures to mitigate off-site migration of airborne particulates and vapors during the remediation and redevelopment periods.

ES-4.0 REMEDY EVALUATION

The proposed cover system has been designed to be protective of human health and the environment. Because VOCs were not detected in the samples collected in the Former Railroad Yard, the primary exposure pathway for contaminants at the site (metals and PAHs in soil and high pH in groundwater) is via direct contact. A qualitative risk assessment determined that the risk of direct contact exposure to the onsite soil/fill and

groundwater was potentially significant. The proposed plan of covering the on-site fill material with clean soil, pavement or buildings as part of the site development will minimize the potential for direct contact with soil and is therefore protective of human health and the environment. Based on the level of site contamination characterized in the previous site investigations, it was determined during the qualitative risk assessment that a cover of clean soil, pavement or buildings would provide adequate protection against the risk of direct contact. The proposed remedial action alternative will effectively reduce the mobility of the contaminants through control and isolation of the on-site fill material. The inclusion of health and safety requirements and the Community Air Monitoring Plan are also effective in protecting on-site workers, the public, and the environment during site redevelopment.

TCLP analysis of select soil samples indicated that the contaminants present at the site do not readily leach. Additionally, results of groundwater sampling indicated that constituents present in the fill material have not significantly impacted groundwater quality with the possible exception of elevated pH. Groundwater is not used at the site and therefore no direct contact with elevated pH groundwater is anticipated except during invasive construction activities.

The remedial action plan includes provisions for routine monitoring and maintenance of the cover, and procedures for the proper testing and disposal of soil/fill, which might be excavated or disturbed in the future. To provide a greater degree of assurance that the cover will be protective, a set of site-specific action levels (SSALs) has been established reflecting the previously characterized level of site contamination. As part of the remedial actions, soil/fill, which is excavated or otherwise moved during the development of the site, will be tested. If concentrations exceed the SSALs, the excavated soil/fill will be properly disposed off site. If the concentrations are below action levels, the soil/fill may be left on site, and properly covered. Section 5 of the Remedial Action Work Plan discusses the protectiveness and effectiveness of the remedial actions in more detail.

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1.0 INTRODUCTION

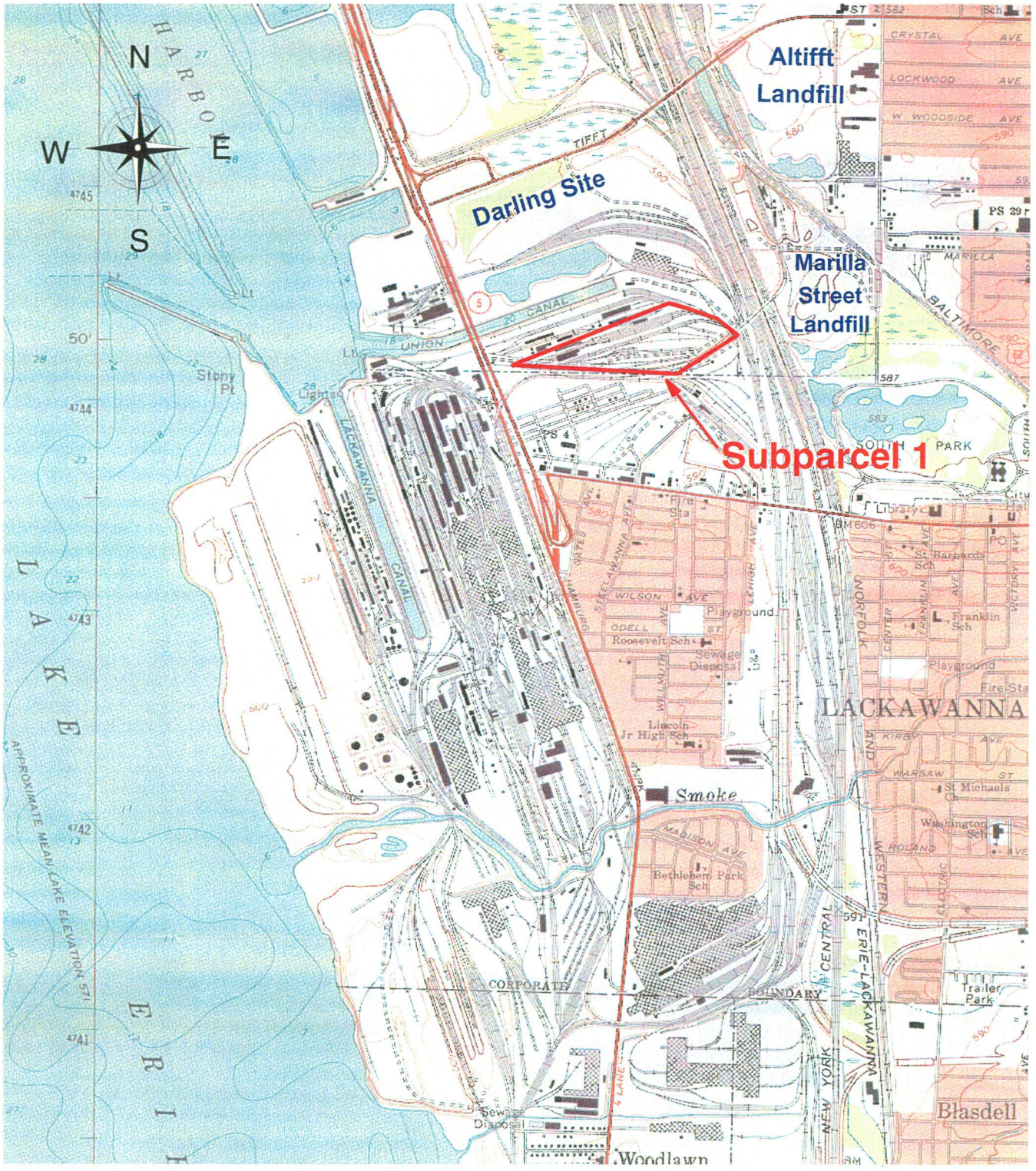
1.1 BACKGROUND

The Hanna Furnace Site is a vacant industrial property currently owned by the City of Buffalo. The site surrounds the eastern portion of the Union Ship Canal, and encompasses approximately 113 acres, including the Former Railroad Yard. The location of the site is shown on Figure 1-1. The Hanna Furnace Site has been characterized during several previous investigations. Based on the findings of those investigations together with the size of the parcel, its historic use, and the City's current developmental needs and plans, the Hanna Furnace Site has been subdivided into four subparcels for future developmental considerations. The Former Railroad Yard has been designated Subparcel 1. Subparcel 2 is comprised of the Former Manufacturing Area. Subparcel 3 consists of an area surrounding the Union Ship Canal 200-feet wide on each side. Subparcel 4 includes the Former Filter Cake/Flue Ash Disposal Area located to the north of the Union Ship Canal. These subparcels are shown on Figure 1-2. These subparcels will be considered separately during future environmental investigatory and remedial activities, as well as during redevelopment activities at the site. This Remedial Action Work Plan has been created specifically for the Former Railroad Yard (Subparcel 1).

An application for the voluntary cleanup of the Former Railroad Yard (Subparcel 1) has been submitted to the New York State Department of Environmental Conservation (NYSDEC). The voluntary cleanup will allow for the future redevelopment of the Former Railroad Yard for commercial and industrial purposes. The current proposed transitional development plan for the site includes lower profile, flex-type product in closest proximity to the canal and high-bay distributors/light manufacturing buildings on the outer perimeter of the site. The estimated average land coverage is 25 percent.

1.2 PURPOSE

This Remedial Action Work Plan has been prepared to be implemented during the voluntary cleanup of the Former Railroad Yard portion of the Hanna Furnace Site. Remedial or redevelopment activities at the Former Railroad Yard will be performed in accordance with this Remedial Action Work Plan.



0 2500 feet

APPROXIMATE SCALE

Source: Buffalo SE, NY USGS Quadrangle

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HANNA FURNACE SITE - FORMER RAILROAD YARD
BUFFALO, NEW YORK

SITE LOCATION

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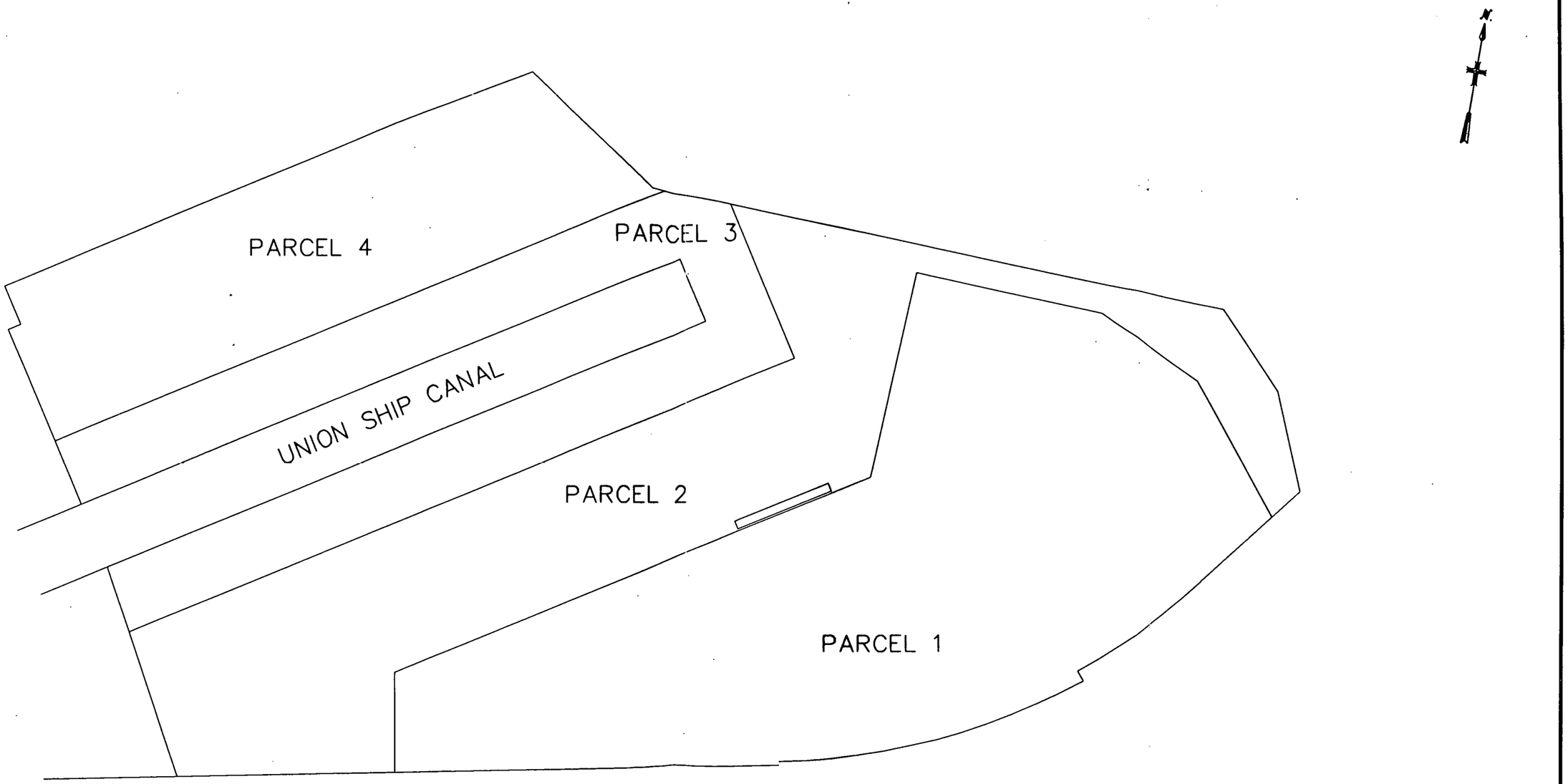
FIGURE 1-1



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HANNA FURNACE-FORMER RAILYARD SITE
REMEDIAL ACTION WORK PLAN

SITE MAP

Environmental investigations have been conducted at the Former Railroad Yard Area to characterize the nature and extent of contamination. The investigations were conducted by the United States Geologic Survey (1982), Engineering Science (1986), Recra Environmental, Inc. (1988), ABB Environmental Services (1995), Ecology and Environment, Inc. (1997), and Malcolm Pirnie (1999, 2000, and 2001). While these investigations were extensive, the nature of subsurface investigations never allows for a 100 percent complete or accurate characterization. It is always possible that some quantity of unsuspected contamination may be encountered during redevelopment of the site.

This document summarizes the findings of the historical investigations and details the methods required for the protection of human health and the environment during redevelopment and long-term maintenance activities. This Remedial Action Work Plan establishes the procedures necessary to protect workers during redevelopment activities and the protocols to be followed during the excavation and handling of the soil/fill material during redevelopment or routine maintenance activities. This Remedial Action Work Plan also includes a plan for the placement of cover in the form of clean soil (vegetated), asphalt, concrete, or buildings over the entire Former Railroad Yard Area. Any remedial action or site redevelopment activity that is inconsistent with this Remedial Action Work Plan and the Soil/Fill Management Plan (attached) will void New York State's release from liability.

1.3 SITE HISTORY

The Former Railroad Yard Area is an approximately 43-acre portion of the Hanna Furnace Site, which occupies approximately 113 acres at the southern edge of the City of Buffalo, as shown on Figure 1-1. The Former Railroad Yard Area is located in the southern portion of the Hanna Furnace Site. The Hanna Furnace Site is bordered to the west by New York State Route 5, to the south by the Lackawanna Commerce Park, to the east by railroad tracks, and to the north by wetland areas and the Shenango Steel property. The Hanna Furnace Site surrounds the eastern portion of the Union Ship Canal.

The Buffalo Union Steel Corporation purchased the manufacturing area and the railroad yard portions of the site in 1900. The Union Ship Canal was constructed near the northern edge of the Buffalo Union Steel property in 1910 to service the facility. Pig iron manufacturing commenced during the period of 1900 to 1915 with the construction of the blast furnaces. Following the construction of the blast furnaces, the Hanna Furnace

Company acquired the property from Buffalo Union Steel. The National Steel Company subsequently purchased the property in 1929, and the corporate entity became known as the Hanna Furnace Corporation. During peak production, the Hanna Furnace Corporation employed over 800 personnel.

Iron ore, lime, coke and other raw materials were received via the canal, and were stockpiled along the northern and southern edges of the canal. It is likely that these raw materials were also shipped to the site on rail cars that were temporarily stored in the railroad yard. Additionally, the pig iron manufactured at the site was transported to customers via the network of railroad yards and railroads at and near the site.

The Hanna Furnace Corporation ceased all operations in 1982 due to foreign competition and to the closure of the Shenango Furnace Company, a primary recipient of pig iron from Hanna Furnace.

The Jordan Foster Scrap Corporation purchased the site in 1983 and subsequently dismantled many of the buildings and removed the rails from the Former Railroad Yard for scrap. The Jordan Foster Scrap Corporation filed for bankruptcy during 1986, and leased the site briefly to the Equity Scrap Processing Company. In 1998, the City of Buffalo gained title to the Hanna Furnace Site due to nonpayment of taxes.

The Hanna Furnace Site has been essentially unoccupied and unsecured since 1986. A large number of soil/debris piles from fugitive dumping are located in the Former Railroad Yard Area. The majority of the tires and railroad ties were removed from the Former Railroad Yard Area in June 1999.

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2.0 PREVIOUS INVESTIGATIONS

The New York State Department of Environmental Conservation (NYSDEC) prepared an "Inactive Hazardous Waste Disposal Site Report" for the Hanna Furnace Site in 1983. The NYSDEC subsequently identified the property as Site # 915029, and initially assigned the site a classification of "2A," indicating that the site was a potential hazardous waste site but that insufficient data were available to properly characterize potential issues at the site. Following several environmental investigations of the Hanna Furnace Site, ABB Environmental Services (ABB) conducted a Preliminary Site Assessment in 1995 for the NYSDEC. Because no evidence of hazardous waste was found during this investigation, the Hanna Furnace Site was delisted from the NYSDEC'S registry of potential hazardous waste sites.

During early investigations of the Hanna Furnace Site, minimal sampling was conducted in the Former Railroad Yard because significant contamination was not suspected to be present in this area. Therefore, Malcolm Pirnie conducted more extensive sampling in 1999, 2000, and 2001 to fulfill the requirements for a Voluntary Cleanup Agreement. The following section describes the findings of previous investigations performed at the Former Railroad Yard.

2.1 RECRA ENVIRONMENTAL INVESTIGATION - 1988

Recra Environmental collected five surface soil samples (SS-19 through SS-24) in the Former Railroad Yard in 1988. The soil samples were collected from the interval 0.5 to 1.5 feet below grade, and were analyzed for polychlorinated biphenyls (PCBs), oil and grease, cyanide, ammonia, and phenols, and the metals arsenic, chromium, copper, and lead. Analytical results indicated that PCBs were detected in all five samples at concentrations ranging from 0.074 to 1.5 parts per million (ppm). The four inorganic analytes were detected in at least one sample at concentrations exceeding conservative NYSDEC Technical and Administrative Guidance Memorandum (TAGM) 4046 soil cleanup guidelines but below cleanup guidelines proposed by NYSDEC for other commercial/industrial development on former steel manufacturing properties.

2.2 ABB ENVIRONMENTAL SCIENCES INVESTIGATION - 1995

More extensive sampling was conducted at the Hanna Furnace Site during the 1995 Preliminary Site Assessment conducted by ABB, although only one soil (BS-104) and one groundwater sample (MW-104) were collected in the Former Railroad Yard. The soil sample was collected from a boring in the south central portion of the Former Railroad Yard Area from fill at a depth of 6 to 8 feet below grade and the water sample was collected from a monitoring well installed at the same location. The well was screened from 5 to 15 feet below grade. Water levels measured during ABB's investigation indicated that the water table was present at a depth of approximately 8.7 feet below grade in MW-104.

The samples were analyzed for Target Compound List (TCL) volatile organic compounds (VOCs), semivolatile organic compounds (SVOCs), pesticides, and PCBs, and Target Analyte List (TAL) metals and cyanide. Analytical results indicate that the metals aluminum, beryllium, calcium, and magnesium were present in the soil sample at concentrations exceeding by up to four times the Eastern United States Background concentrations listed in the TAGM 4046 soil cleanup guidelines. Total cyanide was detected at a concentration of 32.1 ppm in the soil sample. Analysis of the groundwater sample indicated that only cyanide (240 ug/L) and sodium (26,300 ug/L) were detected in concentrations exceeding the NYSDEC Glass GA Groundwater Quality Standards (100 and 20,000 ug/L, respectively). TCL VOCs, SVOCs, pesticides, and PCBs were not detected in the soil and groundwater samples.

2.3 MALCOLM PIRNIE SITE CHARACTERIZATION - 1999

Malcolm Pirnie collected surface and subsurface soil samples from 36 boring locations within the Former Railroad Yard area of the Hanna Furnace Site during the period from December 1998 to January 1999. The report detailing the results of this investigation was submitted to the NYSDEC in October 1999. As described in the report, the results of sampling performed indicated that no VOCs, phenols, or PCBs were detected in any of the samples collected. However, metals and polycyclic aromatic hydrocarbons (PAHs) were present in the samples at concentrations above TAGM guidelines.

The concentrations of PAHs detected in both the surface and subsurface soil samples are primarily within the range typically found in urban soils. The TAGM soil cleanup

guidelines for PAH compounds were contravened in 17 of the 18 surface soil composite samples.

The PAH concentrations detected in the subsurface soil samples were significantly lower than those in the surface soil composite samples. The TAGM soil cleanup guidelines for PAH compounds were contravened in only 5 of the 18 subsurface soil composite samples.

Because PAHs are formed through anthropogenic combustion processes such as the burning of coal, oil and gasoline, they are generally ubiquitous in soils, especially industrial and urban soils. The presence of PAHs at this site is consistent with its industrial location and past use as a railroad yard located adjacent to an active pig iron manufacturing facility.

The analysis of composite soil samples for inorganic analytes (TAL metals plus cyanide) indicated that a number of metals were detected at concentrations above the soil cleanup guidelines.

The analysis of the surface soil composite samples indicated that aluminum, arsenic, beryllium, cadmium, calcium, chromium, copper, lead, magnesium, manganese, mercury, nickel, and zinc were detected in at least one sample at concentrations exceeding the soil cleanup guidelines and/or the Eastern U.S. background concentrations. The concentrations of metals in the composite subsurface soil samples were generally lower than or similar to those of the surface soil samples. Aluminum, arsenic, beryllium, cadmium, calcium, magnesium, manganese, nickel, and zinc were detected in at least one composite surface sample at concentrations exceeding the soil cleanup guidelines and/or the Eastern U.S. background concentrations.

Total cyanide concentrations in the composite surface and subsurface soil samples ranged from 1 to 33 mg/kg. Analysis of the sample of blue-green sandy material collected from boring SB-20 revealed that no reactive cyanide was detected in the sample, and that the total cyanide concentration was 38.8 mg/kg. Although there currently is no NYSDEC soil cleanup guideline for cyanide, the United States Environmental Protection Agency (USEPA) soil screening level (SSL) can be used for comparison. The SSL for amenable cyanide is 1600 mg/kg. Amenable cyanide is that portion which is amenable to chlorination. The susceptibility of cyanide complexes to chlorination is indicative of its availability to organisms. Total cyanide includes the cyanide that is amenable and that is

not amenable to chlorination. Because the total cyanide concentrations detected in the samples from the site are less than 40 mg/kg, the concentrations detected in the soil at the Former Rail Yard are well below the USEPA soil screening levels for amenable cyanide.

The Toxicity Characteristic Leaching Procedure (TCLP) analysis of 5 subsurface composite samples indicated that only barium is present in leachable quantities. Barium concentrations ranged from 0.2 to 0.6 µg/L in the samples of fill material, well below the USEPA Maximum Concentration Value for Toxicity Characteristics of 100 µg/L for barium.

2.4 MALCOLM PIRNIE SUPPLEMENTAL INVESTIGATION - 2000

Based on the results of Malcolm Pirnie's investigation of the railroad yard, the NYSDEC requested additional activities to better characterize the Former Railroad Yard Area. The additional investigatory activities included the installation and sampling of monitoring wells, the characterization of fill piles, and the characterization of blue material encountered at depth in borings.

To address outstanding issues at the Former Railroad Yard, Malcolm Pirnie implemented a Supplemental Investigation in 2000, which included the drilling of seven borings for characterization purposes. Three of those borings were completed as monitoring wells and were sampled as part of the Supplemental Investigation. Additionally, the characterization of on-site debris piles was performed and included a thorough inventory and a test pit program and sample collection. The results of the Supplemental Investigation were detailed in the July 2000 Supplemental Investigation Report, and are discussed below.

Drilling activities were conducted from January 24 through January 26, 2000 and included the advancement of seven borings and the installation of shallow groundwater monitoring wells in three those borings. The borings and monitoring wells were designated B-37 through B-40 and MW-001 through MW-003, respectively.

Additional Characterization of Blue-Colored Fill Material

During the January 1999 characterization, a blue-colored layer of fill material was encountered beneath the majority of the Former Railroad Yard. To further characterize

the chemical composition of the blue material, additional samples were collected from completed borings during the Site Characterization and Supplemental Investigation.

Soil that is described as blue soil, especially Prussian Blue, is often a result of industrial activities, and often contains cyanide at very high concentrations. The blue-colored material at the Hanna Furnace Site is not a Prussian Blue color. The color of the material ranges from grayish blue-green to grayish blue to white-gray. The blue-green material generally underlies the white-gray material, and the transition from one color to the other was sometimes observed to be at approximately the water table.

Photographs 1 and 2 in Attachment C show the range of color of the material. These, however, are actually the same sample. The color of the material shown in Photograph 1 changed after 1 to 2 weeks of exposure to the atmosphere from blue-green to the white-gray color shown in Photograph 2. This indicates that the air in the atmosphere oxidized the sample, and the blue-green coloring is likely due to an environment within the groundwater that is more reducing than that in the air. Photographs 3 and 4 show test pits completed during the pH investigation that contained the blue-green material.

The analysis of the samples collected during the Supplemental Investigation from the blue-green colored material indicated that VOCs were detected at concentrations below the soil cleanup guidelines, and pesticides and PCBs were not detected. Two SVOCs (i.e., benzo(a)anthracene and benzo(a)pyrene) were detected at concentrations above the conservative TAGM soil cleanup guidelines.

Eight metals (aluminum, barium, beryllium, calcium, iron, magnesium, selenium, and zinc) were detected in at least one of the blue-colored soil samples at concentrations above the conservative TAGM soil cleanup guidelines.

As described in the 1999 Characterization Report, one sample was collected from the blue-green material in boring BS-20 for analysis of total cyanide and reactive cyanide due to concerns regarding cyanide contamination. The total cyanide concentration was low (38.8 mg/kg), and no reactive cyanide was detected in this sample. Additional samples were collected specifically for the characterization of the blue-green material during the Supplemental Investigation. These samples were analyzed for total cyanide, and the results showed that cyanide concentrations were low and ranged from 3.1 to 43 mg/kg. Groundwater samples collected from monitoring wells in areas that contain this blue-green material (MW-104, MW-105, and MW-001) contained cyanide at

concentrations ranging from 20 to 90 µg/L. These concentrations are below the NYSDEC groundwater standard of 200 µg/L.

Characterization of Eastern Portion of Former Railroad Yard Area

At the request of the NYSDEC, one additional soil boring was drilled to sample the fill overburden in the extreme eastern portion of the site. Additionally, one boring was completed in the northeastern portion of the Former Railroad Yard because that area also was not characterized in previous investigations. The borings were sampled during advancement using the same techniques employed during the January 1999 investigation.

The material encountered during the drilling of the monitoring wells was similar to that encountered in the borings throughout the area. The analytical results of the soil samples collected from the two borings indicated that VOCs were detected at concentrations below the soil cleanup guidelines, and pesticides and PCBs were not detected. Only one SVOC (chrysene) was detected at concentrations above the soil cleanup guidelines. Chrysene was detected in the sample collected from boring MW-002 at a concentration of 480 µg/kg, slightly above the soil cleanup guideline of 400 µg/kg.

Nine metals (aluminum, arsenic, beryllium, calcium, copper, iron, magnesium, selenium, and zinc) were detected in at least one of the soil samples at concentrations above the soil cleanup guidelines.

Debris Pile Characterization

Numerous debris piles of admixed soil and construction debris have been documented and were observed in the Former Railroad Yard during the January 1999 site characterization effort. The debris piles are generally located along the southern and southeastern perimeters of the Former Railroad Yard Area.

Since these piles had not yet been sampled for chemical analyses, a thorough inventory and sampling program was implemented during the Supplemental Investigation to characterize the contents of the debris piles. To best characterize the debris piles, Malcolm Pirnie verified and updated the inventory to provide an accurate estimate of the number, location, volume, and apparent contents of all on-site debris piles.

Debris Pile Inventory

As part of the Supplemental Investigation, Malcolm Pirnie verified Ecology and Environmental Inc.'s 1997 soil pile inventory and amended the inventory to include the contents of the debris piles. Malcolm Pirnie's estimate of the volume of all above grade debris in the piles is approximately 24,000 cubic yards. The materials observed in the debris piles during the investigation were generally categorized as construction and demolition debris mixed with sand and gravel with occasional railroad ties, slag, and metal refuse.

Debris Pile Screening and Sampling

Subsequent to an inventory of all debris piles, sampling of the debris was performed. A backhoe was used to breach select debris piles to ascertain the contents and provide access to non-weathered debris for sampling. Samples were visually characterized and screened for VOCs using a PID equipped with a 10.2 eV lamp and the observations were recorded on the stratigraphic logs.

A total of 20 debris pile test pits designated SS-1 through SS-20 were excavated on January 23 and 24, 2000, and one sample was collected from each test pit. The Supplemental Investigation Report includes a descriptive log for each sampled excavation. The 20 debris pile samples were submitted to the laboratory for analysis of TCL VOCs, SVOCs, pesticides, and PCBs, and TAL metals plus cyanide.

The analytical results of the debris pile sampling indicated that no VOCs were detected at concentrations above the soil cleanup guidelines. Aldrin was the only pesticide detected above the soil cleanup guidelines. Aldrin was detected in three samples, but the concentrations exceeded the soil cleanup guidelines in only sample SS-4. PCBs were detected in two samples at concentrations above the soil cleanup guidelines.

Only six SVOCs were detected at concentrations exceeding the conservative TAGM soil cleanup guidelines. These six compounds are PAHs, and were also detected in samples collected during the 1999 Site Characterization. The concentrations of these compounds detected in the soil/fill material are primarily within the range typically found in urban soils. Because PAHs are formed through anthropogenic combustion processes such as the burning of coal, oil and gasoline, they are generally ubiquitous in soils, especially urban soils. The presence of PAHs at this site is consistent with its urban location and

past use as a railroad yard. Eleven metals were detected in at least one debris pile sample at concentrations above the soil cleanup guidelines.

Groundwater Characterization Results

Based on the findings of the Supplemental Investigation, the groundwater flow direction at the Former Railroad Yard is generally north and west, toward the canal. This groundwater flow direction is consistent with that described during previous investigations. No VOCs or SVOCs were detected in the groundwater samples above the Class "GA" Groundwater Quality Standards. Pesticides and PCBs were not detected in the groundwater samples. Six metals (iron, magnesium, manganese, selenium, sodium, and thallium) were detected at concentrations exceeding the standards in at least one groundwater sample.

2.5 MALCOLM PIRNIE pH INVESTIGATION – 2001

A total of five soil borings were completed around monitoring wells MW-104 and MW-105 in January 2001 to assess whether the high pH observed in the groundwater in the wells was due to grout contamination of the wells. Figure 2-1 shows the locations of the borings and the pH measurements in groundwater collected from these borings. Groundwater was collected from each boring using either a bailer or a bottle lowered on a string. The pH of each groundwater sample was measured using a portable pH meter that was calibrated immediately prior to the start of the boring program. The pH of the groundwater collected from these five borings ranged from 10.00 to 11.53.

Based on the results of the boring program, Malcolm Pirnie completed on May 17, 2001 a total of 10 test pits to delineate the areal extent of high pH in the groundwater in Subparcel 1. Figure 2-1 also shows the locations of the test pits and the pH measurements in groundwater collected from these test pits. Photographs 3 through 6 in Appendix C show some of the test pits. Groundwater was collected from each test pit either by lowering a bottle into the excavation or by collecting water from the backhoe bucket. The pH of each groundwater sample was measured using a portable pH meter that was calibrated immediately prior to the start of the test pit program. The pH of the groundwater collected from these five borings ranged from 8.67 to 11.95. The results of the pH Investigation were reported to the NYSDEC in a June 6, 2001 letter report.

PARCEL 4

UNION SHIP CANAL

PARCEL 3

METAL BUILDING

MW-001

MW-002

MW-005

PARCEL 2

BRICK BUILDING

MW-107

MW-003

TP-3 (8.67)

TP-2 (10.97)

MW-004

MW-106

1-STORY METAL

2-STORY BRICK

TP-1 (10.79)

APPROXIMATE EXTENT OF HIGH pH IN SUBPARCEL 1

PARCEL 1

TP-7

MW-105 (8.61)

SB105A (10.00)

SB105B (11.51)

TP-9 (9.27)

TP-10 (11.95)

TP-8

2-STORY BRICK

TP-4 (11.82)

TP-5 (11.57)

TP-6 (11.88)

SB104A (11.94)

SB104C (11.11)

MW-104 (11.47)

SB104B (11.53)

250' 0' 250' 500'

SCALE: 1 INCH = 250 FEET

SCALE: 1" = 250'

LEGEND

- PROPERTY LINE
- PARCEL BOUNDARY
- EXISTING BUILDING
- TP-4 — TEST PIT LOCATION
- MW-004 — EXISTING MONITORING WELL
- SB105B — TEST BORING LOCATION
- (11.51) — pH MEASUREMENT

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BUFFALO, NEW YORK

SUBPARCEL 1 – FORMER RAILROAD YARD

FIGURE 2–1

pH INVESTIGATION RESULTS

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3.0 PROPOSED COVER SYSTEM

In order to eliminate potential exposure risks associated with direct contact with site fill material, the entire Former Railroad Yard Area will be covered as part of site redevelopment. The cover system will be placed directly on top of the regraded on-site fill material and will include clean soil for outdoor, vegetated areas, asphalt for roads and parking lots, or concrete for sidewalks, buildings and heavy use areas. Surface coverage over the entire redeveloped subparcel or portion thereof will be required by the site owner or developer as a pre-condition of occupancy. Responsibility for monitoring and maintenance of the site cover system is delineated in the Voluntary Cleanup Agreement. An Operation, Monitoring, and Maintenance (OM&M) Work Plan for implementation following remediation of the site is included in Appendix D.

The proposed cover system has been designed to be protective of human health and the environment. Because VOCs were not detected in the samples collected in the Former Railroad Yard, the primary exposure pathway for contaminants at the site (metals and PAHs in soil and high pH in groundwater) is via direct contact. The proposed plan of covering the on-site fill material will eliminate the potential for direct contact with soil and is therefore protective of human health and the environment. TCLP analysis of select soil samples indicated that the contaminants present at the site do not readily leach. Additionally, results of groundwater sampling indicated that constituents present in the fill material have not significantly impacted groundwater quality with the possible exception of elevated pH. Groundwater is not used at the site and therefore no direct contact with elevated pH groundwater is anticipated except during invasive construction activities.

The Qualitative Risk Assessment performed as part of the Supplemental Investigation (Malcolm Pirnie, 2000) evaluated the risk posed by chemicals of potential concern (COPCs) to human health and wildlife. The Risk Assessment also evaluated the adequacy of the cover system placed during site redevelopment to protect human health and wildlife from these COPCs.

Given the redevelopment plans, exposure to the soil fill piles and surface soil would be precluded for future on-site workers. For the trespasser, potential exposure to

contaminated soil is expected to be precluded due to the planned redevelopment activities.

Following redevelopment, the Former Railroad Yard Area will not present a significant risk to wildlife because the site will be completely covered with clean fill, asphalt or concrete. Additionally, although some wildlife may occasionally use the site, the presence of human activities will inhibit significant use of the site by wildlife.

3.1 PREPARATION OF SITE SURFACE

The site will require grading prior to cover placement activities. The fill material and debris piles in the Former Railroad Yard Area will be graded to a regular topographic surface as planned for redevelopment. Following placement of the cover material, the grading will be completed such that precipitation events will not cause the formation of standing water. All trees, shrubs, stumps, roots, brush, masonry, rubbish, scrap, debris, pavement, curbs, fences and miscellaneous structures will either be buried, removed and disposed of off-site at a permitted disposal facility, or stockpiled north of the Union Ship Canal on Subparcel 4 in accordance with solid waste regulations. Specifically, only exempt materials as defined in 6NYCRR Part 360-7.1(b)(l) are allowed for stockpiling. Prior to placement of the cover soil, all protruding material will be removed from the ground surface. Burning shall not be allowed on the site.

The remediation of the site may proceed in one of two ways. The placement of the cover material may occur as portions of the site are developed. Under this scenario, the site will be completely hydroseeded to limit dust generation from the soil/fill that has not yet been covered. Alternatively, the entire site may be completely graded and covered. Under these two scenarios, obvious access points will be gated to limit the potential for illegal dumping and the vegetation will be maintained during redevelopment.

3.2 COVER SYSTEM

3.2.1 Soil

In areas that will not receive significant equipment on vehicular use, the minimum cover system will be composed of soil/fill tested in accordance with Section 2.2 of the Soil/Fill Management Plan and found to contain constituent concentrations less than those specified in NYSDEC TAGM 4046. The completed soil cover will be of a thickness

specified in NYSDEC TAGM 4046. The completed soil cover will be of a thickness required to maintain sufficient vegetative cover to prevent exposure to the on-site fill material. The soil thickness required must be 12 inches, but a developer can propose less, if justified, via a petition to NYSDEC and NYSDOH.

In order to reduce the potential for disturbance of the surface cover material, berms or mounds composed of clean soil will be constructed in areas in which trees and shrubs will be planted. The berms or mounds will be of sufficient thickness to allow the excavation of only clean fill deep enough to plant the tree or shrub root ball. Unless additional soil is required for the plantings, the soil cover thickness will be 12 inches. The material used in the berms or mounds will contain sufficient organic material to allow the growth of the trees and/or shrubs and will be of sufficient strength to support trees and/or shrubs at their maximum height. Fill containing lumps, pockets, or concentrations of silt or clay, rubble, debris, wood or other organic matter will not be acceptable. Fill containing unacceptable material shall be removed and disposed appropriately.

Topsoil used for the final cover shall meet the following general specifications:

1. Fertile, friable, natural loam surface soil, capable of sustaining plant growth, and free of clods of hard earth, plants or roots, sticks or other extraneous material harmful to plant growth. The topsoil shall be well-graded with the following approximate analysis:

   a.

Sieve Size	Percent Passing by Weight
3-inch	100
No. 4	>75
No. 200	>30
0.002 mm	<20

   b. pH 5.5 to pH 7.6.

   c. Minimum organic content of 2.5 percent as determined by ignition loss.

   d. Soluble salt content not greater than 500 ppm.

2. Before delivery, soil samples will conform to the criteria specified in Sections 2.3 and 2.4 in the Soil/Fill Management Plan.

Grass seed used for final cover shall meet the following general specifications:

1. The grass seed mixture will be fresh, clean, new-crop seed complying with the tolerance for purity and germination established by the Official Seed Analysts of North America.

2. The entire ground surface disturbed by construction operations shall be seeded with 100 lbs/acre of seed conforming to the following:

a.

Name of Grass	Application Rate (lbs/acre)	Purity (%)	Germination (%)
Perennial Ryegrass	10	95	85
Kentucky Bluegrass	20	85	75
Strong Creeping Red Fescue	20	95	80
Chewings Fescue	20	95	80
Hard Fescue	20	95	80
White Clover	10	98	75

b. Germination and purity percentages should equal or exceed the minimum seed standards listed. If it necessary to use seed with a germination percentage less than the minimum recommended above, the seeding rate will be increased accordingly to compensate for the lower germinations.

c. Weed seed content will be less than 0.25 percent and free of noxious weeds.

d. All seed shall be rejected if the label lists any of the following grasses:

1) Sheep Fescue.
2) Meadow Fescue.
3) Canada Blue.
4) Alta Fescue.
5) Kentucky 31 Fescue
6) Bent Grass.

3. In addition to the seed mixtures listed above, one bushel per acre of oats or rye seed shall be sowed over the entire area, including drainage ditches, to provide a quick shade cover and to prevent erosion during turf establishment.

An alternative source of cover system material may be residuals that are presently stored at the Erie County Water Authority's (ECWA) Sturgeon Point Water Treatment Plant (WTP) in the Town of Evans, Erie County, New York. A Beneficial Use Determination (BUD) application is being prepared for use of those residuals as a component of the proposed cover system in accordance with 6NYCRR part 260-1.15, Beneficial Use. This material will consist of a mixture of water treatment plant residuals and clean fill obtained from off-site sources. If the BUD is approved by the NYSDEC, the materials would be handled/placed in accordance with the NYSDEC-approved BUD.

3.2.2 Asphalt

The cover system in areas that will become roads, sidewalks, and parking lots will consist of a minimum of two inches of asphalt that will be placed over the soil/fill material at the site. The asphalt will be placed on a minimum four-inch gravel subbase to provide stability for construction and to limit subsidence. Prior to placement of the subbase, all protruding material will be removed from the ground surface and the area regraded to a regular surface.

3.2.3 Concrete

The cover system in areas that will become slab-on-grade structures will consist of a minimum of two inches of concrete that will be placed above the soil/fill material. The concrete will be placed on a minimum four-inch gravel subbase to provide stability for construction and to limit subsidence. A vapor barrier consisting of polyethylene sheeting with a minimum thickness of 8-mils will be installed under all structures to provide additional protection for on-site workers. Concrete may also be used instead of asphalt for roads, sidewalks, and parking lots. Prior to placement of the subbase, all protruding material will be removed from the ground surface and the area regraded to a sufficient regular surface.

4.0 SOIL/FILL MANAGEMENT PLAN

During construction activities at the site, the excavation of soil/fill material will be necessary for the construction of utility corridors. Excavation may also be necessary during the construction of footings for structures and for other activities including the planting of trees. Although a number of environmental investigations have been conducted at the Former Railroad Yard Area to characterize the nature and extent of contamination, the nature of investigations does not allow for a 100 percent complete or accurate characterization. Therefore, it is possible that some quantity of unsuspected contamination may be encountered during redevelopment of the activities.

Soil management protocols are necessary to limit the potential for exposure of on-site workers to contaminated fill material. The soil handling protocols will also be necessary for assisting with the determination of whether soil/fill removed during excavation activities may be reused on-site or must be disposed off-site. The Soil/Fill Management Plan is included in Appendix A.

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5.0 REMEDY EVALUATION

5.1 INTRODUCTION

Based on the contaminant characterization results and the Qualitative Risk Assessment performed as part of the Supplemental Investigation (Malcolm Pirnie, 2000), soil/fill material and groundwater are the media of concern for the site. The constituents of potential concern (COPC) for soils consist primarily of metals and polyaromatic hydrocarbons (PAHs). Results of groundwater sampling indicate that constituents present in the soil/fill material have not significantly impacted groundwater quality with the possible exception of elevated pH. Since groundwater is not an exposure pathway, except during invasive construction activities, groundwater treatment or containment is not required following construction.

5.2 REMEDIAL ACTION OBJECTIVE

The identification of the remedial action objective (RAO) for the soil/fill material at the site is based primarily on the human health and environmental risks posed by the site as identified in the Qualitative Risk Assessment (Malcolm Pirnie, 2000). The RAO for the site is minimizing potential exposure risks associated with direct contact with on-site soil/fill material and groundwater.

5.3 REMEDIAL ACTION ALTERNATIVE

In order to achieve the RAO for the site, the entire Former Railroad Yard Area will be covered as part of site redevelopment. The remedial action alternative is a cover system that will be placed directly on top of the regraded soil/fill material. The proposed cover system will include clean material, including: vegetated soil cover in areas that will not receive significant equipment or vehicular use; asphalt in areas that will become roads, sidewalks, and parking lots; and concrete in areas that will become slab-on-grade structures.

The following sections present a detailed analysis of the remedial action alternative with respect to the evaluation criteria outlined in 6 NYCRR Part 375-1.10 and the RAO for the site.

5.4 STANDARDS, CRITERIA, AND GUIDANCE (SCGs)

A site's remedial program must be designed so as to conform to standards and criteria that are generally applicable, consistently applied, and officially promulgated, that are either directly applicable, or that are not directly applicable but are relevant and appropriate, unless good cause exists why conformity should be dispensed with [6 NYCRR 375-1.0(c)(1)(i)].

While the Union Ship Canal site is not a State or Federal hazardous waste site, the proposed remedial program has been developed consistent with the requirements of the National Oil and Hazardous Substance Pollution Contingency Plan of March 8, 1990. The proposed remedial program for the railroad yard area of the Union Ship Canal was developed giving consideration to the following three categories of SCGs:

(1) Ambient- or chemical-specific SCGs are usually health- or risk-based numerical values (standards or criteria) that are applied to environmental media and must be achieved by a remedy for an affected medium or in discharges from the site to the ambient environment. In the absence of such values, chemical-specific SCGs may be derived using methodologies which, when applied to site-specific conditions, result in the establishment of numerical criteria.

(2) Action-specific SCGs are usually technology or activity based requirements or limitations on actions taken with respect to hazardous or toxic wastes. These action-specific requirements are not used to determine the remedial alternative; rather, they govern the design and performance of the alternative.

(3) Location-specific SCGs are restriction placed on the concentrations of hazardous substances or the conduct of activities solely because they are in specific locations.

5.4.1 Chemical-Specific SCGs

Based on the known levels of contamination at the site, as determined during previous site investigations and a qualitative assessment of the risks to the public health and the environment, it was determined that the only exposure route of significance was one of direct contact. It was further determined that for the established level of site

contamination, a soil cover would provide adequate protection for the intended commercial/light industrial use of the site. To verify protection, any soil/fill materials encountered during site redevelopment and determined to be significantly more contaminated than what has been previously characterized would be properly disposed off site. The site-specific action levels (SSALs), developed to assess soil/fill excavations or disturbances, define levels for the site contaminants of concern, above which off-site disposal will be required. The SSALs presented in Appendix A, Table 2-1 has been approved by the NYSDEC and NYSDOH.

In areas of high pH, the pH of the water in excavations will be measured using a field pH meter. Water pumped from excavations will be discharged to the ground surface unless staining or elevated PID measurements are observed in the excavation, a sheen is present on the water surface, or the pH of the groundwater is less than 6.5 or greater than 8.5. If any of these conditions exist, the water pumped from the excavations may be discharged to the Buffalo Sewer Authority under a discharge permit if the water quality falls within the conditions of the permit. If the water quality is such that the permit requirements will be exceeded, the groundwater removed from the excavation will be containerized and sampled. Containerized water not meeting the Surface Water and Groundwater Quality Standards set forth in 6 NYCRR Part 703.5 will be transported off-site for proper disposal.

5.4.2 Action-Specific SCGs

During site clearing, grading, excavating, and stockpiling of excavated soil, dust suppression and air monitoring will be conducted in accordance with NYSDEC TAGM HWR-89-4031, Fugitive Dust Suppression and Particulate Monitoring Program at Inactive Hazardous Waste Sites. The program to be implemented at the site is described in Section 2.6 of the Soil/Fill Management Plan (S/FMP) in Appendix A.

Erosion control measures will be implemented for soil/fill stockpiles and unvegetated soil surfaces during redevelopment activities to prevent migration of contaminated soil/fill to the Union Ship Canal.

Soil/fill material containing analytes above the SSALs will be further classified for disposal purposes with respect to hazardous characteristics, as outlined in 6 NYCRR Part 371, Identification and Listing of Hazardous Wastes. Soil/fill material determined to be a hazardous waste will be handled in accordance with the requirements of: 6 NYCRR Part

372, Hazardous Waste Manifest System and Related Standards for Generators, Transporters, and Facilities; and 49 CFR 107-171, DOT Rules for Hazardous Materials Transport.

The water pumped from excavations in areas of elevated pH will be monitored for pH prior to handling and discharge. Because water with elevated pH may act as a skin irritant, care must be taken to inhibit dermal contact when handling any groundwater at the site. Actions to inhibit contact with groundwater may include the use of latex or other waterproof gloves.

Based on the elevated pH of the groundwater in certain areas of Subparcel 1, consideration should be given to use of construction materials resistant to elevated pH when designing and constructing utility corridors in area of Subparcel 1 known to contain elevated pH groundwater. Additionally, clay plugs will be spaced a maximum of 100 feet apart within the utility corridors in areas of elevated pH to limit the potential for the migration of elevated pH groundwater via the utility corridors.

5.4.3 Location-Specific SCGs

Redevelopment of Subparcel 1 is part of the overall redevelopment of the Hanna Furnace Site as a commercial/light industrial park. Review of the New York State Coastal Management Program (19 NYCRR Part 600/601) will be performed as part of the Generic Environmental Impact Statement (GEIS) for the Hanna Furnace Site. The redevelopment will comply with both State and local coastal zone policies, and is compatible with the Local Waterfront Revitalization Plan.

The Union Ship Canal is designated as a Class C fresh surface water. According to 6 NYCRR Part 701.8, the best usage of Class C waters is fishing. These waters shall be suitable for fish propagation and survival. The water quality shall be suitable for primary and secondary contact recreation, although other factors may limit the use for these purposes. During redevelopment, surface water will be collected and discharged to the Union Ship Canal in accordance with the Water Quality Standards set forth in 6 NYCRR Part 703.5.

The Hanna Furnace Site (Subparcel 4) is located near wetland areas; however, site activities on Subparcel 1 will not impact these areas.

5.5 OVERALL PROTECTIVENESS OF PUBLIC HEALTH AND THE ENVIRONMENT

This threshold assessment addresses whether a remedy provides adequate protection, and describes how risks posed through each pathway are eliminated, reduced, or controlled. This evaluation allows for consideration of whether the alternative poses any unacceptable short-term or cross-media impacts.

As determined by the site-specific Qualitative Risk Assessment (Malcolm Pirnie, 2000), the placement of asphalt, concrete, and clean soil cover provides adequate protection of public health and the environment and, therefore, achieves the RAO for the site. The cover material, with routine maintenance, will effectively reduce the potential for direct contact with the contaminated soil/fill and elevated pH groundwater. Additionally, the Remedial Action Work Plan includes a Soil/Fill Management Plan that was created to protect on-site workers, the public, and the environment during site redevelopment. The S/FMP also requires the off-site disposal of soil/fill material determined to contain contaminant concentrations above the SSALs.

5.6 SHORT-TERM EFFECTIVENESS

The effectiveness of alternatives in protecting human health and the environment during construction and implementation of the remedial action is evaluated under this criterion. Short-term effectiveness is assessed by protection of the community, protection of workers, environmental impacts, and time until protection is achieved.

Initially, the restriction of access to the site in its present condition will reduce the risks posed by the site to the general public. The construction of a cover system composed of clean soil, asphalt, and concrete will effectively reduce the risk to public health and the environment in the short-term by covering the soil/fill material. The material used for the cover system will be certified clean material and its presence will limit the potential for exposure of the public to on-site soil/fill material. Although the remedial activities will require the covering of all habitat at the site with clean soil, asphalt, or concrete, the existing habitat is of such poor quality that the immediate impact is negligible.

The Remedial Action Work Plan includes a S/FMP that was created to protect on-site workers, the public, and the environment during site redevelopment activities. During site redevelopment activities, workers engaged in subsurface construction or maintenance

activities will be required to implement a site-specific, activity specific health and safety plan. Recommended health and safety procedures are presented in Appendix A, Attachment III. Additionally, Appendix A, Section 2.6 includes a description of methods of dust suppression to be implemented during site redevelopment activities, thereby reducing potential exposure to contaminated dust.

In the short-term, the site redevelopment activities will be effective and the impact to human health and the environment will be negligible. The proposed remedy should achieve the RAO for this site in less than two years.

5.7 LONG-TERM EFFECTIVENESS AND PERMANENCE

This criterion evaluates the long-term protection of human health and the environment at the completion of the remedial action. Effectiveness is assessed with respect to the magnitude of residual risks; adequacy of controls, if any, in managing treatment residuals or untreated wastes that remain at the site; reliability of controls against possible failure; and potential to provide continued protection.

The remedial action alternative will effectively reduce the long-term risk to public health and the environment by eliminating the potential exposure risk of direct contact with site soil/fill material through the placement and maintenance of a cover system over the entire site. Maintenance of the soil cover may include additional soil or replanting of grass to achieve a vegetative cover that will eliminate the potential for soil erosion. Maintenance of the asphalt and concrete cover may include repair of cracks or damage caused by weathering or vehicular use.

The poor quality habitat that currently exist at the site will be destroyed; however, the clean soil cover will reduce the potential for direct contact by animals and the new vegetation will provide a higher quality habitat. Leaving contaminated soils in-place presents an ecological risk for burrowing animals; however, the presence of human activities will inhibit significant use of the site by these animals.

The contaminants that will remain in the soils at the site following redevelopment will be present at concentrations below the SSALs agreed on by the NYSDEC and NYSDOH. In addition, the contaminants are generally immobile and, therefore, do not pose a threat via migration to adjacent properties via groundwater flow.

In addition, the industrial/commercial use of the site will be controlled through City zoning, land use and design guidelines, and deed restrictions. Therefore, with proper maintenance, the cover system will provide long-term effectiveness and permanence in achieving the RAO for the site.

5.8 REDUCTION OF TOXICITY, MOBILITY, AND VOLUME

This evaluation criterion addresses the preference for selecting a remedial action alternative that permanently and significantly reduces the volume, toxicity, and/or mobility of the hazardous wastes and/or constituents. This preference is satisfied when the treatment is used to reduce the principal threats at a site through destruction of toxic contaminants, irreversible reduction in contaminant mobility, or reduction of total volume of contaminated media. The following is the hierarchy of remedial technologies ranked from most preferable to least preferable:

(1) Destruction.

(2) Separation/treatment.

(3) Solidification/chemical fixation.

(4) Control and isolation.

The proposed remedial action alternative will effectively reduce the mobility of the contaminants through control and isolation of the on-site fill material. The contaminants present at the site are generally immobile and are present at concentrations below the SSALs agreed on by the NYSDEC and NYSDOH. Placement of a properly maintained cover system will eliminate contaminant mobility due to soil erosion. As discussed in the Qualitative Risk Assessment (Malcolm Pirnie, 2000), the proposed remedial action alternative is sufficient to be protective of public health and the environment. Therefore, other remedial action alternatives (e.g., destruction, separation/treatment, and solidification/ chemical fixation) are unwarranted.

If concentrations of contaminants detected in on-site soils during site redevelopment are higher than the SSALs, the impacted soil/fill material will be removed from the site and properly disposed, thereby decreasing the toxicity and volume of contamination at the site.

5.9 FEASIBILITY

A feasible remedy is one that is suitable to site conditions, is capable of being successfully carried out with available technology, and considers, at a minimum, implementability.

The proposed remedial action alternative for the site is suitable to current and future site conditions and uses. Materials and equipment for site clearing, grading, and placing and maintaining the cover system are readily available. The cover system will be easily implementable since all structures, debris, and vegetation will be removed off-site; the site will be graded to a regular topographic surface for redevelopment; and access to the site is good.

Operation, maintenance, and monitoring (OM&M) of the cover systems will be the responsibility of the property owner. Erosion of the soil cover system will be reduced by maintaining a good vegetative cover. In order to reduce the potential for disturbance of the soil cover material, berms or mounds composed of clean soil will be constructed in areas in which trees and shrubs will be planted. Asphalt roadways, sidewalks, and parking lots will be sealed regularly and cracks will be filled.

Redevelopment of Subparcel 1 as part of the Union Ship Canal Redevelopment Plan is a key first step in the City of Buffalo's plan for redevelopment of South Buffalo. These redevelopment efforts will create positive economic benefits for the City of Buffalo and Western New York.

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6.0 HEALTH AND SAFETY ISSUES

Invasive work performed at the Former Railroad Yard Area will be performed in accordance with all applicable local, state, and federal regulations to protect worker health and safety. The Soil/Fill Management Plan (Appendix A) describes recommended Health and Safety procedures for intrusive work activities of the Former Railroad Yard Area.

All contractors performing redevelopment or maintenance activities involving intrusive work at the Former Railroad Yard Area will be required to prepare a site-specific, activity-specific Health and Safety Plan. In order to facilitate the creation of an appropriate Health and Safety Plan by the contractor(s) performing work, the ranges of concentrations of contaminants detected in soil and groundwater samples collected during previous site investigations are shown in Table 6-1 and 6-2, respectively. Additionally, copies of the reports detailing the procedures and findings of these site investigations are available at the offices of the NYSDEC and Malcolm Pirnie, Inc. These reports are included in the List of References (Section 8.0).

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TABLE 6-1
SUMMARY OF ANALYTICAL RESULTS - MINIMUM AND MAXIMUM DETECTED CONCENTRATIONS IN SOIL SAMPLES
REMEDIAL ACTION WORK PLAN
HANNA FURNACE - FORMER RAILROAD YARD AREA

PARAMETER[1]	NYSDEC TAGM VALUES[2]	EASTERN U.S. BACKGROUND RANGE[2]	MIN. DETECTED[3] CONCENTRATION	MAX. DETECTED[3] CONCENTRATION
VOLATILE ORGANIC COMPOUNDS (ug/kg)				
Chloromethane	-	-	16	16
Carbon Disulfide	2,700	-	2	12
cis-1,2-Dichloroethene	-	-	5	5
Chloroform	300	-	2	7
2-Butanone	300	-	4	27
Trichloroethene	700	-	220	220
Benzene	60	-	2	11
2-Hexanone	-	-	14	14
4-Methyl-2-pentanone	1000	-	2	4
Tetrachloroethene	1400	-	1	2
1,1,2,2-Tetrachloroethane	600	-	3	59
Toluene	1,500	-	1	56
Ethylbenzene	5,500	-	2	33
Styrene	-	-	20	20
Xylenes	1,200	-	2	28
SEMIVOLATILE ORGANIC COMPOUNDS (ug/kg)				
4-Methylphenol	900	-	120	120
Naphthalene	13000	-	42	720
2-Methylnaphthalene	36400	-	83	230
Acenaphthylene	41000	-	66	210
2,6-Dinitrotoluene	1000	-	120	120
Acenaphthene	50000	-	47	690
Dibenzofuran	6,200	-	47	670
Fluorene	50000	-	69	900
Phenanthrene	50,000	-	43	6000
Anthracene	50,000	-	57	2500
Carbazole	-	-	40	570
Di-n-butylphthalate	8100	-	47	120
Fluoranthene	50,000	-	53	8500
Pyrene	50,000	-	78	9700
Butylbenzylphthalate	50000	-	130	790
Benzo(a)anthracene	224	-	51	3700
Chrysene	400	-	66	3800
Bis(2-Ethylhexyl)phthalate	50,000	-	41	650
Benzo(b)fluoranthene	1,100	-	89	6400
Benzo(k)fluoranthene	1,100	-	39	1900
Benzo(a)pyrene	61	-	57	5100
Ideno(1,2,3-cd)pyrene	3,200	-	100	3700
Dibenzo(a,h)anthracene	14	-	110	960
Benzo(ghi)perylene	50,000	-	89	4100

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TABLE 6-1
SUMMARY OF ANALYTICAL RESULTS - MINIMUM AND MAXIMUM DETECTED CONCENTRATIONS IN SOIL SAMPLES
REMEDIAL ACTION WORK PLAN
HANNA FURNACE - FORMER RAILROAD YARD AREA

PARAMETER[1]	NYSDEC TAGM VALUES[2]	EASTERN U.S. BACKGROUND RANGE[2]	MIN. DETECTED[3] CONCENTRATION	MAX. DETECTED[3] CONCENTRATION
PESTICIDES / PCBs (ug/kg)				
Aldrin	41	-	2.6	500
4,4'-DDE	2100	-	3.9	13.8
4,4'-DDT	2100	-	5	32
alpha-Chlordane	540	-	29.3	500
gamma-Chlordane	540	-	2.1	2.1
Aroclor 1242	1,000	-	150	370
Aroclor 1254	1,000	-	350	1300
Aroclor 1260	1,000	-	74	3820
Heptachlor	100	-	3.2	3.2
METALS (mg/kg)				
Aluminum	SB	33,000	2,950	54,000
Antimony	SB	-	7.0	16.6
Arsenic	7.5 or SB	3 - 12	3.0	61.7
Barium	300 or SB	15 - 600	40.2	327
Beryllium	0.16 or SB	0 - 1.75	0.73	9.61
Cadmium	(10)	0.1 - 1	0.707	19.9
Calcium	SB	130 - 35,000	14,200	296,000
Chromium	(50)	1.5 - 40	4.36	4,700
Cobalt	30 or SB	2.5 - 60	1.89	16.0
Copper	25 or SB	1 - 50	5.0	640
Iron	2,000 or SB	2,000 - 550,000	1,780	244,000
Lead	(1000)	4 - 500	1.9	3,300
Magnesium	SB	100 - 5,000	3,070	38,200
Manganese	SB	50 - 5,000	194	10,400
Mercury	0.1	0.001 - 0.2	0.022	0.67
Nickel	13 or SB	0.5 - 25	6.93	96.9
Potassium	SB	8,500 - 43,000	655	6,120
Selenium	2 or SB	0.1 - 3.9	2.3	35.9
Silver	SB	-	2.27	1,170
Sodium	SB	6,000 - 8,000	6.26	1,400
Thallium	SB	-	2.4	4.8
Vanadium	150 or SB	1 - 300	8.4	1,150
Zinc	20 or SB	9 - 50	5.4	2,380
Cyanide	-	-	0.99	43

Notes:
(1) Only those parameters detected in at least one sample are shown. Concentrations of 'non-detect' are not included.
(2) Soil Cleanup Guidelines and Eastern U.S. Background Range from NYSDEC TAGM 4046 (1/24/94). Value in parentheses are NYSDEC revised values for nonresidential sites but have not yet been incorporated into TAGM 4046.
(3) Concentration ranges utilize analytical results with appropriate QA/QC for samples collected from surface and subsurface soils and debris piles by Recra (1988), ABB (1995), and Malcolm Pirnie (1999 and 2000).
- Soil cleanup guideline or background range not available.

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TABLE 6-2

SUMMARY OF ANALYTICAL RESULTS - MINIMUM AND MAXIMUM CONCENTRATION DETECTED IN GROUNDWATER SAMPLES
REMEDIAL ACTION WORK PLAN
HANNA FURNACE - FORMER RAILROAD YARD AREA

PARAMETER [1]	MIN. DETECTED CONCENTRATION	MAX. DETECTED CONCENTRATION	NYSDEC Class GA Standards[2]
VOLATILE ORGANIC COMPOUNDS (ug/L)			
4-Methyl-2-pentanone	4	4	-
2-Hexanone	9	9	50
SEMI-VOLATILE ORGANIC COMPOUNDS (ug/L)			
Di-n-butylphthalate	3	4	50
PESTICIDES / PCBs (ug/L)			
None Detected	-	-	-
METALS (ug/L)			
Cyanide	10	90	200
Aluminum	150	1630	-
Barium	23.2	175	1000
Calcium	45100	171000	-
Copper	10.9	10.9	200
Iron	231	11700	300
Lead	3.8	5.1	25
Magnesium	6940	55700	35000
Manganese	13.6	846	300
Potassium	1080	61000	-
Selenium	8.7	114	10
Silver	35.9	41.2	50
Sodium	14700	64600	20000
Thallium	16.6	16.6	0.5
Zinc	10.0	86.2	2000
OTHER			
pH	6.6	12.25	-

Notes:

(1) Only those parameters detected in at least one sample are shown. Concentrations of 'non-detect' are not included.

(2) NYSDEC Water Quality Guidance Values for Class GA Waters from NYS Ambient Water Quality Standards and Guidelines (June 1998).

- Not available.

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7.0 CITIZEN PARTICIPATION PLAN

In accordance with NYSDEC'S guidance for Voluntary Cleanup Agreements, a Citizen Participation Plan has been included in the Remedial Action Work Plan as Appendix B.

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8.0 REFERENCES

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APPENDIX A

SOIL/FILL MANAGEMENT PLAN FOR THE HANNA FURNACE SITE FORMER RAILROAD YARD AREA

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SOIL/FILL MANAGEMENT PLAN FOR THE HANNA FURNACE SITE FORMER RAILROAD YARD (SUBPARCEL 1)

Prepared by Malcolm Pirnie Inc.
On behalf of:

DEVELOPMENT DOWNTOWN, INC.
BUFFALO, NEW YORK

FEBRUARY 2002

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SOIL/FILL MANAGEMENT PLAN FOR THE HANNA FURNACE SITE FORMER RAILROAD YARD AREA

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1.0 INTRODUCTION

1.1 BACKGROUND

The Hanna Furnace Site is a vacant industrial property located in South Buffalo. The site encompasses approximately 113 acres including the 43-acre Former Railroad Yard Area. The eastern portion of the Union Ship Canal is located in the center of the property.

A voluntary cleanup of the Former Railroad Yard Area will be performed in accordance with a Remedial Action Work Plan approved by the New York State Department of Environmental Conservation (NYSDEC). The cleanup will support planned redevelopment of the Former Railroad Yard Area for commercial and industrial purposes.

1.2 PURPOSE

The purpose of this Soil/Fill Management Plan (S/FMP) is to provide protection of human health and the environment during and subsequent to the completion of the voluntary cleanup and redevelopment of the Former Railroad Yard Area.

Previous studies have investigated and assessed the surface and subsurface soil/fill and groundwater at the Former Railroad Yard Area. While significant investigation of the subsurface has occurred, the nature of subsurface investigations does not allow for 100 percent complete or accurate investigation. Therefore, it is possible that some quantity of unsuspected subsurface soil/fill contamination may be encountered during redevelopment activities and/or after the completion of the voluntary cleanup.

During future redevelopment and infrastructure improvements or routine maintenance activities such as construction of waterlines, sewers, electric power distribution, natural gas piping, road construction, foundation construction, site grading and other activities requiring the movement of soils within the Former Railroad Yard Area, unsuspected contamination may be encountered.

This S/FMP was created to provide known site background information and to discuss the handling procedures for subsurface contamination, if encountered. The S/FMP provides protocols during the following events for redevelopment and infrastructure

improvements:

- Sampling, handling, excavation and grading of on-site soils.
- Soil/fill acceptability of off-site sources for on-site backfill, subgrade fill, or cover material.
- Erosion and dust control.
- Installation of fencing and other site access control devices.
- Deed or other land use restrictions.
- Health and safety procedures for site construction work.

This S/FMP will be incorporated into the Voluntary Cleanup Agreement for the Site. As an appendix to the Remedial Action Work Plan, this S/FMP is incorporated into and is an enforceable part of the Voluntary Cleanup Agreement. Any disturbance, excavation, grading, or other movement of soils on the site will be conducted in accordance with this S/FMP.

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2.0 SOIL/FILL MANAGEMENT

2.1 EXCAVATION OF ON-SITE SOIL/FILL

No excavation, grading or disturbance of the final vegetated soil cover or existing subgrade soil/fill shall be initiated prior to a minimum of three working days notification to the NYSDEC Region 9, Division of Environmental Remediation. A Professional Engineer with remedial investigation experience, representing the subject property owner or developer will monitor soil/fill excavations or disturbances. The excavation activities will be conducted in accordance with the protocols detailed in Attachment I and in the sections below.

During excavation, the soil/fill will be inspected for staining and will be field screened for the presence of volatile organic compounds (VOCs) with a photoionization detector (PID). Stained soil is soil that is discolored, tinted, dyed, unnaturally mottled, or contains a sheen. Attachment II contains a Standard Operating Procedure for Soil Screening. Excavated soil/fill that is visibly stained or produces elevated PID readings (i.e., sustained 10 ppm or greater) will be considered potentially contaminated and stockpiled on the Hanna Furnace site for further assessment. The potentially contaminated soil/fill will be stockpiled (maximum 20 cubic yard piles) on polyethylene sheeting and then sampled for reuse, treatment or disposal. The stockpiled potentially contaminated soil/fill will also be completely covered using polyethylene sheeting to reduce the infiltration of precipitation and the entrainment of dust. Sampling and analysis will be completed in accordance with the protocols delineated in Section 2.2. Soil/fill containing one or more constituents in excess of the site-specific action levels (SSALs) shown in Table 2-1 will be transported off-site to a permitted waste management facility. Soil/fill awaiting analytical results or awaiting transportation will be stored on-site under polyethylene sheeting.

Any soil/fill with a pH higher than 12.5 is considered hazardous and therefore must be properly disposed off-site. Additionally, any soil/fill with a pH greater than 9.0 but less than 12.5 may be reused on-site but only to fill in areas below grade. This soil/fill may not be used as backfill in utility trenches or to create berms or other above grade mounds.

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TABLE 2-1
SITE-SPECIFIC ACTION LEVELS
SOIL/FILL HANDLING PLAN
HANNA FURNACE - FORMER RAILROAD YARD AREA

PARAMETER	NYSDEC TAGM VALUES[1]	EASTERN U.S. BACKGROUND RANGE[1]	MAXIMUM CONCENTRATION DETECTED[2]	SITE-SPECIFIC ACTION LEVEL
VOLATILE ORGANIC COMPOUNDS (ug/kg)				
TOTAL VOCs	10,000	-	265	10,000[5]
SEMIVOLATILE ORGANIC COMPOUNDS (ug/kg)				
TOTAL SVOCs	500,000	-	80,750	500,000[3,5]
PESTICIDES / PCBs (ug/kg)				
Total Pesticides	10,000	-	500	10,000[5]
Total PCBs (surface-0 to 1')	1000	-	3820	1000
Total PCBs (subsurface-below 1')	10,000	-	Not Detected	10,000
METALS (mg/kg)				
Arsenic	7.5 or SB	3 - 12	61.7	50
Barium	300 or SB	15 - 600	327	500
Cadmium	(10)	0.1 - 1	19.9	20
Chromium	(50)	1.5 - 40	4,700	200
Lead	(1000)	4 - 500	3,300	1,000
Mercury	0.1	0.001 - 0.2	0.67	1.0
Selenium	2 or SB	0.1 - 3.9	35.9	50
Silver	SB	-	1,170	1,000
Cyanide	1,600[4]	-	43	50

Notes:

(1) Soil Cleanup Guidelines and Eastern U.S. Background Range from NYSDEC TAGM 4046 (1/24/94). Value in parentheses are NYSDEC revised values for nonresidential sites but have not yet been incorporated into TAGM 4046.

(2) Maximum concentration detected during Recra Environmental, Inc.'s 1988 investigation, ABB Environmental Services' 1995 investigation, and Malcolm Pirnie's 1999 and 2000 investigations.

(3) In addition to the SSAL of 500,000 ug/kg for total concentrations of SVOCs, the SSAL for each individual SVOC is 50,000 ug/kg.

(4) USEPA Region 3 Soil Screening Level for cyanide.

(5) Total concentration is the sum of concentrations of Target Compound List (TCL) compounds plus estimated concentrations of Tentatively Identified Compounds (TICs).

- Soil cleanup guideline or background range not available.

This soil/fill must also be covered with clean material in accordance with Section 3.2 of the Remedial Work Plan.

If buried drums or underground storage tanks are encountered during soil excavation activities, excavation will cease and the NYSDEC will be immediately notified. All drums and/or underground storage tanks encountered will be evaluated and the contractor will submit a removal plan for NYSDEC approval. Appropriately trained personnel will excavate all of the drums and/or underground storage tanks while following all applicable federal, state, and local regulations. Removed drums and underground storage tanks will be properly characterized and disposed off-site. The soil/fill surrounding the buried drums or underground storage tanks will be considered as potentially contaminated and will be stockpiled and characterized.

All excavations or disturbances must be backfilled as soon as the work allows. Backfilled excavations must be covered with suitable cover material within ten working days of backfilling or as otherwise approved by the NYSDEC. The cover system is discussed in the Remedial Work Plan.

Excavated or disturbed backfill may be used as subgrade or excavation subgrade backfill following characterization performed in accordance with Section 2.2.

2.2 SOIL/FILL SAMPLING AND ANALYSIS PROTOCOL

All excavated and stockpiled soil/fill with evidence of contamination will be sampled and classified for reuse or disposal. Initially, one composite soil sample and a duplicate sample will be will be collected for each 100 cubic yards of stockpiled soil. The composite sample will be collected in the manner described in the Standard Operating Procedures (SOPs) included in Attachment II from five locations within each stockpile. PID measurements will be recorded for each of the five composite sample locations, and one grab sample and one duplicate sample will be collected from the location with the highest PID measurement of the five composite locations. The composite sample will be analyzed by a NYSDOH ELAP-certified laboratory for Target Compound List (TCL) semivolatile organic compounds (SVOCs), pesticides, and polychlorinated biphenyls (PCBs), and the metals arsenic, barium, cadmium, chromium, lead, mercury, selenium and silver plus cyanide using current NYSDEC Analytical Services Protocols (ASP).

Additionally, pH will be analyzed using SW-846 Method 9045. The grab sample will be analyzed for TCL volatile organic compounds (VOCs).

Excavated soil/fill that exhibits no evidence of contamination (staining or elevated PID measurements) will also require characterization prior to use as subgrade or excavation subgrade backfill at the site. Characterization samples will be collected and analyzed at a frequency of not less than one sample for 2000 cubic yards of soil/fill, and a minimum of one sample will be collected for volumes less than 2000 cubic yards. The characterization samples will be collected in accordance with the protocols described above; the sampling efforts shall consist of discrete samples for VOCs and composite samples collected from five locations for the remaining analytes.

Any soil/fill that has been characterized and found to meet the SSALs may be reused as subgrade or excavation subgrade backfill. If the analysis of the soil/fill samples reveals unacceptably high levels of any analytes (i.e., greater than one or more SSAL), additional analyses will be necessary to further classify the material for hazardous characteristics for disposal purposes. At a minimum, the duplicate sample will be analyzed using the Toxicity Characteristic Leaching Procedure (TCLP) for the particular analytes that were detected at concentrations exceeding the SSALs. The duplicate sample may also be analyzed for RCRA Characteristics including reactivity, corrosivity, and ignitability. If the analytical results indicate that concentrations exceed the standards for either TCLP or RCRA Characteristic analysis, the material will be considered a hazardous waste and must be properly disposed off-site at a permitted disposal facility within 90 days of excavation. Additional characterization sampling for off-site disposal may be required by the disposal facility. To potentially reduce off-site disposal requirements/costs, the owner or site developer may also choose to characterize each stockpile individually.

2.3 SUBGRADE MATERIAL

Subgrade material used to backfill excavations or placed to increase site grades or elevation shall meet the following criteria:

- Excavated on-site soil/fill shall either exhibit no evidence of contamination (staining and/or elevated PID measurements) or, if evidence of contamination

is present, analytical results of the soil/fill indicate that the contaminants are present at concentrations below the SSALs.

- Off-site borrow soils will be documented as having originated from locations having no evidence of disposal or release of hazardous, toxic or radioactive substances, wastes or petroleum products.

- Off-site soils intended for use as site backfill cannot otherwise be defined as a solid waste in accordance with 6NYCRR Part 360-1.2(a).

- If the contractor designates a source as "virgin" soil, it shall be further documented in writing to be native soil material from areas not having supported any known prior industrial or commercial development or agricultural use.

- Virgin soils should be subject to collection of one representative composite sample per source. The sample should be analyzed for TCL VOCs, SVOCs, pesticides, PCBs, and the metals arsenic, barium, cadmium, chromium, lead, mercury, selenium and silver plus cyanide. The soil will be acceptable for use as backfill provided that all parameters meet the SSALs.

- Non-virgin soils will be tested via collection of one composite sample per 500 cubic yards of material from each source area. If more than 1,000 cubic yards of soil are borrowed from a given off-site non-virgin soil source area and both samples of the first 1,000 cubic yards meet the SSALs, the sample collection frequency will be reduced to one composite for every 2,500 cubic yards of additional soils from the same source, up to 5,000 cubic yards. For borrow sources greater than 5,000 cubic yards, sampling frequency may be reduced to one sample per 5,000 cubic yards, provided all earlier samples met the SSALs.

2.4 FINAL COVER

Surface coverage over the entire redeveloped parcel or subparcels will be required by the developer or owner as a pre-condition of occupancy. The purpose of the surface cover is to eliminate the potential for human contact with fill material. Surface coverage will consist of clean soil with vegetative cover, asphalt or concrete paving, or buildings with concrete floors.

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The cover soil material shall meet the following criteria:

- Excavated on-site soil/fill shall not be used as cover material.
- Off-site borrow soils will be documented as having originated from locations having no evidence of disposal or release of hazardous, toxic or radioactive substances, wastes or petroleum products.
- Off-site soils intended for use as site cover cannot otherwise be defined as a solid waste in accordance with 6NYCRR Part 360-1.2(a).
- If the contractor designates a source as "virgin" soil, it shall be further documented in writing to be native soil material from areas not having supported any known prior industrial or commercial development or agricultural use.
- Virgin soils should be subject to collection of one representative composite sample per source. The sample should be analyzed for TCL VOCs, SVOCs, pesticides, PCBs, and TAL metals plus cyanide. The soil will be acceptable for use as cover material provided that all parameters meet the NYSDEC recommended soil cleanup objectives included in TAGM 4046.
- Non-virgin soils will be tested via collection of one composite sample per 500 cubic yards of material from each source area. If more than 1,000 cubic yards of soil are borrowed from a given off-site non-virgin soil source area and both samples of the first 1,000 cubic yards meet the TAGM 4046 criteria, the sample collection frequency will be reduced to one composite for every 2,500 cubic yards of additional soils from the same source, up to 5,000 cubic yards. For borrow sources greater than 5,000 cubic yards, sampling frequency may be reduced to one sample per 5,000 cubic yards, provided all earlier samples met the TAGM 4046 criteria.
- To reduce the potential for disturbance of the soil cover material, berms or mounds composed of clean soil will be constructed in areas in which trees and shrubs will be planted.

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2.5 EROSION CONTROLS

2.5.1 General Guidelines

When the remedial actions at the Hanna Furnace Site require the disturbance of more than five acres of land, federal and state laws[1] require that the project obtain coverage under the NYSDEC SPDES General Permit for Storm Water Discharges from Construction Activities that are classified as "Associated with Industrial Activity", Permit #GP-93-06 (Construction Storm Water General Permit). Requirements for coverage under the Construction Storm Water General Permit include the submittal of a Notice of Intent form and the development of a Storm Water Pollution Prevention Plan (SWPPP). The SWPPP must fulfill all permit requirements and must be prepared in accordance with "Chapter Four: the Storm Water Management and Erosion Control Plan" in Reducing Impacts of Storm Water Runoff from New Development, NYSDEC, 1992. This Storm Water Management and Erosion Control Plan, in accordance with permit requirements, will provide the following information:

- A background discussion of the scope of the construction project.
- A statement of the storm water management objectives.
- An evaluation of post-development runoff conditions.
- A description of proposed storm water control measures.
- A description of the type and frequency of maintenance activities required to support the control measure.

The SWPPP will address issues such as erosion prevention, sedimentation control, hydraulic loading, pollutant loading, ecological protection, physical site characteristics that impact design, and site management planning. The SWPP will also include a contingency plan to be implemented in the event that heavy rain events are determined to be impacting water quality in the Union Ship Canal due to redevelopment activities. All descriptions of proposed features and structures at the site will include a description of

[1] The Federal Water Pollution Control Act (as amended, 33 U.S.C. 1251 et. Seq.) and the New York State Environmental Conservation Law: Article 17, Titles 7 and 8 and Article 70.

structure placement, supporting engineering data and calculations, construction scheduling, and references to established detailed design criteria. The SWPPP will conform to all requirements as established by applicable regulatory agencies.

Proven soil conservation practices will be incorporated in the construction and development plans to mitigate soil erosion damage, off-site sediment migration, and water pollution from erosion. These practices combine vegetative and structural measures. Many of these measures will be permanent in nature and become part of the completed construction project (design features such as drainage channels and grading). Other measures will be temporary and serve only during the construction stage. The contractor will remove temporary measures at the completion of construction. The selection of erosion and sediment control measures will be based on several general principles, including:

- The minimization of erosion through project design (maximum slopes, phased construction, etc.).
- The incorporation of temporary and permanent erosion control measures.
- The removal of sediment from sediment-laden storm water before it leaves the site.

The generic erosion and surface water control plan included in Attachment III details the methods of erosion control that must be followed during site redevelopment activities. As described in Attachment III, a specific erosion and surface water control plan must be created prior to implementation of redevelopment activities. The use of appropriate temporary erosion control measures such as silt fencing and/or hay bales will be required around all soil/fill stockpiles and unvegetated soil surfaces during redevelopment activities. These methods are described below, and Attachment IV includes details for various erosion control measures that might be used during site redevelopment activities. Stockpiles shall be graded and compacted as necessary for positive surface water runoff and dust control. Stockpiles of soil/fill will be placed a minimum of fifty feet from the parcel boundaries.

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2.5.2 Temporary and Permanent Erosion Control Measures

2.5.2.1 Temporary Measures

Temporary erosion and sedimentation control measures and facilities will be employed during active construction stages. Prior to any construction activity, temporary erosion and sediment control measures shall be installed and maintained until they are no longer needed, or until such time that permanent erosion control measures are installed and effective. Additional sediment control measures may also be necessary. Structural measures, as described below, will be designed and installed to provide the required sediment and erosion control. The following temporary measures will be incorporated into construction activities:

- Silt fencing.
- Straw bales.
- Temporary vegetation/mulching.

2.5.2.1.1 Silt Fencing

Regrading and capping activities may result in sheet flow to various areas of the site; therefore, silt fencing will be used as the primary sediment control measure. Prior to extensive clearing, grading, excavation, and placement of cover soils, silt fences will be installed along all construction perimeter areas to prevent sedimentation in low areas and drainage areas. The location and orientation of silt fencing to be used during redevelopment operations will be field determined. There may be breaks and overlaps in the silt fencing to allow construction vehicles access to the construction areas.

Intermediate silt fencing will be used upslope of perimeter areas where phased construction activities are occurring. This measure will effectively lower sheet flow velocities and reduce sediment loads to perimeter fencing. In addition, silt fencing around soil stockpiles will be employed.

As sediment collects along the silt fences, they will be cleaned to maintain desired removal performance and prevent structural failure of the fence. Removed sediment will be disposed on-site as general fill in a designated area. The perimeter silt fences will remain in place until construction activities in the area are completed and vegetative cover or other erosion control measures are adequately established. Silt fences will be provided and installed in accordance with the details presented in Attachment IV.

2.5.2.1.2 Straw Bales

Straw bales will be used to intercept sediment-laden runoff from storm water channels as needed during various phases of construction. Additional straw bale dikes may be necessary in some areas during some phases of construction.

Use of straw bales will be limited to swales and/or diversion ditches where the anticipated flow velocity will not be greater than 5 feet per second (fps). Where flows may eventually exceed 5 fps along a swale or diversion ditch, an intermediate straw bale barrier will be installed upgradient of the final bale barrier. The intermediate bale barrier will effectively reduce flow velocities and sediment load to the final barrier.

As with the silt fencing, sediment will be removed to maintain performance and prevent overtopping or failure of the straw bale barrier. Removed sediment will be disposed of on-site as general fill in a designated area. Sediment laden straw bales that have lost their structural integrity and/or effectiveness will be disposed of off-site as a solid waste. Straw bale barriers will remain in place until construction activities contributing sediment to the barrier are complete and vegetative cover or other erosion control measures are adequately established. Straw bales will be provided and installed in accordance with the details presented in Attachment IV.

2.5.2.1.3 Temporary Vegetation and Mulching

As a result of phased construction and split construction schedule, portions of the site may be left in intermediate/incomplete conditions. Intermediate areas may include rough graded areas awaiting finer grading or areas awaiting topsoil placement. Intermediate areas where activities will not resume for a period in excess of two weeks shall be seeded with a quick germinating variety of grass or covered with a layer of straw mulch.

The temporary cover will act to stabilize the soil and reduce erosion. As construction progresses, areas containing temporary vegetation or straw mulch can be covered without removal of the temporary vegetation or mulch.

2.5.2.2 Permanent Control Measures

Permanent erosion control measures and facilities will be incorporated during cover construction and during site redevelopment for long-term erosion protection. Permanent measures and facilities will be installed as early as possible during construction phases. Parking and building systems associated with redevelopment shall not include dry wells or other subsurface injections/disposal piping or facilities.

2.5.2.2.1 Design Features

The remedial construction activities will involve the installation of cover system including asphalt, concrete, or clean fill over the entire site. Permanent erosion control measures incorporate a combination of design features to limit overall erosion and sediment problems to practical design limits, and the placement of permanent facilities during site restoration for long term erosion protection. The soil cover system will be designed based on the following criteria:

- Maximum slope of 33% (3H: 1 V) to limit erosion.
- Minimize the potential contact with, and migration of, waste fill.
- Provide a medium for the growth of vegetation to control erosion.

Design features incorporated into the construction plans to control erosion will include limiting steep slopes, routing runoff to surface water collection channels, limiting flow velocities in the collection channels to the extent practical, and lining collection channels, where appropriate. In areas where flow will be concentrated (i.e; collection channels) the channel slopes and configuration will be designed to maintain channel stability.

2.5.2.2.2 Construction Features

Any final slopes greater than 33 percent will be reinforced or have a demarcation layer under the clean cover to indicate if erosion has extended into the subgrade. Following the placement of final cover soils over regraded areas, a revegetation program will be implemented to establish permanent vegetation. Vegetation serves to reduce erosion, enhance evapotranspiration, and improve runoff water quality. The areas to be grassed will be seeded in stages as construction in is completed with 70 lbs./acre of seed conforming to the mix included in 3.2.1 of the Remedial Work Plan. In addition to the above seed mixture, mulch, mulch blankets, or synthetic fabric will be placed to prevent erosion during turf establishment. Mulch will be placed on all slopes less than 15% and a mulch blanket on all slopes greater than 15%. Synthetic erosion control fabric will be placed in drainage ditches and swales. As an aid to turf establishment, seeded areas will be fertilized with a starter fertilizer.

2.6 DUST CONTROLS

The surface of unvegetated or disturbed soil/fill areas will be wetted at all times with water or other dust suppressive agents to control dust during construction. There shall be no visible dust generated during redevelopment activities. Any subgrade material left exposed during extended interim periods (greater than 90 days) prior to placement of final cover shall be covered with a temporary cover system (i.e., tarps, spray type cover system, etc.) or planted with vegetation to control fugitive dust to the extent practicable. Particulate monitoring will be performed along the downwind occupied perimeter of parcels during subgrade excavation, grading, and handling activities in accordance with the Community Air Monitoring Plan further detailed in Section 4.2.

Dust suppression techniques will be employed at the site in accordance with NYSDEC TAGM 4031 (Fugitive Dust Suppression and Particulate Monitoring Program at Inactive Hazardous Waste Sites). This TAGM describes guidance for dust monitoring, and includes a list of effective dust suppression techniques. Dust monitoring is more fully described in ~~Appendix V~~ ATTACHMENT I (Minimum Requirements for Health and Safety). As per TAGM 4031, dust suppression techniques that may be used at the site include applying water on roadways, wetting equipment, spraying water on buckets during excavation and

dumping, hauling materials in properly covered or watertight containers, covering excavated areas and material after excavation activity ceases, establishing vegetative cover immediately after placement of cover soil, and reducing the excavation size and/or number of excavations. If the BUD for the reuse of water treatment residuals is acceptable to the NYSDEC, dust suppression techniques will also be constantly employed during soil blending. The use of atomizing sprays is recommended so that excessively wet areas will not be created but fugitive dust will be suppressed.

2.7 FENCING AND ACCESS CONTROL

Access to soil/fill on subdivided parcels adjacent to occupied on- or off-site parcels must be controlled until final cover is placed to prevent direct contact with subgrade materials. A six-foot tall chain link fence currently surrounds portions of the site. To better control site access, obvious access points will be gated. All City- and DDI-owned gates and existing fencing will be posted with "No Trespassing" signs. The entire site will be completely covered with clean fill or vegetated via hydroseeding to limit dust generation.

2.8 PROPERTY USE LIMITATIONS

The use of the property will be restricted through verbiage in the Voluntary Cleanup Agreement, to which this Remedial Action Work Plan will be attached.

2.9 NOTIFICATION AND REPORTING REQUIREMENTS

The following minimum notification and reporting requirements shall be followed by the property owner prior to and following site development, as appropriate:

- The NYSDEC and NYSDOH will be notified that subgrade activities are being initiated a minimum of five working days in advance of construction.
- A construction certification report stamped by a New York State licensed Professional Engineer, will be prepared and submitted to the NYSDEC and NYSDOH within 90 days after development of each parcel or subparcel. At a minimum, the report will include:

- An area map showing the parcel or subparcel that was developed and the property's tax map number.
- A topographic map of the developed property showing actual building locations and dimensions, roads, parking areas, utility locations, berms, fences, property lines, sidewalks, green areas, contours and other pertinent improvements and features. The topographic map will be stamped by a New York State licensed surveyor.
- Plans showing areas and depth of fill removal.
- Copies of daily inspection reports.
- Description of erosion control measures.
- A text narrative describing the excavation activities performed, health and safety monitoring performed (both site specified and Community Air Monitoring), quantities and locations of soil/fill excavated, disposal locations for the soil/fill, soil sampling locations and results, a description of any problems encountered, location and acceptability test results for backfill sources, and other pertinent information necessary to document that the site activities were carried out properly.
- Plans showing before and after survey elevations on a 100-foot grid system to document the thickness of the clean soil cover system.
- A certification that all work was performed in conformance with the S/FMP.

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3.0 QUALITY ASSURANCE AND QUALITY CONTROL (QA/QC)

3.1 ANALYTICAL METHODS

All characterization samples collected during site redevelopment activities will be analyzed using EPA-approved analytical methods using the most recent edition of the EPA's "Test Methods for Evaluating Solid Waste" (SW-846). Methods for Chemical Analysis of Water and Wastes "(EPA 600/4-79-020), Standard Methods for Examination of Waste and Wastewater" (prepared and published jointly by the American Public Health Association, American Waterworks Association and Water Pollution Control Federation).

3.2 LABORATORY

The laboratory proposed to perform the analyses will be certified through the New York State Department of Health Environmental Laboratory Approval Program (ELAP) to perform Contract Laboratory Program (CLP) analysis and Solid Waste and Hazardous Waste Analytical testing on all media to be sampled during this investigation. The laboratory will maintain this certification for the duration of the project.

3.3 DATA SUBMITTAL

The laboratory will perform the analysis of samples in accordance with the most recent (year 2000) NYSDEC Analytical Services Protocol (ASP). Analytical data will be submitted in complete ASP Category B data packs including documentation of laboratory QA/QC procedures that will provide legally defensible data in a court of law. If requested, the Category B data packs will be submitted to the NYSDEC.

Procedures for chain of custody, laboratory instrumentation calibration, laboratory analyses, reporting of data, internal quality control, and corrective actions shall be followed as per SW-846 and as per the laboratory's Quality Assurance Plan. Where appropriate, trip blanks, field blanks, field duplicates, and matrix spike, matrix spike duplicate shall be performed at a rate of 10% and will be used to assess the quality of the data. The laboratory's in-house QA/QC limits will be utilized whenever they are more stringent than those suggested by the EPA methods.

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3.4 DATA USABILITY SUMMARY REPORTS

After receipt of analytical results, the data package will be sent to a qualified, third party, data validation specialist for evaluation. A Data Usability Summary Report (DUSR) will be prepared. The DUSR will provide a determination of whether or not the data meets the project specific criteria for data quality and data use.

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4.0 HEALTH AND SAFETY PROCEDURES FOR INTRUSIVE OR MAINTENANCE ACTIVITIES

4.1 CONSTRUCTION PERSONNEL PROTECTION

Contractors engaged in subsurface construction or maintenance activities (e.g., foundation and utility workers) will be required to implement appropriate health and safety procedures. These procedures will involve, at a minimum, donning adequate personal protective equipment, performing appropriate air monitoring, and implementing other engineering controls as necessary to mitigate potential ingestion, inhalation and contact with residual constituents in the soils. A site-specific, activity-specific health and safety plan must be prepared by the contractor prior to on-site construction activities. Recommended health and safety procedures include the following:

- While conducting invasive work at the site, the Contractor shall provide working conditions on each operation that shall be as safe and healthful as the nature of that operation permits. The Contractor shall comply with all New York State Department of Labor regulations and published recommendations and regulations promulgated under the Federal Occupational Safety and Health Act of 1970 and the Construction Safety Act of 1969, as amended, and with laws, rules, and regulations of other authorities having jurisdiction. Compliance with governmental requirements is mandated by law and considered only a minimum level of safety performance. The Contractor shall insure that all work is performed in accordance with recognized safe work practices.

- The Contractor shall be responsible for the safety of the Contractor's employees, the public and all other persons at or about the site of the work. The Contractor shall be solely responsible for the adequacy and safety of all construction methods, materials, equipment and the safe prosecution of the work.

- The Contractor shall have a written health and safety plan (HASP) prepared, signed and sealed by a safety professional; a safety professional and/or a trained safety representative(s) active on the job whenever the work is in progress; an effective and documented safety training program; and a safety work method check list system.

- The Contractor shall stop work whenever a work procedure or a condition at a work site is deemed unsafe by the safety professional or his trained safety representative(s).

- The Contractor shall employ a properly qualified safety professional whose duties shall be to initiate, review and implement measures for the protection of health and prevention of accidents. The Contractor shall also employ safety representative(s) whose duties, working under the direct supervision of the safety professional, shall include the implementation the safety program for the work at the site.

- Recognition as a safety professional shall be based on a minimum of certification by the Board of Certified Safety Professionals as a Certified Safety Professional and 5 years of professional safety management experience in the types of construction and conditions expected to be encountered on the site.

- The safety representative(s) who will work under the direction of the safety professional will have appropriate qualifications. The required qualifications shall include a minimum of: five years of relevant construction experience, two years of which were exclusively in construction safety management; successful completion of a 30-hour OSHA Construction Safety and Health training course; 40-hour training as per 29 CFR 1926.65, Hazardous Waste Operations and Emergency Response; and, if confined space entry is required, training as per 29 CFR 1910.146, Permit-Required Confined Spaces.

- The safety professional shall visit and audit all work areas as often as necessary but at least once each week and shall be available for consultation whenever necessary.

- The safety representative(s) must be at the job site full-time (a minimum of 8 hours per working day) whenever work is in progress. When multiple shift work is in progress more than one safety representative may be required.

- The safety professional and his safety representative(s) shall be responsible for ensuring Contractor compliance with governing laws, rules and regulations as well as of good safety practice.

- The safety staff shall maintain and keep available safety records, up-to-date copies of all pertinent safety rules and regulations, Material Safety Data Sheets, and the Contractors' site specific health and safety plans (HASPs) and the site emergency response plan with emergency and telephone contacts for supportive actions.

- The responsible safety professional shall sign and seal the Contractor's written site-specific HASP and the Plan shall be available to workers on site. The Contractor shall provide copies of the HASP to the Contractors' insurer, if required.

- The HASP shall be written in accordance with 29 CFR 1926.65 and it will

identify and define the following: the hazards anticipated for each major invasive task; the engineering, administrative and/or personal protective equipment control measures that will be implemented; the surveillance methods, and schedules of both walk through surveys and in-depth safety audits to be performed on site; medical monitoring and screening methods; the Contractors' pre-start-up and continuous safety- training program; emergency response equipment, notification, training and procedures; and include copies of safety inspection check-off sheets, specific to the work methods and crews performing work at the various job locations, to be used on a regular basis in evaluating the site and work methods.

- The safety professional and/or his trained safety representative(s) shall as a minimum:

  - Schedule and conduct safety meetings and safety training programs as required by law, the health and safety plan, and good safety practice. A specific schedule of dates of these meetings and an outline of materials to be covered shall be provided with the health and safety plan. All employees shall be instructed on the recognition of hazards, observance of precautions, of the contents of the health and safety plan and the use of protective and emergency equipment.

  - Determine that operators of specific equipment are qualified by training and/or experience before they are allowed to operate such equipment.

  - Develop and implement emergency response procedures. Post the name, address and hours of the nearest medical doctor, name and address of nearby clinics and hospitals, and the telephone numbers of the appropriate ambulance service, fire, and the police department.

  - Post all appropriate notices regarding safety and health regulations at locations that afford maximum exposure to all personnel at the job site.

  - Post appropriate instructions and warning signs in regard to all hazardous areas or conditions that cannot be eliminated. Identification of these areas shall be based on experience, on site surveillance, and severity of hazard. Such signs shall not be used in place of appropriate workplace controls.

  - Ascertain by personal inspection that all safety rules and regulations are enforced. Make inspections at least once a shift to ensure that all machines, tools and equipment are in a safe operating condition; and that all work areas are free of hazards. Take necessary and timely corrective actions to eliminate all unsafe acts and/or conditions, and submit to the Engineer each day a copy of his findings on the inspection check list report forms established in the health and safety plan.

- Provide safety training and orientation to authorized visitors to ensure their safety while occupying the job site.

- Perform all related tasks necessary to achieve the highest degree of safety that the nature of the work permits.

- The Contractor shall have proper safety and rescue equipment, adequately maintained and readily available, for foreseeable contingencies. This equipment may include such applicable items as: proper fire extinguishers, first aid supplies, safety ropes and harnesses, stretchers, water safety devices, oxygen breathing apparatus, resuscitators, gas detectors, oxygen deficiency indicators, combustible gas detectors, etc. This equipment should be kept in protected areas and checked at scheduled intervals. A log shall be maintained indicating who checked the equipment, when it was checked, and that it was acceptable. This equipment log shall be updated monthly and be submitted with the monthly report. Equipment that requires calibration shall have copies of dated calibration certificates on site. Substitute safety and rescue equipment must be provided while primary equipment is being serviced or calibrated.

- All personnel employed by the Contractor or his subcontractors or any visitors whenever entering the job site, shall be required to wear appropriate personal protection equipment required for that area. The Contractor may remove from the site any person who fails to comply with this or any other safety requirement.

- Because water with elevated pH may act as a skin irritant, care must be taken to inhibit dermal contact when handling any groundwater at the site. Actions to inhibit contact with groundwater may include the use of latex or other waterproof gloves by on-site workers.

- The Contractor will follow the more thorough requirements for health and safety included in Attachment V.

4.2 COMMUNITY AIR MONITORING PROGRAM

Ambient air monitoring will be conducted by the Professional Engineer monitoring the work on a real-time basis during all subsurface construction activities using a minimum of a photoionization detector and a dust meter. Battery charge level for each instrument will be checked at the beginning and end of each day. The instruments will be calibrated at a frequency recommended by the manufacturer. All air monitoring readings will be recorded in a logbook and will be available for review by the NYSDEC and New York State Department of Health (NYSDOH).

Baseline conditions will be measured at proposed intrusive activity locations prior to commencement of operations. Air quality within the work zone will be monitored in accordance with the site-specific health and safety plan created by the site developer or contractor. In addition to monitoring the work area for worker health and safety, volatile organic compounds will be monitored at the downwind perimeter of the work area every hour. If downwind perimeter organic vapor levels exceed five parts per million (ppm) above the upwind work area perimeter concentrations, the Vapor Emission Response Plan will be implemented.

As described in Section 2.6, appropriate dust suppression techniques will be employed at all times during site redevelopment activities. Using a dust meter, particulates will be continuously monitored immediately downwind in the work area and integrated over a period not to exceed 15 minutes. If the downwind particulate level is more than 150 ug/m^3, then upwind (background) levels must be measured immediately. If the downwind levels are more than 100 ug/m^3 above background, additional dust suppression measures must be taken.

4.2.1 Vapor Emission Response Plan

If the downwind area perimeter air concentrations of organic vapors exceed the upwind work area perimeter concentration by 5 ppm but less than 25 ppm, the following actions will be taken:

- Every 30 minutes monitor the perimeter work area location.
- Every 30 minutes monitor the organic vapor concentration 200 feet downwind of the work area perimeter or half the distance to the nearest receptor,

whichever is less. If this reading exceeds the perimeter work area upwind organic vapor concentration by 5 ppm, all work must halt and monitoring increased to every 15 minutes. If, at any time, this reading exceeds the perimeter work area upwind concentration by 10 ppm, the Major Vapor Emissions Response Plan will be initiated.

- If organic vapor levels 200 feet downwind of the perimeter work area or half the distance to the nearest downwind receptor, whichever is less, exceeds by 5 ppm the work area perimeter upwind concentration persistently, then air quality monitoring must be performed within 20 feet of the nearest downwind receptor (20-foot zone). If the readings in the 20-foot zone exceed the perimeter work area upwind concentration by 5 ppm for more than 30 minutes, then the Major Vapor Emissions Response Plan will be implemented.

- Work activities can resume only after the downwind 200 foot reading and the 20-foot zone reading are less than 5 ppm above the perimeter work area upwind concentration. In addition, the downwind perimeter work area concentration must be less than 25 ppm above the perimeter work area upwind concentration.

4.2.2 Major Vapor Emission Response Plan

If the downwind work area perimeter organic vapor concentration exceeds the upwind work area perimeter concentration by more than 25 ppm, then the Major Vapor Emission Response Plan will be activated. Upon activation, the following activities will be undertaken:

1. All work will halt.

2. All Emergency Response Contacts as listed in the Health and Safety Plan will be contacted.

3. The NYSDEC, NYSDOH, and the Erie County Health Department will be notified and advised of the situation.

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

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

MALCOLM PIRNIE

ATTACHMENT I

EXCAVATION AND HANDLING OF POTENTIALLY CONTAMINATED SOIL/FILL

EXCAVATION AND HANDLING OF POTENTIALLY CONTAMINATED SOIL/FILL

PART 1 - GENERAL

1.1 DESCRIPTION

A. Scope:
   1. Provide all labor, materials, equipment and incidentals required to perform all excavating, backfilling, filling and grading, and disposing of soil/fill materials as required for construction of structures, manholes, vaults, conduits, pipelines, roads, and other facilities.
   2. Stockpile and characterize soil/fill in which evidence of contamination (staining, odors, elevated pH and/or elevated photoionization detector measurements) is observed. Stained soil is soil that is discolored, tinted, dyed, unnaturally mottled, or contains a sheen.
   3. Prepare all waste disposal applications and shipping manifests and make all arrangements for transportation and disposal of contaminated material.

1.2 QUALITY ASSURANCE

A. Permits and Regulations:
   1. Obtain all necessary permits for work in roads, rights-of-way, railroads, etc. Also obtain permits as required by local, state and federal agencies for discharging water from excavations.
   2. Perform excavation work in compliance with applicable requirements of governing authorities having jurisdiction.

B. Reference Standards: Comply with applicable provisions and recommendations of the following.
   1. OSHA Standard, Title 29, Code of Federal Regulations, Part 1926, Section .650 (Subpart P - Excavations).

1.3 SUBMITTALS

A. No excavation, grading or disturbance of the final vegetated soil over or existing subgrade soil/fill shall be initiated prior to a minimum of five working days written notification to the NYSDEC Region 9, Division of Environmental Remediation. The notification will include a description of planned excavation activities and protective measures, and the name of the site supervisor.

B. Provide waste manifests, bills of lading, certified weight scale tickets, or other transportation records for soil/fill material removed from the site, to the NYSDEC, if requested.

C. Test Reports – Characterization of Soil/Fill and Borrow Materials:
   1. Provide NYSDEC analytical results, if requested, for the following :
      a. Tests of soil/fill with evidence of contamination of material removed during excavation.
      b. Tests, if necessary, of off-site material that will be used as fill or cover material at the site.

1.4 JOB CONDITIONS

A. Subsurface Information: Refer to Remedial Work Plan and previous investigation reports on subsurface conditions. Data is not intended as a representation or warranty of continuity of conditions between soil borings nor of groundwater levels at dates and times other than date and time when measured.

B. Existing Structures and Utilities: Due to site history, underground structures and utilities may be present in the area of the Former Railyard.
   1. CONTRACTOR may need to explore ahead of the required excavation to determine the exact location of all structures and utilities.
   2. Locate existing underground utilities in the areas of work. If utilities are to remain in place, provide adequate means of protection during all operations.
   3. Should uncharted or incorrectly charted piping or other utilities be encountered during excavation, consult piping or utility owner immediately for directions as to procedure. Cooperate with utility owner in keeping services and facilities in operation. Repair damaged utilities to satisfaction of utility owner.
   4. Should underground storage tanks or drums be encountered, the CONTRACTOR shall notify the NYSDEC immediately. The CONTRACTOR shall also take appropriate measures to protect the health and safety of on-site workers. Any tanks or drums encountered shall be evaluated to the satisfaction of the NYSDEC and properly closed in place or removed and properly disposed.
   5. Should foundations be encountered, the CONTRACTOR shall either remove the foundation in areas necessary to complete the work or modify the work to accommodate the foundations.

D. Protection of Persons and Property: Barricade open excavations occurring as part of the work and post with warning lights, if necessary. Operate warning lights, if necessary, during hours from dusk to dawn each day and as otherwise required.
   1. Protect structures, utilities, sidewalks, pavements, and other facilities from damage caused by settlement, lateral movement, undermining, washout and other hazards created by earthwork operations.

E. Dust Control: Conduct all operations and maintain areas of activity, including sweeping and sprinkling of roadways, to minimize creation and dispersion of dust.

PART 2 – PRODUCTS (NOT APPLICABLE)

PART 3 -EXECUTION

3.1 INSPECTION

A. Provide NYSDEC with sufficient notice and with means to examine the areas and conditions under which excavating, filling, and grading are occurring.

3.2 SITE PREPARATION

A. Clear all areas to be excavated of all trees, brush, roots, stumps, logs, wood and other materials and debris. All contaminated waste materials shall be removed from site and properly disposed. Burning will not be permitted unless permitted by the appropriate authorities.

B. If cover material was previously placed in the area to be excavated, the cover material may be stripped from the surface and stockpiled separately for reuse.

3.3 TEST PITS

A. CONTRACTOR may, if necessary, excavate and backfill, in advance of construction, test pits to determine conditions or location of existing facilities. The test pit operations will be conducted in accordance with the excavation procedures outlined below.

3.4 EXCAVATION

A. Perform all excavation required to complete the work as necessary. Excavations shall include earth, sand, clay, gravel, hardpan, boulders not requiring drilling and blasting for removal, decomposed rock, pavements, rubbish and all other materials within the excavation limits.

B. All work shall be completed in accordance with all air quality standards as determined by applicable federal, state, and local regulations.

C. Excavations for structures and utilities shall be open excavations. Provide excavation protection system(s) required by ordinances, codes, law and regulations to prevent injury to workmen and to prevent damage to new and existing structures or pipelines. Unless shown or specified otherwise, protection system(s) shall be utilized under the following conditions.

1. Excavation Less Than 5 Feet Deep: Excavations in stable rock or in soil conditions where there is no potential for a cave-in may be made with vertical sides. Under all other conditions, excavations shall be sloped and benched, shielded, or shored and braced.

2. Excavations More Than 5 Feet Deep: Excavations in stable rock may be made with vertical sides. Under all other conditions, excavations shall be sloped and benched, shielded or shored and braced.
3. All excavations or disturbances must be covered using appropriate cover material within 10 working days of backfilling or as otherwise approved by the NYSDEC.

D. Pumping of water from excavations, if necessary, shall be done in such a manner to prevent the carrying away of particulates, soil/fill, or unsolidified concrete materials, and to prevent damage to the existing subgrade.
   1. Water from the excavations will be disposed properly in accordance with all applicable regulations in such a manner as not to endanger public health, property, or any portion of the work under construction or completed.
   2. In areas of high pH, the pH of the water in excavations will be measured using a field pH meter. Based on the groundwater analytical results, water in the excavations may be discharged to the ground surface unless staining or elevated PID measurements are observed in the excavation, a sheen is present on the water surface or if pH is less than 6.5 or greater than 8.5. If any of these conditions exist, the water pumped from the excavations will be containerized or may be discharged to the Buffalo Sewer Authority under a discharge permit if the water quality falls within the conditions of the permit. If the water quality is such that the permit requirements will be exceeded, the groundwater removed from the excavation will be containerized and sampled. Containerized water not meeting the Surface Water and Groundwater Quality Standards set forth in 6 NYCRR Part 703.5 will be transported off-site for proper disposal.

E. Utility Trench Preparation:
   1. No more than 200 feet of trench may be opened in advance of utility laying.
   2. Trench width shall be minimized to greatest extent practical but shall conform to the following:
      a. Sufficient to provide room for installing, jointing and inspecting utilities.
      b. Enlargements at pipe joints may be made if required.
      c. Sufficient for shoring and bracing, or shielding and dewatering.
      d. Sufficient to allow thorough compaction of backfill adjacent to bottom half of utility.
      e. Do not use excavating equipment that requires the trench to be excavated to excessive width or depth.

F. Field Screening of Excavated Materials:

1. The soil/fill removed during excavation will be inspected for staining and will be field screened for the presence of volatile organic compounds (VOCs) with a photoionization detector (PID).
2. Excavated soil/fill with no evidence of contamination (no staining or elevated PID measurements) may be used as subgrade or excavation subgrade backfill. However, soils with high pH (8.5 to 12.5) will not be used as backfill in utility trenches or as subsurface material in the construction of berms.
3. Excavated soil/fill that is visibly stained or produces elevated PID readings (i.e., sustained 10 ppm or greater) will be considered potentially contaminated soil/fill. Potentially contaminated soil/fill will be stockpiled on polyethylene sheeting and then sampled for reuse, treatment or disposal.
   a. Sampling and analysis of soil/fill exhibiting staining and/or elevated PID measurements will be completed in accordance with the protocols delineated in the Soil/Fill Management Plan (S/FMP). Sampling and analysis will also be completed in accordance with the requirements of the disposal facility at which the soil/fill with concentrations of contaminants above the site-specific action levels (SSALs) will be disposed.
   b. Soil/fill containing one or more constituents in excess of SSALs in the S/FMP will be transported off-site to a permitted waste management facility.
   c. Excavated or disturbed soil/fill that has been analyzed and found to meet SSALs may be used as subgrade or excavation subgrade backfill.

G. Material Storage:

1. Stockpile soil/fill with no evidence of contamination (no staining or elevated PID measurements) in approved areas in approximately 50 cubic yard piles, until required for backfill or fill. Place, grade and shape stockpiles for proper drainage.
   a. Locate and retain soil materials away from edge of excavations.
   b. Dispose of excess soil material and waste materials appropriately.
2. Stockpile soil/fill with evidence of contamination (staining and/or elevated PID measurements) in approved areas in approximately 50 cubic yard piles, until sample analysis is completed. Place, grade and shape stockpiles for proper drainage. Ensure effective weather proofing of potentially contaminate soil stockpiles.
   a. Locate and retain soil materials away from edge of excavations.
   b. The stockpiled soil/fill will be placed on top of and be completely covered using polyethylene sheeting with a minimum thickness of 8-mil to reduce the infiltration of precipitation and the entrainment of dust. A berm wall shall be constructed around the stockpile using uncontaminated material covered with the same sheeting as the stockpiled material. The stockpile area shall be protected from stormwater runoff. Edges of the sheeting shall overlap a minimum of two feet and duct tape shall be applied along all seams to prevent movement of sheeting and infiltration of precipitation

into the stockpiled soil. Non-soil weights (e.g. tires) may be necessary to inhibit movement of the cover sheeting by wind.

H. Sample Collection and Analysis:
   1. Collect a minimum of one composite sample, and one duplicate sample using five grab samples per 100 cubic yards of potentially contaminated soil as described in the Soil/Fill Management Plan. The characterization samples should be collected from stockpiled potentially contaminated soil/fill within five days of excavation.
   2. Engage the services of a NYSDOH ELAP certified analytical laboratory to analyze samples in order to determine the proper handling and disposal of potentially contaminated soil/fill material as listed below.
   3. Required Analyses:
      a. Target Compound List (TCL) Volatile Organic Compounds (VOCs) by New York State Department of Environmental Conservation (NYSDEC) Analytical Services Protocol (ASP) 95-1.
      b. TCL Semivolatile Organic Compounds (SVOCs) by NYSDEC ASP 95-2.
      c. TCL pesticides and polychlorinated benzenes (PCBs) by NYSDEC ASP (95-3).
      d. Target Analyte List (TAL) metals and cyanide by NYSDEC ASP.
      e. pH by SW-846 Method 9045.
   4. If contaminants are present at concentrations above the SSALs, additional analysis will be required by the disposal facility and will likely include:
      a. Toxicity Leaching Characteristic Procedure (TCLP)
      b. RCRA Characteristics (Ignitability, Corrosivity, and Reactivity).

3.5 LOADING AND TRANSPORTING

A. Furnish all labor, materials, equipment, and incidentals required to load and transport all contaminated soil/fill from the site.

B. Notify the NYSDEC in writing when loading of contaminated soil/fill will occur and include the name and location of the disposal facility to be used. Submit to the NYSDEC, if requested, a full description of the disposal facility, licenses, permits, and compliance status.

C. Do not load and transport contaminated soil and debris until receipt of approval from the disposal facility that the contaminated soil and debris will be disposed in.

D. Conduct all loading and transportation activities in accordance with all applicable federal, state, and local regulations, including but not limited to United States Department of Transportation and USEPA regulations 40 CFR 172-179.

E. Conduct all loading activities to minimize the formation of dust.

F. Obtain and comply with the required permits and authorization for transportation of contaminated soil and debris in accordance with State and local jurisdictions. The contaminated soil and debris shall be transported by a licensed waste hauler.

G. All trucks transporting contaminated soil and debris for off-site disposal shall be lined, covered, and secured in accordance with all federal, State, and local regulations. Any liner that cannot be decontaminated shall be disposed of with the contaminated soil and debris. Trucks used for transportation of contaminated soil and debris shall travel on authorized roads in accordance with all federal, state and local regulations.

H. Contaminated soil and debris shall be transported for disposal in containers that are watertight. Leaking containers shall be unloaded at the site and any leaked liquids cleaned up as spills.

I. Contaminated soil and debris transport containers shall be covered to prevent release of dust and particulates and exposure of the contaminated soil and debris to precipitation.

J. Employ a temporary transport vehicle pad for vehicle loading operations to control and contain contaminated soil and debris spillage.

K. Inspect and clean loaded transport vehicle tires and undercarriage to remove any adhering contaminated soil and debris prior to vehicle departure from the site.

3.6 DISPOSAL OF EXCAVATED MATERIALS

A. Soil/Fill with concentrations of contaminants above the SSALs will be disposed off-site within 90 days of excavation at an appropriate, permitted disposal facility.

B. Prepare all applications for waste disposal at appropriate disposal facilities and waste transportation and disposal manifests and any other documents necessary for the off-site disposal of contaminated soil/fill material. Submit waste transportation and disposal documentation to the NYSDEC, if requested.

C. Prepare a waste transportation and disposal manifest, and all other documents required for waste shipment, for each load of waste material that is transported from the site.

D. Maintain a waste disposal log on-site containing pertinent waste disposal information. If requested, the NYSDEC on-site representative may review the log.

3.7 SOIL/FILL COVER SYSTEM

A. Backfill all excavations as promptly as work permits.

B. Replace cover material within 10 days of backfilling excavations. The cover material shall be consistent with and will be placed in accordance with the Remedial Work Plan.

C. If working conditions require the excavation to remain open for a period greater than ten days, plastic or metal sheeting will be used to cover the entire or portions of the excavation during periods of inactivity.

++ END OF SECTION ++

MALCOLM PIRNIE

ATTACHMENT II

STANDARD OPERATING PROCEDURES

Appendix ____: Item ____ - SCREENING OF SOIL/FILL SAMPLES FOR ORGANIC VAPORS

Applicability: GENERAL Revision No.: _____ Date: _____

Prepared By: PIM Date: _____ Approved By: _____ Date: _____

1.0 INTRODUCTION

This guideline presents a method for screening soil samples. During soil/fill excavation activities, a photoionization detection (PID) or flame ionization detector (FID) will be used to monitor the excavated soils. The monitoring results provide criteria for sampling of soil potentially impacted by volatile organic substances.

2.0 METHODOLOGY

1. During excavation, the excavated soil will be examined for visually contaminated (stained) soils. If present, these areas will be sampled first. If no staining is observed, collect samples from each stockpile at random locations.

2. Place the sample in a labeled wide-mouthed glass jar. Seal the jar with aluminum foil and a screw top cap.

   a. Keep these samples at as near to 70°F as possible.
   b. Check head space of each sample for any organic vapor present by inserting the probe of the PID through the aluminum foil seal.
   c. The soil sample from each excavation location will be noted where VOA's were detected and removal of the contaminated soil will be coordinated per project requirements.

Appendix ____: Item ____ - ____SCREENING OF SOIL/FILL SAMPLES FOR ORGANIC VAPORS

Applicability: GENERAL____ Revision No.: _____ Date: _____

Prepared By: PIM Date: _____ Approved By:_____ Date: _____

3.0 EQUIPMENT REQUIREMENTS

- 40 ml. precleaned and prelabeled glass VOA vials with teflon-lined septum caps.
- Ice and ice chest.
- Wide mouthed glass jars with screw caps
- Aluminum foil.
- Photoionization detector.

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Appendix ____: Item ____ - ____COMPOSITE SAMPLE PROCEDURE FOR NON-VOLATILE ORGANICS ANALYSIS

Applicability: _____ Revision No.: _____Date:_____

Prepared By: _____Date: _____ Approved By: _____ Date: _____

1.0 INTRODUCTION

This guideline addresses the procedure to be used when soil samples are to be composited in the field.

2.0 METHODOLOGY

1. Transfer equal portions of soil from individual split-spoon samples to a large precleaned stainless steel (or Pyrex glass) mixing bowl.

2. Thoroughly mix (homogenize) and break up the soil using a stainless steel scoop or trowel.

3. Spread the composite sample evenly on a stainless steel tray and quarter the sample.

4. Discard alternate (i.e. diagonal) quarters and, using a small stainless steel scoop or spatula, collect equal portions of subsample from the remaining two (2) quarters until the amount required for the composite sample is acquired. Transfer these subsamples to a precleaned stainless steel (or glass Pyrex) mixing bowl and re-mix.

5. Transfer the composite sample to an appropriate precleaned jars provided by the laboratory and label. Store any excess sample from the stainless steel tray in separate, precleaned, sample containers, and submit to the laboratory for holding in case additional analysis is necessary.

6. Decontaminate all stainless steel (or glass Pyrex) trays, spoons, spatulas, and bowls in accordance with the sampling equipment decontamination procedure provided.

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MALCOLM PIRNIE

ATTACHMENT III

GENERIC EROSION AND SURFACE WATER CONTROL PLAN

GENERIC EROSION AND SURFACE WATER CONTROL PLAN

PART 1 - GENERAL

1.1 DESCRIPTION

A. Scope:
   1. Provide all labor, materials, equipment and incidentals required to perform all excavating, backfilling, filling and grading, for construction of structures, manholes, vaults, conduits, pipelines, roads, and other facilities and all related sediment and erosion controls as specified herein.
   2. Provide positive means of erosion control, such as shallow ditches (see "New York Guidelines for Urban Erosion and Sediment Control" Third Printing 10/91 USDA – Soil Conservation Service), around work areas to remove surface drainage water from excavated areas. Pumping of water from excavations, if necessary, shall be done in such a manner to prevent the carrying away of particulates, soil/fill, or unsolidified concrete materials, and to prevent damage to the existing subgrade.
   3. Water from the excavations will be disposed properly in accordance with all applicable regulations in such a manner as not to endanger public health, property, or any portion of the work under construction or completed. Based on groundwater analytical results for samples collected at the Site, water may be discharged to the ground surface unless staining or elevated PID measurements are observed in the excavation or a sheen is present on the water surface. If any of these conditions exist the water removed from the excavation will be containerized and sampled. Any groundwater not meeting NYSDEC Ambient Water Quality and Guidance Values will be transported and disposed off-site.

1.2 QUALITY ASSURANCE

A. Permits and Regulations:
   1. Obtain all necessary permits for work in roads, rights-of-way, railroads, etc. Also obtain permits as required by local, state and federal agencies for discharging water from excavations.
   2. Perform excavation work in compliance with applicable requirements of governing authorities having jurisdiction.

B. Reference Standards: Comply with applicable provisions and recommendations of the following.
   1. NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION (NYSDEC) SPDES General Permit for Storm Water Discharges from Construction Activities (Permit Number GP-93-06).
   2. SOIL AND WATER CONSERVATION SOCIETY (SWCS) - EMPIRE STATE CHAPTER 1991 (or latest version) New York Guidelines for Urban Erosion and Sediment Control.

3. CODES, RULES, AND REGULATIONS OF THE STATE OF NEW YORK
   6 NYCRR Part 700 Definitions, Samples and Tests.
4. 6 NYCRR Part 364 Waste Transporter Permits.
5. OSHA Standard, Title 29, Code of Federal Regulations, Part 1926, Section .650 (Subpart P - Excavations).

1.3 SUBMITTALS

A. The Contractor shall prepare a written Work Plan that details the Contractor's operations and includes all activities that relate to the soil excavation (i.e., excavation plan, sampling plan, etc.). The Work Plan must detail erosion control methods and surface water management procedures that will be implemented by the Contractor throughout the work. The Work Plan shall include:
   1. Procedures for excavating, handling, storing and transporting off-site contaminated soils, hazardous soils and concrete debris including a contingency plan detailing procedures and methods to be employed at no additional cost to prevent, contain, and recover spills during the work.
   2. Description of equipment to be used on site with appropriate safety devices needed to undertake the remediation of the site.
   3. Identification of permits required to conduct the work.
   4. Worksite layout showing, at a minimum, equipment and material staging areas, trailers, decontamination station, and staging procedures.
   5. Identification of proposed haul routes for wastes and backfill.
   6. Detailed construction drawing(s) of the proposed decontamination station.
   7. Provisions for control and prevention of surface runoff.
   8. Procedures and provisions for control of fugitive air emissions and dust control.
   9. Detailed work schedule for all tasks to fulfill the project.
   10. Other requirements necessary to provide security, staging, sampling, testing, removal, and disposal of wastes.
   11. Procedures and provisions for traffic control on public right of ways and private properties.
   12. Procedures and provisions for site winterization, if necessary.
   13. Procedures for collecting, storing, and disposing of decontamination water and other contaminated water generated during the work.
   14. Methods and equipment to be used for compaction of fill materials backfilled in the excavated areas.

1.3.1. STORM WATER MANAGEMENT AND EROSION CONTROL PLAN (SWECP)

A. A SWECP will be included in the Work Plan. The SWECP shall follow guidelines for structure and content contained in SPDES-GP-93-06, Appendix F. The SWECP shall include:
   1. Information regarding site background, description of work, analysis of site limitations for storm water facilities, and potential impact to natural resources.

2. All calculations and assumptions used for the sizing and siting of proposed temporary erosion and sedimentation control facilities.
3. Information regarding maintenance needs and safety considerations of storm water management and erosion and sediment control facilities.
4. Description of the staging of erosion and sedimentation control facilities and construction activities.
5. Description of winterization provisions, if necessary.

1.3.1.1 Storm Water Management Guidelines

A. Control and prevent surface runoff into remediation areas.

B. Control and prevent surface runoff from contaminating a clean area, or recontaminating an area that has been excavated to remove all soil above the cleanup goals. In the event surface runoff is the cause of existing clean areas, or subsequently cleaned areas, becoming contaminated, the affected areas shall be cleaned in accordance with the Remedial Work Plan.

1.3.1.2 Erosion and Sediment Control Guidelines

A. Existing vegetation on the project site shall be retained and protected to minimize soil loss on the project site and to minimize erosion control costs.

B. Sediment control practices and measures, where necessary, shall be designed to protect the natural character of rivers, streams, lakes, coastal waters or other waterbodies in the vicinity of the site and minimize erosion and sedimentation off-site from the start of land disturbance activities to completion of the project.
   1. The off-site impacts of erosion and sedimentation related to land clearing, grading and construction activities shall not be any greater during and following land disturbance activities than under pre-mobilization conditions.
   2. Pursuant to 6NYCRR Part 700.
      a. Toxic and other deleterious substances shall not be discharged in amounts that will adversely affect the taste, color or odor thereof, or impair the waters of the state for their classified usages.
      b. Suspended, colloidal and settleable solids shall not be discharged in amounts that cause substantial visible contrast to natural conditions, or causes deposition or impairs the waters for their classified usages.
   3. Stream reaches downstream of construction areas shall not have substantial visible contrast relative to color, taste, odor, turbidity and sediment deposition from the reaches upstream of the construction area. Impacts such as these which result from construction or developmental activities are a violation of 6 NYCRR Park 700 water quality standards and may be subject to enforcement actions.

C. Erosion and sediment control measures shall be constructed in accordance with an erosion and sediment control plan. The plan shall:
   1. Describe the temporary structural and vegetative measures that will be used to control erosion and sedimentation for each stage of the project from land clearing to the finished stage.
   2. Provide a map showing the location of erosion and sediment control measures.
   3. Provide an implementation schedule for staging temporary and permanent erosion and sediment control facilities.
   4. Provide a maintenance schedule for soil and sediment control facilities and describe maintenance activities to be performed.

D. Erosion and sediment control measures shall be constructed prior to beginning any other land disturbances. The devices shall not be removed until the disturbed land areas are stabilized.

E. Guidance:
   1. Grading: Perimeter grading shall blend with adjoining properties.
   2. Vegetative Protection: Where protection of trees or other vegetation is required, the location of the site to be protected shall be shown on the erosion control plan. The method of protecting vegetation during construction shall conform to the design criteria in SWCS.
   3. Drainage Control:
      a. Surface runoff that is relatively clean and sediment free shall be diverted or otherwise prevented from flowing through areas of construction activity on the project site.
      b. An approved temporary sediment control structure or permanent storm water management structure shall not be created which causes water to pond off-site on adjacent property, without first having obtained ownership or permanent easement for such use from the owner of the off-site or adjacent property.
      c. Natural drainage channels shall not be altered or relocated without the proper approvals. Pursuant to ECL Article 15 a protected stream and the bed and banks thereof shall not be altered or relocated without the approval of the NYSDEC.
      d. Runoff from any land disturbing activity shall not be discharged or have the potential to be discharged off-site or into storm drains or into watercourses unless such discharge is directed through a properly designed, installed and maintained structure, such as a sediment trap, to retain sediment on-site. Accumulated sediment shall be removed when 60 percent of the storage capacity of the sediment retention structure is filled with sediment.
      e. To limit the potential for migration of water with high pH from the site, clay plugs will be installed in the utility corridors at a maximum spacing of 100 feet.
      f. For finished grading, adequate gradients shall be provided so as to prevent water from standing on the surface of lawns for more than

24 hours after the end of a rainfall, except in a swale flow area which may drain as long as 48 hours after the end of rainfall.

g. Permanent swales or other points of concentrated water flow shall be stabilized with sod, rip rap, paving, or covered with an approved erosion control matting as provided for in the design criteria in SWCS.

h. Surface flows over cut and fill slopes shall be controlled as provided for in the design criteria for vegetating waterways in SWCS.

5. Stream protection:

   a. The bed and banks of all on-site and off-site streams that may be impacted by land clearing, grading, and construction activities shall be protected to prevent stream, river, lake or coastal sedimentation, streambank erosion, stream enlargement and degradation or loss of fisheries habitat. Measures for protecting the bed and banks of a stream include: rip rap, log cribbing, and vegetative measures.

6. Maintenance:

   a. An erosion control plan for the project site shall identify maintenance requirements for erosion and sediment control practices utilized, and it shall provide a maintenance schedule. All erosion and sediment control measures shall be inspected periodically and maintained in conformance with the schedule so as to ensure they remain in effective, operating condition until such times as they are removed.

   b. All points of construction ingress and egress shall be protected to prevent the deposition of materials onto traversed public thoroughfare, either by installing and maintaining a stabilized construction entrance, or by washing all vehicle wheels in a safe disposal area. All materials deposited onto public thoroughfares shall be removed immediately. Proper precautions shall be taken to ensure that materials deposited onto public thoroughfares are removed so that they do not enter catch basins, storm sewers, or combined sewers.

   c. Accumulated sediment shall be removed when 60 percent of the storage capacity of the retention structure is filled with sediment.

PART 2 – PRODUCTS (NOT APPLICABLE)

PART 3 -EXECUTION

A. The Contractor will provide NYSDEC with sufficient notice and means to examine the areas and conditions under which excavating, filling, and grading are occurring.

B. The Contractor shall strictly adhere to the provisions of the Work Plan and shall control and manage surface water in every area where his/her activities take place.

C. The Contractor shall plan and execute construction and earth work by methods to control surface drainage from cuts and fills, and from borrow and waste disposal areas, to prevent erosion and sedimentation.
   1. Hold the areas of bare soil exposed at one time to a minimum.
   2. Provide temporary control measures such as berms, dikes and drains.

D. Construct fills and waste areas by selective placement to eliminate surface silts or clays, which will erode.

E. Periodically inspect earthwork to detect any evidence of the start of erosion, apply corrective measures as required to control erosion.

F. Surface water from known areas of contamination shall be collected prior to leaving those areas and properly disposed following all applicable state and federal regulations.

G. In the event that surface runoff is the cause of existing clean areas, or subsequently cleaned areas, becoming contaminated, the affected areas shall be cleaned in accordance with the Remedial Work Plan.

H. Groundwater that is visibly flowing from the excavation shall be collected at each exit point and properly disposed following all applicable state and federal regulations.

++ END OF SECTION ++

MALCOLM PIRNIE

ATTACHMENT IV

EROSION CONTROL DETAILS

STANDARD AND SPECIFICATIONS FOR SILT FENCE

Definition

A temporary barrier of geotextile fabric (filter cloth) used to intercept sediment laden runoff from small drainage areas of disturbed soil.

Purpose

The purpose of a silt fence is to reduce runoff velocity and effect deposition of transported sediment load. Limits imposed by ultraviolet stability of the fabric will dictate the maximum period the silt fence may be used.

Conditions Where Practice Applies

A silt fence may be used subject to the following conditions:

1. Maximum allowable slope lengths contributing runoff to a silt fence are:

Slope Steepness	Maximum Slope Length (Ft)
2:1	50
3:1	75
4:1	125
5:1	175
Flatter than 5:1	200

2. Maximum drainage area for overland flow to a silt fence shall not exceed 1/2 acre per 100 feet of fence; and
3. Erosion would occur in the form of sheet erosion; and
4. There is no concentration of water flowing to the barrier.

Design Criteria

Design computations are not required. All silt fences shall be placed as close to the area as possible, and the area below the fence must be undisturbed or stabilized.

A detail of the silt fence shall be shown on the plan, and contain the following minimum requirements:

1. The type, size, and spacing of fence posts.
2. The size of woven wire support fences. (OPTIONAL)
3. The type of filter cloth used.
4. The method of anchoring the filter cloth.
5. The method of fastening the filter cloth to the fencing support.

Where ends of filter cloth come together, they shall be overlapped, folded and stapled to prevent sediment bypass. See Figure 4.4 on page 4.12 for details.

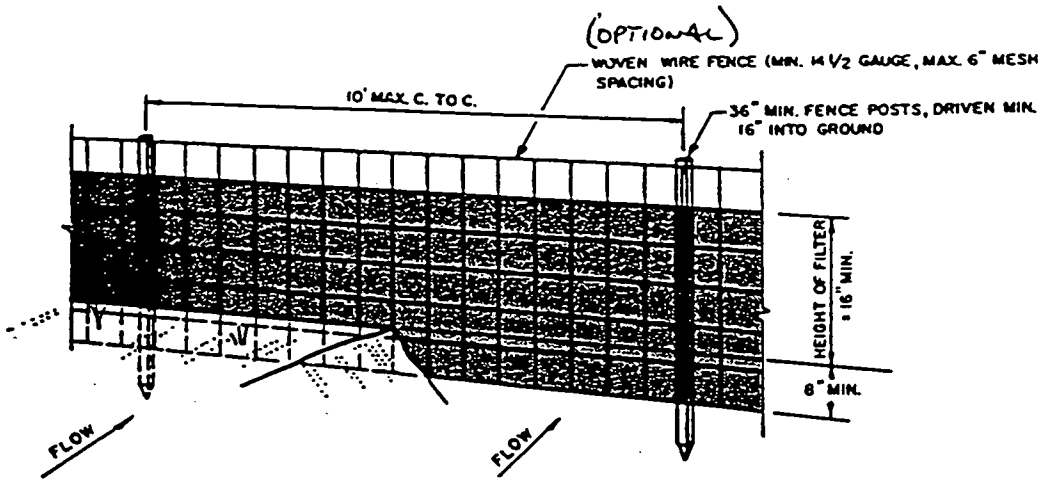
Criteria for Silt Fence Materials

1. Silt Fence Fabric: The fabric shall meet the following specifications unless otherwise approved by the appropriate erosion and sediment control plan approval authority. Such approval shall not constitute statewide acceptance. Statewide acceptability shall depend on in field and/or laboratory observations and evaluations.

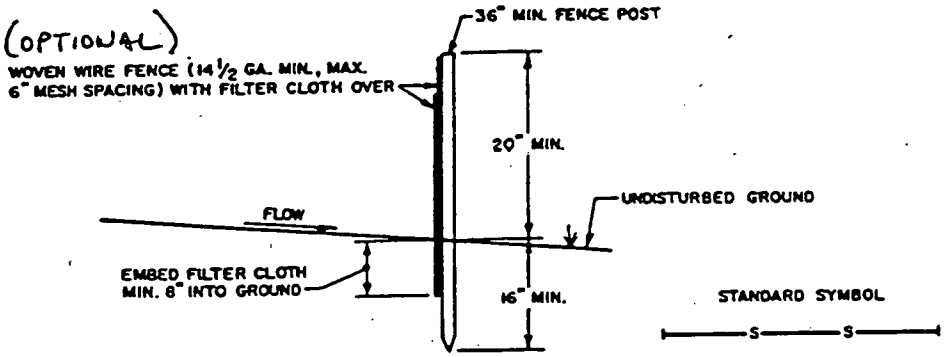
Fabric Properties	Minimum Acceptable Value	Test Method
Grab Tensile Strength (lbs)	90	ASTM D1682
Elongation at Failure (%)	50	ASTM D1682
Mullen Burst Strength (PSI)	190	ASTM D3786
Puncture Strength (lbs)	40	ASTM D751 (modified)
Slurry Flow Rate (gal/min/sf)	0.3	
Equivalent Opening Sizw	40-80	US Std Sieve CW-02215
Ultraviolet Radiation Stability (%)	90	ASTM G-26

2. Fence Posts (for fabricated units): The length shall be a minimum of 36 inches long. Wood posts will be of sound quality hardwood with a minimum cross sectional area of 3.0 square inches. Steel posts will be standard T and U section weighing not less than 1.00 pound per linear foot.
3. Wire Fence (for fabricated units): Wire fencing shall be a minimum 14-1/2 gage with a maximum 6 in. mesh opening, or as approved. (OPTIONAL)
4. Prefabricated Units: Envirofence or approved equal may be used in lieu of the above method providing the unit is installed per manufacturer's instructions.

Figure 4.4
Silt Fence Details



PERSPECTIVE VIEW



SECTION

CONSTRUCTION NOTES FOR FABRICATED SILT FENCE

(OPTIONAL)

1. WOVEN WIRE FENCE TO BE FASTENED SECURELY TO FENCE POSTS WITH WIRE TIES OR STAPLES.
2. FILTER CLOTH TO BE FASTENED SECURELY TO WOVEN WIRE FENCE WITH TIES SPACED EVERY 24" AT TOP AND MID SECTION.
3. WHEN TWO SECTIONS OF FILTER CLOTH ADJOIN EACH OTHER THEY SHALL BE OVERLAPPED BY SIX INCHES AND FOLDED.
4. MAINTENANCE SHALL BE PERFORMED AS NEEDED AND MATERIAL REMOVED WHEN "BULGES" DEVELOP IN THE SILT FENCE.

POSTS: STEEL EITHER T OR U TYPE OR 2" HARDWOOD

FENCE: WOVEN WIRE, 14½ GA. (OPTIONAL) 6" MAX. MESH OPENING

FILTER CLOTH: FILTER X, MIRAFI 100X, STABILINKA T140N OR APPROVED EQUAL

PREFABRICATED UNIT: GEOFAB, ENVIROFENCE, OR APPROVED EQUAL.

U.S. DEPARTMENT OF AGRICULTURE SOIL CONSERVATION SERVICE	SILT FENCE	STANDARD DRAWING
		SF-1

STANDARD AND SPECIFICATIONS FOR STRAW BALE DIKE

Definition

A temporary barrier of straw or similar material used to intercept sediment laden runoff from small drainage areas of disturbed soil.

Purpose

The purpose of a bale dike is to reduce runoff velocity and effect deposition of the transported sediment load. Straw bale dikes are to be used for no more than three (3) months.

Conditions Where Practice Applies

The straw bale dike is used where:

1. No other practice is feasible.
2. There is no concentration of water in a channel or other drainage way above the barrier.
3. Erosion would occur in the form of sheet erosion.
4. Length of slope above the straw bale dike does not exceed these limits:

Constructed Slope	Percent Slope	Slope Length (feet)
2:1	50	25
2-1/2:1	40	50
3:1	33	75
3-1/2:1	30	100
4:1	25	125

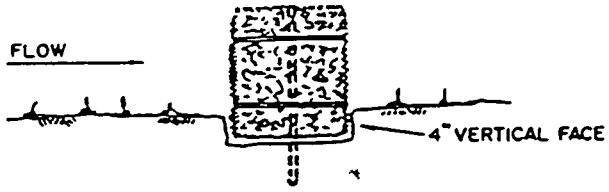
Where slope gradient changes through the drainage area, steepness refers to the steepest slope section contributing to the straw bale dike.

The practice may also be used for a single family lot if the slope is less than 15 percent. The contributing drainage area in this instance shall be less than one acre and the length of slope above the dike shall be less than 200 feet.

Design Criteria

A design is not required. All bales shall be placed on the contour with cut edge of bale adhering to the ground. See Figure 4.3 on page 4.10 or details.

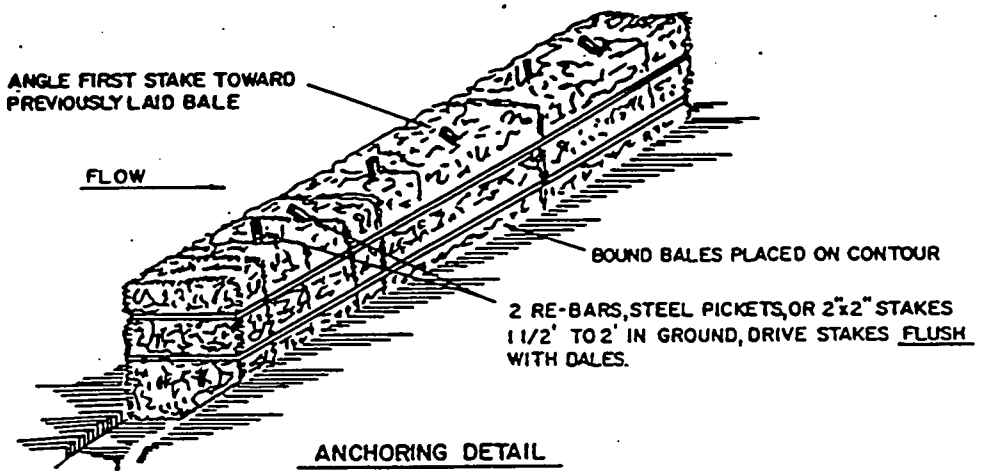
Figure 4.3
Straw Bale Dike Details



BEDDING DETAIL

STANDARD SYMBOL

SBD — DRAINAGE AREA NO MORE THAN 1/4 ac. PER 100 FEET OF STRAW BALE DIKE FOR SLOPES LESS THAN 25%



ANCHORING DETAIL

CONSTRUCTION SPECIFICATIONS

1. BALES SHALL BE PLACED AT THE TOE OF A SLOPE OR ON THE CONTOUR AND IN A ROW WITH ENDS TIGHTLY ABUTTING THE ADJACENT BALES.
2. EACH BALE SHALL BE EMBEDDED IN THE SOIL A MINIMUM OF (4) INCHES, AND PLACED SO THE BINDINGS ARE HORIZONTAL.
3. BALES SHALL BE SECURELY ANCHORED IN PLACE BY EITHER TWO STAKES OR RE-BARS DRIVEN THROUGH THE BALE. THE FIRST STAKE IN EACH BALE SHALL BE DRIVEN TOWARD THE PREVIOUSLY LAID BALE AT AN ANGLE TO FORCE THE BALES TOGETHER. STAKES SHALL BE DRIVEN FLUSH WITH THE BALE.
4. INSPECTION SHALL BE FREQUENT AND REPAIR REPLACEMENT SHALL BE MADE PROMPTLY AS NEEDED.
5. BALES SHALL BE REMOVED WHEN THEY HAVE SERVED THEIR USEFULNESS SO AS NOT TO BLOCK OR IMPEDE STORM FLOW OR DRAINAGE.

U.S. DEPARTMENT OF AGRICULTURE SOIL CONSERVATION SERVICE	STRAW BALE DIKE	STANDARD DRAWING SBD-1

STANDARD AND SPECIFICATIONS FOR PERIMETER DIKE/SWALE

Definition

A temporary ridge of soil excavated from an adjoining swale located along the perimeter of the site or disturbed area.

Purpose

The purpose of a perimeter dike/swale is to prevent off site storm runoff from entering a disturbed area and to prevent sediment laden storm runoff from leaving the construction site or disturbed area.

Conditions Where Practice Applies

Perimeter dike/swale is constructed to divert flows from entering a disturbed area, or along tops of slopes to prevent flows from eroding the slope, or along base of slopes to direct sediment laden flows to a trapping device.

The perimeter dike/swale shall remain in place until the disturbed areas are permanently stabilized.

Design Criteria

See Figure 4.16 on page 4.34 for details.

The perimeter dike/swale shall not be constructed outside the property lines without obtaining legal easements from effected adjacent property owners. A design is not required for perimeter dike/swale. The following criteria shall be used:

Drainage area - Less than 2 acres (for drainage areas larger than 2 acres but less than 10 acres see earth dike; for drainage areas larger than 10 acres, see standard and specifications for diversion).

Height - 18 inches minimum from bottom of swale to top of dike evenly divided between dike height and swale depth.

Bottom width of dike - 2 feet minimum.

Width of swale - 2 feet minimum.

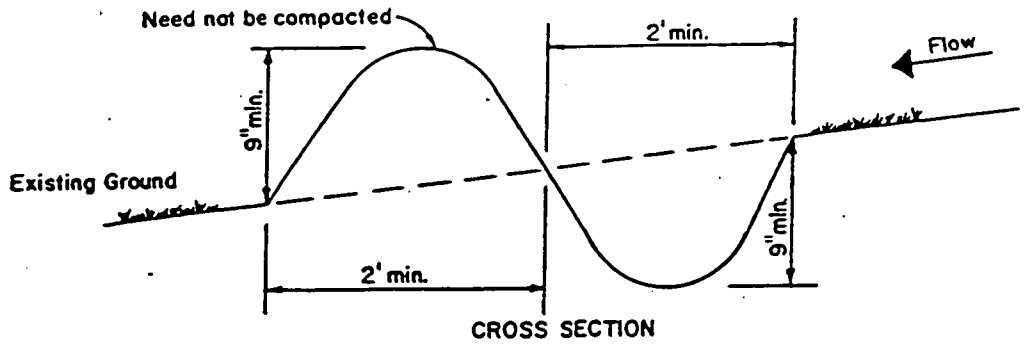
Grade - Dependent upon topography, but shall have positive drainage (sufficient grade to drain) to an adequate outlet. Maximum allowable grade not to exceed 20 percent.

Stabilization - The disturbed area of the dike and swale shall be stabilized within 10 days of installation, in accordance with the standard and specifications for seed and straw mulch or straw mulch only if not in the seeding season.

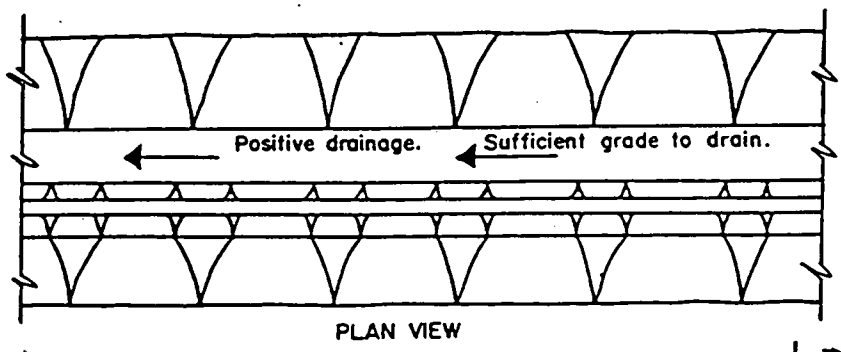
Outlet

1. Perimeter dike/swale shall have an outlet that functions with a minimum of erosion.
2. Diverted runoff from a protected or stabilized upland area shall outlet directly onto an undisturbed stabilized area.
3. Diverted runoff from a disturbed or exposed upland area shall be conveyed to a sediment trapping device such as a sediment trap, sediment basin, or to an area protected by any of these practices.
4. The on-site location may need to be adjusted to meet field conditions in order to utilize the most suitable outlet.

Figure 4.16
Perimeter Swale Dike Detail



CROSS SECTION



PLAN VIEW

STANDARD SYMBOL

CONSTRUCTION SPECIFICATIONS

1. ALL PERIMETER DIKE/SWALE SHALL HAVE UNINTERRUPTED POSITIVE GRADE TO AN OUTLET.
2. DIVERTED RUNOFF FROM A DISTRUBED AREA SHALL BE CONVEYED TO A SEDIMENT TRAPPING DEVICE.
3. DIVERTED RUNOFF FROM AN UNDISTURBED AREA SHALL OUTLET INTO AN UNDISTURBED STABILIZED AREA AT NON-EROSION VELOCITY.
4. THE SWALE SHALL BE EXCAVATED OR SHAPED TO LINE, GRADE, AND CROSS SECTION AS REQUIRED TO MEET THE CRITERIA SPECIFIED IN THE STANDARD.
5. STABILIZATION OF THE AREA DISTURBED BY THE DIKE AND SWALE SHALL BE DONE IN ACCORDANCE WITH THE STANDARD AND SPECIFICATION FOR SEED AND STRAW MULCH, AND SHALL BE DONE WITHIN 10 DAYS.
6. PERIODIC INSPECTION AND REQUIRED MAINTENANCE MUST BE PROVIDED AFTER EACH RAIN EVENT.

Max. Drainage Area Limit: 2 Acres

U.S. DEPARTMENT OF AGRICULTURE SOIL CONSERVATION SERVICE	PERIMETER DIKE/SWALE	Standard Drawing PDS-1

STANDARD AND SPECIFICATION FOR TEMPORARY SWALE

Definition

A temporary excavated drainage way.

Purpose

The purpose of a temporary swale is to prevent runoff from entering disturbed areas by intercepting and diverting it to a stabilized outlet or to intercept sediment laden water and divert it to a sediment trapping device.

Conditions Where Practice Applies

Temporary Swales are constructed:

1. To divert flows from a disturbed area.
2. Intermittently across disturbed areas to shorten overland flow distances.
3. To direct sediment laden water along the base of slopes to a trapping device.
4. To transport offsite flows across disturbed areas such as rights-of-way.

Swales collecting runoff from disturbed areas shall remain in place until the disturbed areas are permanently stabilized.

Design Criteria

See Figure 4.5 on page 4.14 for details.

	Swale A <5 Ac	Swale B 5-10 Ac
Drainage Area		
Bottom Width of Flow Channel	4 ft	6 ft
Depth of Flow Channel	1 ft	1 ft
Side Slopes	2:1 or Flatter	2:1 or Flatter
Grade	0.5% Min. 20% Max.	0.5% Min. 20% Max.

For drainage areas larger than 10 acres, refer to the Standard and Specifications for Waterways on page 4.91.

Stabilization

Stabilization of the swale shall be completed within 10 days of installation in accordance with the appropriate standard and specifications for vegetative stabilization or stabilization with mulch as determined by the time of year. The flow channel shall be stabilized as per the following criteria:

		FLOW CHANNEL	
Type of Treatment	Channel Grade	A ≤5 Ac	B 5-10 Ac
1	0.5-3.0%	Seed & Straw Mulch	Seed & Straw Mulch
2	3.1-5.0%	Seed & Straw Mulch	Seed and cover with Jute or Excelsior; Sod, or lined with 2 in. stone
3	5.1-8.0%	Seed and cover with Jute or Excelsior, Sod line with 2 in. stone	Line with 4-8 in. stone or Recycled Concrete Equivalent
4	8.1-20%	Line with 4-8 in. stone or Recycled Concrete Equivalent[1]	Engineering Design

In highly erodible soils, as defined by local approving agency, refer to the next higher slope grade for type of stabilization.

[1] Recycled Concrete Equivalent shall be concrete broken into the required size, and shall contain no steel reinforcement.

Outlet

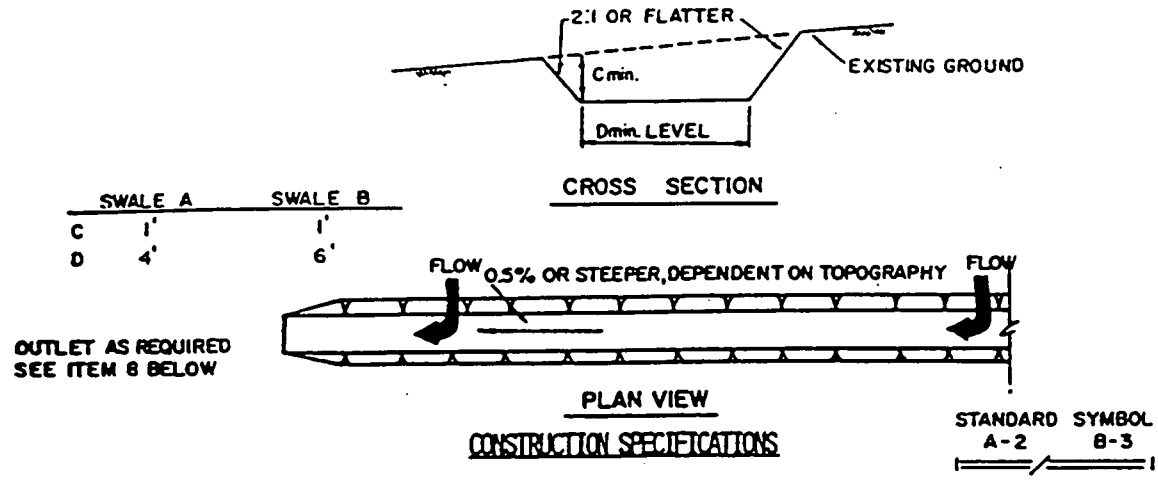
Swale shall have an outlet that functions with a minimum of erosion, and dissipates runoff velocity prior to discharge off the site.

Runoff shall be conveyed to a sediment trapping device such as a sediment trap or sediment basin until the drainage area above the swale is adequately stabilized.

The on-site location may need to be adjusted to meet field conditions in order to utilize the most suitable outlet condition.

If swale is used to divert flows from entering a disturbed area, a sediment trapping device may not be needed.

Figure 4.5
Temporary Swale Detail



CONSTRUCTION SPECIFICATIONS

STANDARD SYMBOL
A-2 B-3

1. ALL TEMPORARY SWALES SHALL HAVE UNINTERRUPTED POSITIVE GRADE TO AN OUTLET.
2. DIVERTED RUNOFF FROM A DISTURBED AREA SHALL BE CONVEYED TO A SEDIMENT TRAPPING DEVICE.
3. DIVERTED RUNOFF FROM AN UNDISTURBED AREA SHALL OUTLET DIRECTLY INTO AN UNDISTURBED STABILIZED AREA AT NON-EROSIVE VELOCITY.
4. ALL TREES, BRUSH, STUMPS, OBSTRUCTIONS, AND OTHER OBJECTIONABLE MATERIAL SHALL BE REMOVED AND DISPOSED OF SO AS NOT TO INTERFERE WITH THE PROPER FUNCTIONING OF THE SWALE.
5. THE SWALE SHALL BE EXCAVATED OR SHAPED TO LINE, GRADE, AND CROSS SECTION AS REQUIRED TO MEET THE CRITERIA SPECIFIED HEREIN AND BE FREE OF BANK PROJECTIONS OR OTHER IRREGULARITIES WHICH WILL IMPEDE NORMAL FLOW.
6. FILLS SHALL BE COMPACTED BY EARTH MOVING EQUIPMENT.
7. ALL EARTH REMOVED AND NOT NEEDED ON CONSTRUCTION SHALL BE PLACED SO THAT IT WILL NOT INTERFERE WITH THE FUNCTIONING OF THE SWALE.
8. STABILIZATION SHALL BE AS PER THE CHART BELOW:

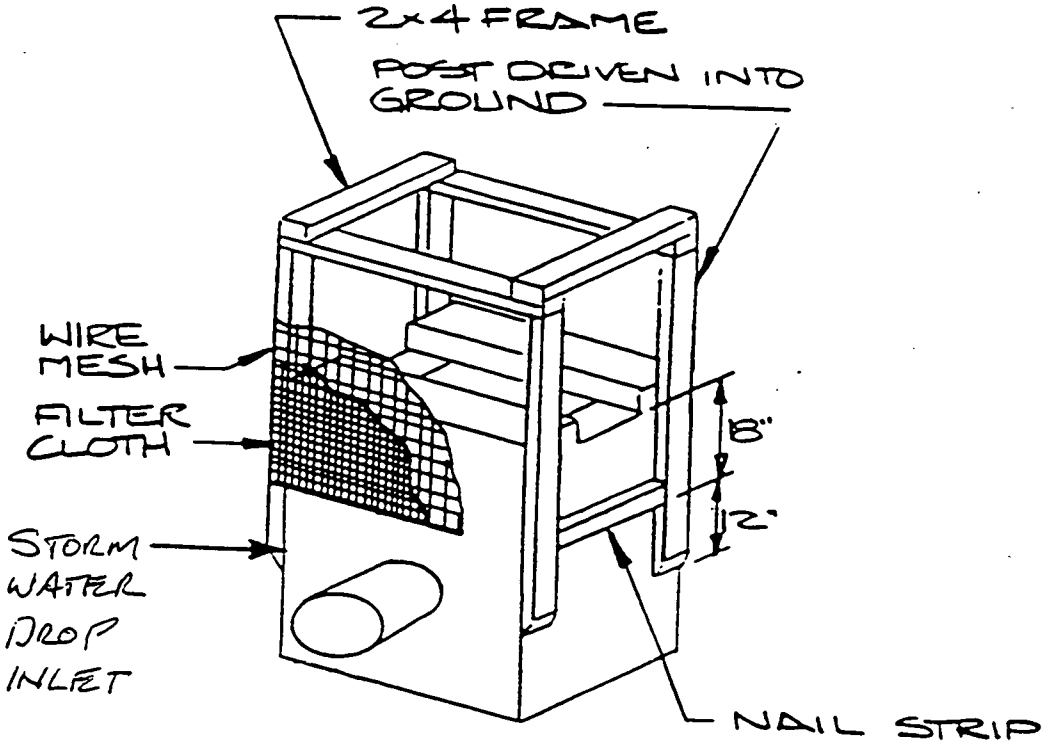
FLOW CHANNEL STABILIZATION

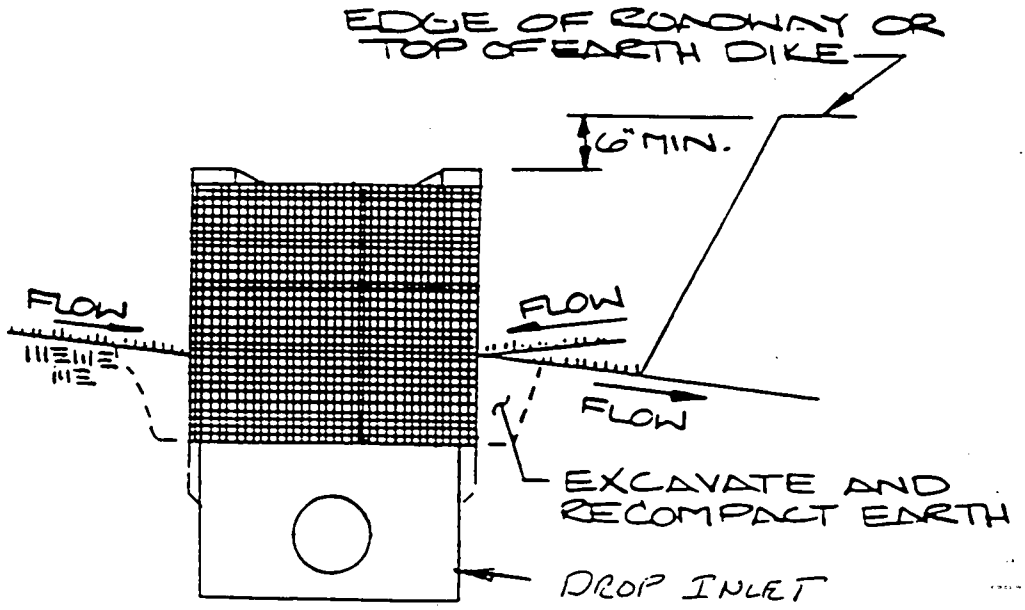
TYPE OF TREATMENT	CHANNEL GRADE	A (5 AC OR LESS)	B (5 AC - 10 AC)
1	0.5-3.0%	SEED AND STRAW MULCH	SEED AND STRAW MULCH
2	3.1-5.0%	SEED AND STRAW MULCH	SEED USING JUTE OR EXCELSIOR
3	5.1-8.0%	SEED WITH JUTE OR EXCELSIOR; SOD	LINED RIP-RAP 4-8" RECYCLED CONCRETE EQUIVALENT
4	8.1-20%	LINED 4-8" RIP-RAP	ENGINEERED DESIGN

9. PERIODIC INSPECTION AND REQUIRED MAINTENANCE MUST BE PROVIDED AFTER EACH RAIN EVENT.

U.S. DEPARTMENT OF AGRICULTURE SOIL CONSERVATION SERVICE	TEMPORARY SWALE	STANDARD DRAWING TS-1

SEDIMENT TRAP FOR DROP INLETS





MALCOLM PIRNIE

ATTACHMENT V

MINIMUM REQUIREMENTS FOR HEALTH AND SAFETY

MINIMUM REQUIREMENTS FOR HEALTH AND SAFETY

1.0 Description

The Contractor is responsible and liable for the health and safety of all on-site personnel and off-site community impacted by the site redevelopment activities.

This section describes the minimum health and safety requirements for this project including the requirements for the development of a written Health and Safety Plan (HASP). All on-site workers must comply with the requirements of the HASP. The Contractor's HASP must comply with all applicable federal and state regulations protecting human health and the environment from the hazards posed by activities during this site remediation.

2.0 References

The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by the basic designation only.

AMERICAN CONFERENCE OF GOVERNMENTAL INDUSTRIAL HYGIENISTS

ACGIH TLVs	Threshold Limit Values for Chemical Substances and Physical Agents and Biological Exposure Indices (Latest Edition)

CODES OF FEDERAL REGULATIONS (CFR)

29 CFR 1910	Occupational Safety and Health Standards (Latest Edition)
29CFR 1926	Safety and Health Regulations for Construction (Latest Edition)
40 CFR 262	Standards Applicable to Generators of Hazardous Waste (Latest Edition)
49 CFR 178	Shipping Container Specification (Latest Edition)

U.S. ENVIRONMENTAL PROTECTION AGENCY (EPA)

EPA 9285.1-30	1992 or latest edition: Standard Operating Safety Guides (Office of Emergency and Remedial Response)
EPA-450	1987 or latest edition: Ambient Monitoring Guidelines for Prevention of Significant Deterioration (PSD)

NATIONAL INSTITUTES FOR SAFETY AND HEALTH (NIOSH)

NIOSH 85-115	1985 or latest edition: Occupational Safety and Health Guidance Manual for Hazardous Waste Site Activities (NIOSH, OSHA, USCG, and EPA)
NIOSH 89-127	1989 or latest edition: Manual of Analytical Methods

N.Y.S. DEPARTMENT OF ENVIRONMENTAL CONSERVATION (NYSDEC)

TAGM 4031	1989 Division Technical and Administrative Guidance Memorandum -- Fugitive Dust Suppression and Particulate Monitoring Program at Inactive Hazardous Waste Sites

N.Y.S. DEPARTMENT OF LABOR

NYSDOL 28.876	1980 Article 28 Section 876 NYS Labor Law (Right-to-Know Law)

3.0 Basis

The Occupational Safety and Health Administration (OSHA) Standards and Regulations contained in Title 29, Code of Federal Regulations, Parts 1910 and 1926 (20 CFR 1910 and 1926) and subsequent additions and/or modifications, the New York State Labor Law Section 876 (Right-to-Know Law), the Standard Operating Safety Guidelines by the United States Environmental Protection Agency (EPA), Office of Emergency and Remedial Response and the Occupational Safety and Health Guidance Manual for Hazardous Waste Site Activities (NIOSH, OSHA, USCG, and EPA) provide the basis for the safety and health program. Additional specifications within this section are in addition to OSHA regulations and reflect the positions of both the EPA and the National Institute for Occupation Safety and Health (NIOSH) regarding procedures required to ensure safe operations at abandoned hazardous waste disposal sites.

The safety and health of the public and project personnel and the protection of the environment will take precedence over cost and schedule considerations for all project work. The Contractor will notify the NYSDEC and NYSDOH of conditions which may adversely affect the safety and health of project personnel and the community. The NYSDEC or the NYSDOH may stop work for health and safety reasons. If work is suspended for health and/or safety reasons, it shall not resume until approval is obtained from the NYSDEC or the NYSDOH. The cost of work stoppage due to health and safety is the responsibility of the Contractor.

4.0 Health and Safety Definitions

The following definitions shall apply to the work of the redevelopment of the site:

A. Project Personnel: Project personnel include the Contractor, subcontractor, and Federal, and State, and local Representatives, working or having official business at the Project Site.

B. Authorized Visitor: The Safety Officer has primary responsibility for determining who is qualified and may enter the site. The Site Safety Officer will only allow authorized visitors with written proof that they have been medically certified and trained in accordance with 29 CFR 1910.120 to enter the contamination reduction zone and/or exclusion area.

C. Health and Safety Coordinator (HSC): The HSC shall be a Certified Industrial Hygienist (CIH) or Certified Safety Professional (CSP) retained by the Contractor. The HSC will be responsible for the development and implementation of the HASP.

D. Safety Officer (SO): The SO will be the Contractor's on-site person who will be responsible for the day-to-day implementation and enforcement of the HASP.

E. Health and Safety Technicians (HST): The HST(s) will be the Contractor's on-site personnel who will assist the SO in the implementations of the HASP, in particular, with air monitoring in active work areas and maintenance of safety equipment.

F. Medical Consultant (MC): The MC is a physician retained by the Contractor who will be responsible for conducting physical exams as specified under the Medical Monitoring Programs in this section.

G. Project Site: The area of the Hanna Furnace Site that is undergoing redevelopment, which includes the Contractor Work Area.

H. Contractor Work Area: An area of the project site including the Support Zone, access road, staging area, and Exclusion Zone.

I. Contractor Support Zone: An area of the Contractor Work Area outside the Exclusion Zone, accessible for deliveries and visitors. No persons, vehicles, or equipment may enter these areas from the Exclusion Zone without having gone through specified decontamination procedures in the adjacent Contamination Reduction Zone.

J. Staging Areas: Areas within the Exclusion Zone for the segregated temporary staging of uncontaminated and contaminated soil and debris.

K. Exclusion Zone: The innermost area within the Contractor Work Area that encloses the area of contamination. Protective clothing and breathing apparatus as specified in the health and safety requirements and in the Contractor's approved HASP must be worn.

L. Contamination Reduction Zone: An area at the Exit Point of the Exclusion Zone through which all personnel, vehicles, and equipment must enter and exit. All decontamination of vehicles and equipment and removal of personal protective clothing and breathing apparatus must take place at the boundary between the Exclusion Zone and the Contamination Reduction Zone.

M. Work: Work includes all labor, materials, and other items that are part of site redevelopment activities.

N. Monitoring: The use of direct reading field instrumentation to provide information regarding the levels of gases and/or vapor, which are present during remedial action. Monitoring shall be conducted to evaluate employee exposures to toxic materials and hazardous conditions.

5.0 Responsibilities

The Contractor shall:

A. Employ an SO who shall be assigned full-time responsibility for all tasks herein described under this HASP. In the event the SO cannot meet his responsibilities, the Contractor shall be responsible for obtaining the services of an "alternate" SO meeting the minimum requirements and qualifications contained herein. No work will proceed on this project in the absence of an approved SO.

B. Ensure that all project personnel have obtained the required physical examination prior to and at the termination of work covered by the contract.

C. Be responsible for the pre-job indoctrination of all project personnel with regard to the HASP and other safety requirements to be observed during work, including but not limited to (a) potential hazards, (b) personal hygiene principles, (c) personal protection equipment, (d) respiratory protection equipment usage and fit testing, and (e) emergency procedures dealing with fire and medical situations.

D. Be responsible for the implementation of this HASP, and the Emergency Contingency and Response Plan.

E. Provide and ensure that all project personnel are properly clothed and equipped and that all equipment is kept clean and properly maintained in accordance with the manufacturer's recommendations or replaced as necessary.

F. Will perform all site redevelopment work in a safe and environmentally acceptable manner. The Contractor will provide for the safety of all project personnel and the community for the duration of the redevelopment activities.

G. Have sole and complete responsibility for safety conditions for the project, including safety of all persons (including employees).

H. Be responsible for protecting the project personnel and the general public from hazards due to the exposure, handling, and transport of contaminated materials. Barricades, warning lights if needed, roped-off areas, and proper signs shall be furnished in sufficient amounts and locations to safeguard the project personnel and public at all times.

I. Ensure all OSHA health and safety requirements are met.

J. Maintain a chronological log of all persons entering the project site. It will include organization, date, and time of entry and exit. Each person must sign in and out.

6.0 Submittals

Health and Safety Plan (HASP)

The HASP is a deliverable product of this project. The Contractor will submit the HASP to the NYSDEC and NYSDOH a minimum of two weeks prior to initiation of redevelopment activities. Agreed upon responses to all comments will be incorporated into the final copy of the HASP. The HASP shall govern all work performed for this contract. The HASP shall address, at a minimum, the following items in accordance with 29 CFR 1910.120(I)(2):

A. Health and Safety Organization.
B. Site Description and Hazard Assessment.
C. Training.
D. Medical Surveillance.
E. Work Areas.
F. Standard Operating Safety Procedures and Engineering Controls.
G. Personal Protective Equipment (PPE).
H. Personnel Hygiene and Decontamination.
I. Equipment Decontamination.
J. Air Monitoring.
K. Emergency Equipment/First Aid Requirements.
L. Emergency Response and Contingency Plan.
M Spill Containment Plan.
N. Heat & Cold Stress.
O. Record Keeping.
P. Community Protection Plan.

The following sections will describe the requirements of each of the above-listed elements of the HASP.

7.0 Health and Safety Organization

The Contractor shall list in the HASP a safety organization with specific names, qualifications, and responsibilities. At a minimum, the Contractor shall provide the services of a Health and Safety Coordinator, SO, and a Medical Consultant.

Health and Safety Coordinator: The Contractor must retain the services of a Health and Safety Coordinator (HSC). The HSC must be an American Board of Industrial Hygiene (ABIH) Certified Industrial Hygienist (CIH) or a Certified Safety Professional (CSP). The HSC must have a minimum of two years experience in hazardous waste site remediations or related industries and have a working knowledge of federal and state occupational health and safety regulations. The HSC must be familiar with air monitoring techniques and the development of health and safety programs for personnel working in potentially toxic atmospheres.

In addition to meeting the above requirements, the HSC will have the following responsibilities:

A. Responsibility for the overall development and implementation of the HASP.

B. Responsibility for the initial training of on-site workers with respect to the contents of the HASP.

C. Availability during normal business hours for consultation by the Safety Officer.

D. Availability to assist the Safety Officer in follow-up training and if changes in site conditions occur.

Safety Officer: The designated SO must have, at a minimum, two years of experience in the remediation of hazardous waste sites or related field experience. The SO must have formal training in health and safety and be conversant with federal and state regulations governing occupational health and safety. The SO must be certified in CPR and first aid and have experience and training in the implementation of personal protection and air monitoring programs. The SO must have "hands-on" experience with the operation and maintenance of real-time air monitoring equipment. The SO must be thoroughly knowledgeable of the operation and maintenance of air-purifying respirators (APR) and supplied-air respirators (SAR) including SCBA and airline respirators.

In addition to meeting the above qualifications, the SO will be responsible for the following minimum requirements:

A. Responsibility for the implementation, enforcement, and monitoring of the health and safety plan.

B. Responsibility for the pre-construction indoctrination and periodic training of all on-site personnel with regard to this safety plan and other safety requirements to be observed during construction, including:

(1) Potential hazards.
(2) Personal hygiene principles.
(3) PPE.
(4) Respiratory protection equipment usage and fit testing.
(5) Emergency procedures dealing with fire and medical situations.
(6) Conduct daily update meetings in regard to health and safety.

C. Responsibility for alerting any State or Federal on-site representative prior to the Contractor starting any particular hazardous work.

D. Responsibility for informing project personnel of the New York State Labor Law Section 876 (Right-to-Know Law).

E. Responsibility for the maintenance of separation of Exclusion Zone (Dirty) from the Support Zone (Clean) areas as described hereafter.

Health and Safety Technicians: The Health and Safety Technician (HST) must have one year of hazardous waste site or related experience and be knowledgeable of applicable occupational health and safety regulations. The HST must be certified in CPR and first aid. The HST will be under direct supervision of the SO during on-site work. The HST must be familiar with the operations, maintenance and calibration of monitoring equipment used in this remediation. A HST will be assigned to each work crew or task in potentially hazardous areas.

Medical Consultant: The Contractor is required to retain a Medical Consultant (MC) who is a physician, certified in occupational medicine. The physician shall have experience in the occupational health area and shall be familiar with potential site hazards of remedial action projects. The MC will also be available to provide annual physicals and to provide additional medical evaluations of personnel when necessary.

8.0 Site Description and Hazard Assessment

The Contractor shall perform a hazard assessment to provide information to assist in selection of PPE and establish air monitoring guidelines to protect on-site personnel, the environment, and the public. The Contractor shall provide a general description of the site, its location, past history, previous environmental sampling results, and general background on the conditions present at the site.

A. Chemical Hazards: A qualitative evaluation of chemical hazards shall be based on the following:

- Nature of potential contaminants;
- Location of potential contaminants at the project site;
- Potential for exposure during site activities; and
- Effects of potential contaminants on human health.

B. Biological Hazards: A qualitative evaluation of biological hazards consisting of the elements listed for chemical hazards.

C. Physical Hazards: The Contractor shall assess the potential for physical hazards affecting personnel during the performance of on-site work.

The Contractor shall develop a hazard assessment for each site task and operation established in the HASP.

9.0 Training

OSHA Training

The Contractor is responsible to ensure that all project personnel have been trained in accordance with OSHA 1910.120 regulations.

The Contractor shall ensure that all employees are informed of the potential hazards of toxic chemicals to the unborn child and of the risks associated with working at the project site.

The Contractor shall be responsible for, and guarantee that, personnel not successfully completing the required training are not permitted to enter the project site to perform work.

Safety Meetings

At a minimum, the SO will conduct daily safety meetings that will be mandatory for all project personnel. The meetings will provide refresher courses for existing equipment and protocols, and will examine new site conditions as they are encountered.

Additional safety meetings will be held on an as-required basis.

Should any unforeseen or site-peculiar safety-related factor, hazard, or condition become evident during the performance of work at this site, the Contractor will bring

such to the attention of the SO in writing as quickly as possible for resolution. In the interim, the Contractor will take prudent action to establish and maintain safe working conditions and to safeguard employees, the public, and the environment.

10.0 Medical Surveillance

The Contractor shall utilize the services of a Physician to provide, at a minimum, the medical examinations and surveillance specified herein. The name of the Physician and evidence of examination of all Contractor and subcontractor on-site personnel shall be kept by the SO.

Contractor and subcontractor project personnel involved in this project shall be provided with medical surveillance prior to onset of work. At any time there is suspected excessive exposure to substances that would be medically detectable, all project personnel will be medically monitored. The costs for these medical exams are to be borne by the Contractor.

Physical examinations are required for:

A. Any and all personnel entering hazardous or transition zones or performing work that required respiratory protection.

B. All Contractor personnel on site who are dedicated or may be used for emergency response purposes in the Exclusion Zone.

C. Contractor supervisors entering hazardous or transition zones, or on site for more than 16 hours during the length of the project.

Physical examinations are not required for people making periodic deliveries provided they do not enter hazardous or transition zones.

In accordance with good medical practice, the examining Physician or other appropriate representative of the Physician shall discuss the results of such medical examination with the individual examined. Such discussion shall include an explanation of any medical condition that the Physician believes required further evaluation or treatment and any medical condition which the Physician believes would be adversely affected by such individual's employment at the project site. A written report of such examination shall be transmitted to the individual's private physician upon written request by the individual.

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

The physical examination shall also include but not be limited to the following minimum requirements:

A. Complete blood profile;

B. Blood chemistry to include: chloride, CO_2, potassium, sodium, BUN, glucose, globulin, total protein, albumin, calcium, cholesterol, alkaline phosphates, triglycerides, uric acid, creatinine, total bilirubin, phosphorous, lactic dehydrogenase, SGPT, SGOT;

C. Urine analysis;

D. "Hands on" physical examination to include a complete evaluation of all organ systems including any follow-up appointments deemed necessary in the clinical judgement of the examining physician to monitor any chronic conditions or abnormalities;

E. Electrocardiogram;

F. Chest X-ray (if recommended by examining physician in accordance with good medical practice);

G. Pulmonary function;

H. Audiometry - To be performed by a certified technician, audiologist, or physician. The range of 500 to 8,000 hertz should be assessed.

I. Vision screening - Use a battery (TITMUS) instrument to screen the individual's ability to see test targets well at 13 to 16 inches and at 20 feet. Tests should include an assessment of muscle balance, eye coordination, depth perception, peripheral vision, color discrimination, and tonometry.

J. Tetanus booster shot (if no inoculation has been received within the last five years); and

K. Complete medical history.

11.0 Site Control

Security

Security shall be provided and maintained by the Contractor.

Vehicular access to the site, other than to designated parking areas, shall be restricted to authorized vehicles only. Use of on-site designated parking areas shall be restricted to vehicles of the State or Federal on-site representative, Contractor,

subcontractor, and service personnel assigned to the site and actually on duty but may also be used on short-term basis for authorized visitors.

The Contractor shall be responsible for maintaining a log of security incidents and visitor access granted.

The Contractor shall require all personnel having access to the project site to sign-in and sign-out, and shall keep a record of all site access.

All approved visitors to the site shall be briefed by the SO on safety and security, provided with temporary identification and safety equipment, and escorted throughout their visit.

Site visitors shall not be permitted to enter the hazardous work zone unless approved by the SO with appropriate site access agreement.

Project sites shall be posted, "Warning Hazardous Work Area, Do Not Enter Unless Authorized," and access restricted by the use of a snow fence or equal at a minimum. Warning signs shall be posted at a minimum of every 500 feet.

Site Control

The Contractor shall provide the following site control procedures as a minimum:

- A site map;
- A map showing site work zones;
- The use of a "buddy system"; and
- Standard operating procedures or safe work practices.

Work Areas

The Contractor will clearly lay out and identify work areas in the field and will limit equipment, operations and personnel in the areas as defined below:

A. Exclusion Zone (EZ) - This will include all areas where potential environmental monitoring has shown or it is suspected that a potential hazard may exist to workers. The level of PPE required in these areas will be determined by the SO after air monitoring and on-site inspection has been conducted. The area will be clearly delineated from the decontamination area. As work within the hazardous zone proceeds, the delineating boundary will be relocated as necessary to prevent the accidental contamination of nearby people and equipment. The Exclusion Zone will be delineated by fencing (e.g., chain link, snow fencing, or orange plastic fencing).

B. Contamination Reduction Zone - This zone will occur at the interface of "Hazardous" and "Clean" areas and will provide for the transfer of equipment and materials from the Support Zone to the Exclusion Zone, the

decontamination of personnel and clothing prior to entering the "Clean" area, and for the physical segregation of the "Clean" and "Hazardous" areas. This area will contain all required emergency equipment, etc. This area will be clearly delineated by fencing (e.g., chain link, snow fencing, or orange plastic fencing). It shall also delineate an area that although not contaminated at a particular time may become so at a later date.

C. Support Zone - This area is the remainder of the work site and project site. The Support Zone will be clearly delineated and procedures implemented to prevent active or passive contamination from the work site. The function of the Support Zone includes:

(1) An entry area for personnel, material and equipment to the Exclusion Zone of site operations through the Contamination Reduction Zone;

(2) An exit for decontamination personnel, materials and equipment from the "Decontamination" area of site operations;

(3) The housing of site special services; and

(4) A storage area for clean, safety, and work equipment.

12.0 Standard Operating Safety Procedures (SOP), Engineering Controls

General SOP

A. The Contractor will ensure that all safety equipment and protective clothing is kept clean and well maintained.

B. All prescription eyeglasses in use on this project will be safety glasses and will be compatible with respirators. No contact lenses shall be allowed on site.

C. All disposable or reusable gloves worn on the site will be approved by the SO.

D. During periods of prolonged respirator usage in contaminated areas, respirator filters will be changed upon breakthrough. Respirator filters will always be changed daily.

E. Footwear used on site will be covered by rubber overboots or booties when entering or working in the Exclusion Zone area or Contamination Reduction Zone. Boots or booties will be washed with water and detergents to remove dirt and contaminated sediment before leaving the Exclusion Zone or Contamination Reduction Zone.

F. All PPE used in the Exclusion Zone or Contamination Reduction Zone will be decontaminated or disposed of at the end of the workday. The SO will be responsible for ensuring decontamination of PPE before reuse.

G. All respirators will be individually assigned and not interchanged between workers without cleaning and sanitizing.

H. Contractor, subcontractor and service personnel unable to pass a fit test as a result of facial hair or facial configuration shall not enter or work in an area that requires respiratory protection.

I. The Contractor will ensure that all project personnel shall have vision or corrected vision to at least 20/40 in one eye.

J. On-site personnel found to be disregarding any provision of this plan will, at the request of the SO, be barred from the project.

K. Used disposable outerwear such as coveralls, gloves, and boots shall not be reused. Used disposable outerwear will be removed upon leaving the hazardous work zone and will be placed inside disposable containers provided for that purpose. These containers will be stored at the site at the designated staging area and the Contractor will be responsible for proper disposal of these materials at the completion of the project.

L. Protective coveralls that become torn or badly soiled will be replaced immediately.

M. Eating, drinking, chewing gum or tobacco, smoking, etc., will be prohibited in the hazardous work zones and neutral zones.

N. All personnel will thoroughly cleanse their hands, face, and forearms and other exposed areas prior to eating, smoking or drinking.

O. Workers who have worked in a hazardous work zone will shower at the completion of the workday.

P. All personnel will wash their hands, face, and forearms before using toilet facilities.

Q. No alcohol, firearms or drugs (without prescriptions) will be allowed on site at any time.

R. All personnel who are on medication should report it to the SO who will make a determination whether or not the individual will be allowed to work and in what capacity. The SO may require a letter from the individual's personal physician stating what limitations (if any) the medication may impose on the individual.

Engineering Controls - Dust and Air Emissions

The Contractor shall provide all equipment and personnel necessary to monitor and control dust and air emissions.

13.0 Personal Protective Equipment

General

The Contractor shall provide all project personnel with the necessary safety equipment and protective clothing, taking into consideration the chemical wastes at the site. At a minimum, the Contractor may supply project personnel with the following:

A. Sufficient disposable coveralls;

B. One pair splash goggles;

C. Chemical-resistant outer and inner gloves;

D. Rubber overshoes (to be washed daily);

E. Hard hat;

F. One full-face mask with appropriate canisters for work requiring Level C protection; and

G. For all project personnel involved with Level B protection, a positive-pressure SCBA or a positive-pressure in-line air respirator. A 5-minute escape bottle must be included with the in-line air apparatus.

Levels of Protection

The following sections described the requirements of each level of protection.

A. Level A Protection

(1) PPE:

a. Supplied-air respirator approved by the Mine Safety and Health Administration (MSHA) and NIOSH. Respirators may be:

- Positive-pressure SCBA; or
- Positive-pressure airline respirator (with escape bottle for Immediately Dangerous to Life and Health [IDLH] or potential for IDLH atmosphere).

b. Fully encapsulating chemical-resistant suit.

c. Coveralls.

d. Cotton long underwear.*

e. Gloves (inner), chemical-resistant.

f. Boots, chemical-resistant, steel toe and shank. (Depending on suit construction, worn over or under suit boot.)

g. Hard hat (under suit).*

h. Disposal gloves and boot covers (worn over fully encapsulating suit).

I. Cooling unit.*

j. Two-way radio communications (inherently safe).*

* Optional

(2) Criteria for Selection:

Meeting any of these criteria warrants use of Level A protection:

a. The chemical substance has been identified and requires the highest level of protection for skin, eyes, and the respiratory system based on:

- Measures (or potential for) high concentration of atmospheric vapors, gases, or particulates, or
- Site operations and work functions involves high potential for splash, immersion, or exposure to unexpected vapors, gases, or particulates of materials highly toxic to the skin.

b. Substances with a high degree of hazard to the skin are known or suspected to be present, and skin contact is possible.

c. Operations must be conducted in confined, poorly ventilated areas until the absence of substances requiring Level A protection is determined.

d. Direct readings on field Flame Ionization Detectors (FID) or Photoionization Detectors (PID) and similar instruments

indicate high levels of unidentified vapors and gases in the air.

(3) Guidance on Selection:

a. Fully encapsulating suits are primarily designed to provide a gas- or vapor-tight barrier between the wearer and atmospheric contaminants. Therefore, Level A is generally worn when high concentrations of airborne substances could severely effect the skin. Since Level A requires the use of SCBA, the eyes and respiratory system are also more protected.

Until air surveillance data become available to assist in the selection of the appropriate level of protection, the use of Level A may have to be based on indirect evidence of the potential for atmospheric contamination or other means of skin contact with severe skin affecting substances.

Conditions that may require Level A protection include:

- Confined spaces: Enclosed, confined, or poorly ventilated areas are conducive to the buildup of toxic vapors, gases, or particulates. (Explosive or oxygen-deficient atmospheres are also more probable in confined spaces). Confined-space entry does not automatically warrant wearing Level A protection, but should serve as a cue to carefully consider and to justify a lower level of protection.

- Suspected/known highly toxic substances: Various substances that are highly toxic, especially skin absorption, for example, fuming corrosives, cyanide compounds, concentrated pesticides, Department of Transportation Poison "A" materials, suspected carcinogens, and infectious substances may be known or suspected to be involved. Field instruments may not be available to detect or quantify air concentrations of these materials. Until these substances are identified and concentrations measured, maximum protection may be necessary.

- Visible emissions: Visible air emissions from leaking containers or railroad/vehicular tank cars, as well as smoke from chemical fires and others, indicate high potential for concentrations of substances that could be extreme respiratory or skin hazards.

- Job Functions: Initial site entries are generally walk-throughs, in which instruments and visual observations are used to make a preliminary evaluation of the hazards.

In initial site entries, Level A should be worn when:

- There is a probability for exposure to high concentrations of vapors, gases, or particulates; and
- Substances are known or suspected of being extremely toxic directly to the skin or by being absorbed.

Subsequent entries are to conduct the many activities needed to reduce the environmental impact of the incident. Levels of protection for later operations are based not only on data obtained from the initial and subsequent environmental monitoring, but also on the probability of contamination and ease of decontamination.

Examples of situations where Level A has been worn are:

- Excavating of soil to sample buried drums suspected of containing high concentrations of dioxin;
- Entering a cloud of chlorine to repair a valve broken in a railroad accident;
- Handling and moving drums known to contain oleum; and
- Responding to accidents involving cyanide, arsenic, and undiluted pesticides.

b. The fully encapsulating suit provides the highest degree of protection to skin, eyes, and respiratory system if the suit material resists chemicals during the time the suit is worn. While Level A provides maximum protection, all suit material may be rapidly permeated and degraded by certain chemicals from extremely high air concentrations, splashes, or immersion of boots or gloves in concentrated liquids or sludges. These limitations should be recognized when specifying the type of fully encapsulating suit. Whenever possible, the suit material should be matched with the substance it is used to protect against.

B. Level B Protection

(1) PPE:

a Positive-pressure SCBA (MSHA/NIOSH approved); or

b. Positive-pressure air line respirator (with escape bottle for IDLH or potential for IDLH atmosphere) MSHA/NIOSH approved;

c. Chemical-resistant clothing (overalls and long-sleeved jacket; coveralls or hooded, one- or two-piece chemical-splash suit; disposable chemical-resistant, one-piece suits);

d. Cotton long underwear;*

e. Coveralls;

f. Gloves (outer), chemical-resistant;

g. Gloves (inner), chemical-resistant;

h. Boots (inner), leather work shoe with steel toe and shank;

I. Boots (outer), chemical-resistant, (disposable);

j. Hard hat (face shield*);

k. 2-way radio communication;* and

l. Taping between suit and gloves, and suit and boots.

*Optional

(2) Criteria for Selection:

Any one of the following conditions warrants use of Level B Protection:

a. The type and atmospheric concentration of toxic substances have been identified and require a high level of respiratory protection, but less skin protection than Level A. These atmospheres would:

- Have IDLH concentrations; or
- Exceed limits of protection afforded by an air-purifying mask; or

- Contain substances for which air-purifying canisters do not exist or have low removal efficiency; or

- Contain substances requiring air-supplied equipment, but substances and/or concentrations do not represent a serious skin hazard.

b. The atmosphere contains less than 19.5% oxygen

c. Site operations make it highly unlikely that the work being done will generate high concentrations of vapors, gases or particulates, or splashes of material that will affect the skin of personal wearing Level B protection.

d. Working in confined spaces.

e. Total atmospheric concentrations, sustained in the breathing zone, of unidentified vapors or gases range from 5 ppm above background to 500 ppm above background as measured by direct reading instruments such as the FID or PID or similar instruments, but vapors and gases are not suspected of containing high levels of chemicals toxic to skin.

(3) Guidance on Selection Criteria:

Level B equipment provides a reasonable degree of protection against splashes and to lower air contaminant concentrations, but a somewhat lower level of protection to skin than Level A. The chemical-resistant clothing required in Level B is available in a wide variety of styles, materials, construction detail, permeability, etc. Taping joints between the gloves, boots and suit, and between hood and respirator reduces the possibility for splash and vapor or gas penetration. These factors all affect the degree of protection afforded. Therefore, the SO should select the most effective chemical-resistant clothing based on the known or anticipated hazards and/or job function.

Level B does provide a high level of protection to the respiratory tract. Generally, if SCBA is required, Level B clothing rather than a fully encapsulating suit (Level A) is selected based on needing less protection against known or anticipated substances affecting the skin. Level B skin protection is selected by:

a. Comparing the concentrations of known or identified substances in air with skin toxicity data;

b. Determining the presence of substances that are destructive to or readily absorbed through the skin by liquid splashes, unexpected high levels of gases, vapor or particulates, or other means of direct contact; and

c. Assessing the effect of the substance (at its measured air concentrations or splash potential) on the small area of the head and neck left unprotected by chemical-resistant clothing.

For initial site entry at an open site, Level B protection should protect site personnel, providing the conditions described in selecting Level A are known or judged to be absent.

C. Level C Protection

(1) PPE

a. Full-face, air-purifying, cartridge- or canister-equipped respirator (MSHA/NIOSH approved) with cartridges appropriate for the respiratory hazards;

b. Chemical-resistant clothing (coveralls, hooded, one-piece or two-piece chemical splash suit; chemical-resistant hood and apron; disposable chemical-resistant coveralls);

c. Coveralls;

d. Cotton long underwear;*

e. Gloves (outer), chemical-resistant;

f. Gloves (inner), chemical-resistant;

g. Boots (inner), leather work shoes with steel toe and shank;

h. Boots (outer), chemical-resistant (disposable);*

I. Hard hat (face shield);*

j. Escape SCBA of at least 5-minute duration;

k. 2-way radio communications (inherently safe);* and

(2) Taping between suit and boots, and suit and gloves.

* Optional

(3) Criteria for Selection

Meeting all of these criteria permits use of Level C protection:

a. Measured air concentrations of identified substances will be reduced by the respirator to, at or below, the substance's Threshold Limit Value (TLV) or appropriate occupational exposure limit and the concentration is within the service limit of the canister.

b. Atmospheric contaminant concentrations do not exceed IDLH levels.

c. Atmospheric contaminants, liquid splashes, or other direct contact will not adversely affect the small area of the skin left unprotected by chemical-resistant clothing.

d. Job functions do not require SCBA.

e. Total readings register between background and 5 ppm above background as measured by instruments such as the FID or PID.

f. Oxygen concentrations are not less than 19.5% by volume.

g. Air will be monitored continuously.

(4) Guidance on Selection Criteria

Level C protection is distinguished from Level B by the equipment used to protect the respiratory system, assuming the same type of chemical-resistant clothing is used. The main selection criterion for Level C is that conditions permit wearing air-purifying devices. The air-purifying device must be a full-face mask (MSHA/NIOSH approved) equipped with a cartridge suspended from the chin or on a harness. Cartridges must be able to remove the substances encountered.

A full-face, air-purifying mask can be used only if:

a. Oxygen content of the atmosphere is at least 19.5% by volume;

b. Substance(s) is identified and its concentrations(s) measured;

c. Substance(s) has adequate warning properties;

d. Individual passes a qualitative fit-test for the mask; and

e. Appropriate cartridge is used, and its service limits concentration is not exceeded.

An air monitoring program is part of all response operations when atmospheric contamination is known or suspected. It is particularly important that the air be monitored thoroughly when personnel are wearing air-purifying respirators (Level C). Continual surveillance using direct-reading instruments and air sampling is needed to detect any changes in air quality necessitating a higher level of respiratory protection. Total unidentified vapor/gas concentrations exceeding 5 ppm above background require Level B.

D. Level D Protection

(1) PPE:

a. Coveralls, chemical resistant;

b. Gloves (outer), chemical resistant;

c. Gloves (inner), chemical resistant;*

d. Boots (inner), leather work shoes with steel toe and shank;

e. Boots (outer), chemical resistant (disposable);*

f. Hard hat;

g. Face shield;*

h. Safety glasses with side shields or chemical splash goggles;* and

i. Taping between suit and boots, and suit and gloves.

* Optional

(2) Criteria for Selection:

a. No atmospheric contaminant is present.

b. Direct reading instruments do not indicate any readings above background.

c. Job functions have been determined not to require respirator protection.

(3) Guidance on Selection Criteria:

Level D protection is distinguished from Level C protection in the requirement for respiratory protection. Level D is used for non-intrusive activities or intrusive activities with continuous air monitoring. It can be worn only in areas where there is no possibility of contact with contamination.

E. Anticipated Levels of Protection

It is anticipated that most of the work shall be performed in Level D. A respirator shall be immediately available in the event that air monitoring indicates an upgrade to Level C is required. The determination of the proper level of protection for each task shall be the responsibility of the Contractor. The task specific levels of protection shall be stated in the Contractor's HASP.

Disposable Coveralls

The Contractor shall provide, as necessary, protective coveralls for all project personnel each day with extra sets provided for authorized visitors. The coveralls shall be of the disposable type made of Tyvek or equivalent material, and shall be manufactured/supplied by Durafab, Koppler, or other appropriate manufacturers. To protect project personnel from exposure to liquids, splash-resistant suits (Saranex suits, from appropriate manufacturers) shall be provided. Ripped suits will be immediately replaced after all necessary decontamination has been completed to the satisfaction of the SO.

Hard Hat

The Contractor shall provide and maintain one hard hat per person on site (authorized visitors included). The hard hats shall comply with OSHA Health and Safety Standards (29 CFR 1910.135).

Face Shields

The Contractor shall provide and maintain one face shield per person on site, if necessary. The face shields shall be of the full face type meeting OSHA Health and Safety Standards (29 CFR 1910.133) and shall have brackets for mounting on hard hats. Hard hats and face shields shall be from the same manufacturer to ensure proper fit and shall be manufactured/supplied by Bullard, Norton, or other appropriate manufacturers.

Full Face Organic Vapor Respirator

The Contractor shall provide and maintain a dedicated air-purifying organic vapor respirator per person working in hazardous work and neutral work zones. The respirator shall be of the full-face canister type with cartridges appropriate for the respiratory hazards. Respirators and cartridges shall be MSHA/NIOSH approved, manufactured/supplied by MSA, Scott, or other appropriate manufacturers. The Contractor shall inspect and maintain respirators and canisters in accordance with OSHA regulations (29 CFR 1910.134) and in accordance with manufacturer's instructions. The Contractor shall ensure that proper fit testing training and medical surveillance of respirator users is in accordance with OSHA regulations (29 CFR 1910.134).

Gloves (outer)

The Contractor shall supply a minimum of one pair of gloves per workman in areas where skin contact with hazardous material is possible. Work gloves shall consist of nitrile (NCR) or Neoprene material. Other gloves may be selected if required based on the potential chemical present. Cotton liners will be provided by the Contractor during cold weather.

Gloves (inner)

The Contractor shall supply Latex or equivalent surgical gloves to be worn inside the outer gloves.

Boots (inner)

The Contractor shall supply one pair of safety shoes or boots per workman and shall be of the safety-toe type meeting the requirements of 29 CFR 1910.136.

Boots (outer)

The Contractor shall provide and maintain one pair of overshoes for each on-site person entering a hazardous work area. The overshoes shall be constructed of rubber and shall be 12 inches high minimum.

14.0 Decontamination

Portable "Boot Wash" Decontamination Equipment

The Contractor shall provide a portable decontamination station, commonly referred to as a "Boot Wash" facility for each hazardous work zone requiring decontamination for project personnel. These facilities shall be constructed to contain spent wash water, contain a reservoir of clean wash water, a power supply to operate a pump for the wash water, a separate entrance and exit to the decontamination platform, with

the equipment being mobile, allowing easy transport from one hazardous work zone to the next. An appropriate detergent such as alconox shall be used.

Personnel Decontamination

The Contractor shall provide full decontamination facilities at all hazardous zones. Decontamination facilities must be described in detail in the HASP.

Disposal of Spent Clothing and Material

Contaminated clothing, used respirator cartridges and other disposable items will be put into drums/containers for transport and proper disposal as hazardous waste in accordance with RCRA requirements.

Containers/55-gallon capacity drums shall conform to the requirements of 40 CFR Part 178 for Transportation of Hazardous Materials. The containers containing hazardous material shall be transported by the Contractor to the staging area.

The Contractor is responsible for the proper container packaging, labeling, transporting, and disposal.

15.0 Equipment Decontamination

General

Thoroughly decontaminate all equipment and material used in this project in accordance with established federal and state procedures before it is removed from the project site. With the exception of the excavated materials, all contaminated materials and clothing that cannot be decontaminated shall be disposed of using a method permitted by appropriate regulatory agencies. All vehicles and equipment used will be decontaminated to the satisfaction of the SO in the decontamination area on site prior to leaving the project.

Decontamination shall take place within the designated equipment and materials decontamination area. The decontamination shall consist of degreasing (if required), followed by high-pressure, water cleaning, supplemented by detergents as appropriate. Wash units shall be portable, high-pressure with a self-contained water storage tank and pressurizing system (as required). Each unit shall be capable of providing a nozzle pressure of 150 psi.

If the Contractor cannot or does not satisfactorily decontaminate his tools or equipment at the completion of the project, the Contractor will dispose of any equipment which cannot be decontaminated satisfactorily. At the completion of the project the Contractor shall completely decontaminate and clean the decontamination area.

Decontamination Pad

The Contractor shall construct a decontamination station located on-site. The decontamination station shall be located in the Contamination Reduction Zone and shall be used to clean all vehicles leaving the Exclusion Zone prior to entering the Support Zone or leaving the site. The Contractor shall install at a minimum a 40 mil polyethylene sealed liner decontamination pad in such a manner that is capable of collecting all decontamination waters with a minimum of six foot corrugated splash walls or curtains to prevent overspray. The decontamination pad shall be able to support vehicles without cracking or becoming damaged. The area is to be properly graded and have no deleterious materials. All decontamination water shall be collected and stored in a holding tank. The Contractor shall clean and dismantle the decontamination pad and properly transport and dispose of the materials at the conclusion of the construction.

16.0 Air Monitoring Program

General

The Contractor shall develop, as part of the HASP, an air monitoring program (AMP). The purpose of the AMP is to determine that the proper level of personnel protective equipment is used, to document that the level of worker protection is adequate, and to assess the migration of contaminants to off-site receptors as a result of site work.

The Contractor shall supply all personnel, equipment, facilities, and supplies to develop and implement the air monitoring program described in this section. Equipment shall include at a minimum: an organic vapor analyzer and real-time aerosol monitors, depending on work activities and environmental conditions.

The Contractor's AMP shall include both real-time and documentation air monitoring (personal and area sampling as needed). The purpose of real-time monitoring will be to determine if an upgrade (or downgrade) of PPE is required while performing on-site work and to implement engineering controls, protocols, or emergency procedures if site action levels are encountered.

The Contractor shall also use documentation monitoring to ensure that adequate PPE is being used and to determine if engineering controls are mitigating the migration of contamination to off-site receptors. Documentation monitoring shall include the collection and analysis of samples for total nuisance dust.

To protect the public in the neighboring residential neighborhood, the Contractor must include in the AMP provisions for suspending work and implementing engineering controls based upon detectable odors, as well as upon instrument monitoring results.

During the progress of active remedial work, the Contractor will monitor the quality of the air in and around each active hazardous operation with real-time instrumentation prior to personnel entering these areas. Sampling at the hazardous work site will be conducted on a continuous basis. Any departures from general background will be reported to the SO prior to entering the area. The SO will determine when and if operations should be shut down.

Air monitoring (both real time and documentation monitoring) shall be conducted by a minimum of one dedicated person with communication to the foreman whenever intrusive activities (such as excavation) are performed in an exclusion zone. After completion of intrusive activities involving contaminated materials and removal of the exclusion zone, air monitoring may be discontinued.

Air monitoring equipment will be operated by personnel trained in the use of the specific equipment provided and will be under the control of the SO. A log of the location, time, type and value of each reading and/or sampling will be maintained. The NYSDEC of NYSDOH on-site representative may request copies of daily log sheets.

Real-Time Monitoring

Real-time particulate monitoring shall be conducted using the following equipment:

Photoionization Detectors (PIDs) shall be MiniRAE Plus (PG-76) Professional PIDs as manufactured by RAE Systems Inc., or equal. The Contractor shall provide one PID for each and every hazardous work zone operation, and one site backup PID. Total particulates shall be measured using a real-time aerosol monitor. The instrument shall be calibrated daily according to the procedure in the users manual. The meter shall be capable of measuring concentrations in the size range of less than 0.1 to 10 microns with a sensitivity down to 0.001 mg/m^3. The monitor shall be Miniram model MIEPDM-3, or equal.

Real-time particulate monitoring will be conducted during any excavation, transportation, or other handling of contaminated soil, scarification, and during the relocation of debris.

Action Levels

The following action levels will be established for work area and perimeter monitoring of particulates, organic vapors, and odors. If the following levels are attained at half the distance between the work zone and the property line, then work will cease until engineering controls bring levels down to acceptable limits. These levels are general and shall be used as minimum action levels. The Contractor shall develop site-specific perimeter monitoring action levels based on contaminants found in the work areas.

Monitor the air, using the same equipment, for 10-15 minutes upwind of the work site to establish background level. The background level shall be established before the start of each shift every day. Particulate levels should be integrated over a period not to exceed 15 minutes. In the event that downwind particulates are detected at levels in excess of 150 ug/m^3 or 2.5 times the established background level, whichever is less, at the work site, immediately re-measure the background concentrations upwind of the work zone also using the same equipment. If the measured particulate level at the work zone(s) is 100 ug/m^3 above the background level, monitor the downwind site perimeter and implement additional dust controls in the work zone(s). Continue to take hourly measurements of the upwind background concentrations, and compare such concentrations with the particulate level at the work zone(s), until the downwind level at the work zone is less than 100 ug/m^3 above the upwind level.

If at any time the measured particulate level at the work zone(s) is more than 150 ug/m^3, the Contractor shall immediately suspend work at the remediation site, promptly notify the Safety Officer, and implement suitable corrective action or engineering controls before work resumes. Notify the NYSDEC Division of Air resources in writing within 5 working days including a description of the control measures implemented to prevent further exceedances.

If work activities generate any visible dust in off-site areas, the Contractor shall immediately suspend work, promptly notify the Safety Officer, and implement suitable corrective action or engineering controls before work resumes. This "no visible dust" requirement in off-site areas is in addition to the 100/150 ug/m^3 actions levels given above.

The action level for total organic vapors shall be five parts per million above background as measured on the FID or PID. The action level for odors shall be noticeable odors.

Real-time monitoring will also be conducted at half the distance to the site perimeter including an upwind (background) and a downwind location. A background reading will be established daily at the beginning of the work shift. If the wind direction changes during the course of the day, a new background reading will be made. Downwind readings at half the distance to the site perimeter will be made when site action levels have been exceeded at the work zone, if odors are evident, if complaints are received, during periods of higher activity, or at a minimum of twice per work shift.

If site action levels are exceeded at half the distance to the site perimeter location for fugitive dust, organic vapors, or noticeable odors, work must be suspended and engineering controls must be implemented to bring concentrations back down to acceptable levels.

Ensure the validity of real-time monitoring through appropriate QA/QC procedures. Include periodic instrument calibration, operator training, daily instrument performance checks, and details of the record keeping plan in QA/QC plans.

Documentation Monitoring

Documentation monitoring will be conducted at the site perimeter at four locations (north, south, east and west site perimeter) for total dust. Documentation monitoring will be conducted only during the handling of soil that is potentially contaminated (as per the Remedial Work Plan) or known to be contaminated including excavation, staging, grading, or decontamination activities. Documentation Monitoring will include the following:

A. Total nuisance dust will be collected using a PVC collection filter and personnel sampling pump and analyzed gravimetrically according to NIOSH Method 0500.

B. The perimeter locations will be established and marked with high visibility paint or flagging at approximately equidistant points around the site. Samples will be collected at a height of 6 feet above ground surface.

C. Documentation samples will be collected continuously during excavation, staging, grading, and decontamination activities, during the normal work hours when activities are occurring on site. At the end of the week real-time monitoring data will be reviewed and the four samples from one day will be selected by the Contractor and will be analyzed for lead. A maximum of seven days turnaround time is required for all documentation samples.

D. In addition to perimeter monitoring, particulate documentation samples will be collected on site once a week. On-site samples will be collected by choosing "high risk" workers to wear appropriate collection media for metals and particulates. "High risk" workers are those workers most likely to encounter contamination on a particular task. At a minimum, two high risk workers will be chosen to wear collection media for a particular day each week and the media will be analyzed with the documentation air monitoring samples.

Install a meteorological station on site that will be capable of recording, at a minimum, outside temperature, wind velocity, and wind direction.

The documentation sampling submitted shall also identify the "high risk" workers chosen to wear appropriate collection media for contaminants; date media was worn; task involved; analytical results and applicable standards.

Community Air Monitoring (Refer also to: Section 24.0 - Community Protection Plan)

Real-time air monitoring, for particulate levels at the perimeter of the work area is necessary:

A. Particulates should be continuously monitored upwind, downwind and within the work area at temporary particulate monitoring stations. This requires a minimum of one monitor per station or work zone. If the downwind particulate level is 2.5 times background or 100 ug/m^3 greater than the upwind particulate level, then dust suppression techniques must be employed to reduce the particulates to below these levels. All readings must be recorded and be available for review by NYSDEC and NYSDOH representatives.

   As discussed above, the Contractor shall install a meteorological station on site that will be capable of recording, at a minimum, wind velocity, temperature, and direction.

17.0 Emergency Equipment and First Aid Requirements

Communications

The Contractor shall provide telephone communication at the site field office. Emergency numbers, such as police, sheriff, fire, ambulance, hospital, NYSDEC, EPA, NYSDOH, and utilities, applicable to this site shall be prominently posted near the telephone.

The Contractor shall establish a signaling system for emergency purposes.

Emergency Shower and Emergency Eye Wash

The Contractor shall supply and maintain one portable eyewash/body wash facility per active hazardous work zone. The facility shall have a minimum water capacity of 10 gallons and shall conform to OSHA regulations 29 CFR 1910.151. The portable eyewash/body wash facility shall be manufactured/ supplied by Direct Safety Company, Lab Safety Supply Company, or other appropriate suppliers.

Fire Extinguishers

The Contractor shall supply and maintain at least one fire extinguisher in the Contractor's office and one at each hazardous work zone. The fire extinguisher shall be a 20-pound Class ABC dry fire extinguisher with UL-approval per OSHA Safety and Health Training Standards 29 CFR 1910.157. The fire extinguisher shall be manufactured/supplied by Direct Safety Company, Lab Safety Supply Company, or other appropriate suppliers.

First Aid Kit

The Contractor shall supply and locate in his project office and at each and every hazardous work zone one 24-unit (minimum size) "industrial" or "Contractor" first aid kit, required by OSHA requirements 29 CFR 1910.151. The first aid kit shall be manufactured/supplied by Norton, Scott, or other appropriate suppliers.

Emergency Inventory

In addition to those items specified elsewhere, the SO will maintain the following inventory of equipment and protective clothing for use at the site in the event of emergencies.

A. Washable coveralls;

B. Gloves (outer);

C. Gloves (inner);

D. Face shields;

E. Safety glasses;

F. Respirators and appropriate cartridges;

G. Disposable coveralls;

H. Chemical-resistant boots and latex boot covers;

I. Hard hats; and

J. Rain suits.

18.0 Emergency Responses/Contingency Plan and Procedures

Daily Work

During the progress of work, the Contractor will monitor the quality of the air in and around each active hazardous operation prior to personnel entering these areas. Sampling shall be conducted on a continuous basis. Based on the air monitoring data, the proper level of protection will be chosen by the SO.

Emergency Vehicle Access

In the event that emergency services vehicles (police, fire, ambulance) need access to a location which is blocked by the working crew operations, those operations (equipment, materials, etc.) will be immediately moved to allow those vehicles

access. Emergency crews will be briefed as to site conditions and hazards by the SO. All vehicles and personnel will be decontaminated prior to leaving the site.

The Contractor shall schedule a site briefing with the local Fire Department at the completion of mobilization to familiarize emergency response personnel with his/her operations and site layout.

Personal Injury Response Plan

In cases of personal injuries, the injured person or the crew personnel in charge will notify the SO. The SO will assess the seriousness of the injury, give first aid treatment if advisable, consult by telephone with a physician if necessary, and arrange for hospitalization if required. The SO will arrange for an ambulance if required.

If soiled clothing cannot be removed, the injured person will be wrapped in blankets for transportation to the hospital.

Personnel, including unauthorized personnel, having skin contact with chemically contaminated liquids or soils shall be flushed with water after any wet or soiled clothing has been removed. These personnel should be observed by the SO to ascertain whether there are any symptoms resulting from the exposure. If there is any visible manifestation of exposure such as skin irritation, the project personnel will refer to a consulting physician to determine whether the symptoms were the result of a delayed or acute exposure, a secondary response to exposure such as skin infection, or occupational dermatitis. All episodes of obvious chemical contamination will be reviewed by the SO in order to determine whether changes are needed in work procedures.

Route to the Hospital

The Contractor shall post in conspicuous places in the Support Zone a map with written directions to the nearest hospital or emergency medical treatment facility.

Fire Service

The Contractor will make arrangements to take immediate fire fighting and fire protection measures with the local Fire Chief. If there is a fire, the crewmen or their person in charge will immediately call the SO. The SO will immediately call the fire personnel.

The air downwind from any fire or explosion will be monitored immediately in order to protect workers and the nearby community. If personal injuries result from any fire or explosion, the procedures outlined in the Personal Injury Response Plan are to be followed.

Master Telephone List

The attached master telephone list will be completed and prominently posted at the field office. The list will have telephone numbers of all project personnel, emergency services including hospital, fire, police, and utilities. In addition, two copies with telephone numbers are to be given to the NYSDEC and NSYDOH for emergency reference purposes.

Emergency Service	Telephone Number
Fire Department (Sloan Fire Dept.)	911
Police Department (Buffalo Police Dept.)	911
Ambulance (Rural Metro)	911
Hospital/Emergency Care Facility (Mercy Hospital)	911/(716) 826-7000
Poison Control Center	(716) 878-7654
Chemical Emergency Advice (CHEMTREC)	(800) 424-9300
Erie County Department of Health	(716) 858-7690 (business hours) (716) 898-4225 (after 5 pm)
NYSDEC Region 9 office (Buffalo)	(716) 851-7220
NYSDEC Division of Environmental Remediation, Albany, NY	(518) 457-9285 (800) 342-9296 (leave a message for next work day response)
NYSDOH Western Regional Office	(716) 847-4385
NYSDOH Headquarters (Albany)	(800)-458-1158
Contractor	

19.0 Confined Space Work

The Contractor will evaluate the work areas and determine if there are any permit-required confined spaces. If the Contractor determines that personnel will not need to enter a permit-required confined space, appropriate measures to prevent personnel from entering such shall be taken. If the Contractor determines that personnel will need to enter a permit-required confined space, develop and implement a written permit-required confined space program.

The written program shall comply with 29 CFR 1910.146 and shall include the following:

A. Implement methods to prevent unauthorized entry;

B. Identify and evaluate the hazards of permit-required confined spaces before personnel entry;
C. Develop and implement procedures for safe permit-required confined space entry;
D. Provide the appropriate equipment to evaluate permit-required confined spaces;
E. Evaluate permit-required confined spaces when entry operations are conducted;
F. Provide at least one attendant outside the permit-required confined space which will be entered;
G. Designate the personnel who will have active roles in entry operations;
H. Develop and implement procedures for obtaining rescue and emergency services;
I. Develop and implement a system for the preparation, issuance, use and collection of entry permits;
J. Develop and implement procedures to coordinate entry operations when personnel from more than one employer are working;
K. Develop and implement procedures for concluding the entry;
L. Review and revise entry operations if measures may not protect personnel; and
M. Review the permit-required confined space program to ensure personnel are protected from the hazards present.

Copies of the permit-required confined space program and employee training certificates shall be included with the HASP.

20.0 On-Site Spill Containment Plan

The Contractor will provide a written on-site spill containment program that includes the following minimum requirements:

A. Procedures to help prevent spills from occurring;
B. Spill reporting procedure;
C. Spill containment equipment list;
D. Hazard assessment for known or unknown spilled materials;
E. Containment techniques;
F. Air monitoring and sampling requirements;
G. Personal protective equipment requirements;
H. Employee training requirements;
I. Decontamination procedures;
J. Cleanup and disposal methods; and
K. Emergency evacuation procedures.

21.0 Heat Stress Monitoring

Site personnel who wear protective clothing allow body heat to be accumulated with an elevation of the body temperature. Heat cramps, heat exhaustion, and heat stroke

can be experienced, which, if not remedied, can threaten life or health. Therefore, an American Red Cross Standard First Aid book or equivalent will be maintained on site at all times so that the SO and site personnel will be able to recognize symptoms of heat emergencies and be capable of controlling the problem.

When protective clothing is worn, especially Levels A and B, the suggested guidelines for ambient temperature and maximum wearing time per excursion are:

Ambient Temperature (°F)	Maximum Wearing Time Per Excursion (Minutes)
Above 90	15
85 to 90	30
80 to 85	60
70 to 80	90
60 to 70	120
50 to 60	180

One method of measuring the effectiveness of employees' rest-recovery regime is by monitoring the heart rate. The "Brouha guideline" is one such method:

- During a 3-minute period, count the pulse rate for the **last** 30 seconds of the first minute, the **last** 30 seconds of the second minute, and the **last** 30 seconds of the third minute.

- Double each count.

If the recovery pulse rate during the last 30 seconds of the first minute is at 110 beats/minute or less and the deceleration between the first, second, and third minutes is **at least** 10 beats/minute, the work-recovery regime is acceptable. If the employee's rate is above that specified, a longer rest period is required, accompanied by an increased intake of fluids.

In the case of heat cramps or heat exhaustion, "Gatorade" or its equivalent is suggested as part of the treatment regime. The reason for this type of liquid refreshment is that such beverages will return much-needed electrolytes to the system. Without these electrolytes, body systems cannot function properly, thereby increasing the represented health hazard.

This liquid refreshment will be stored in a cooler at the edge of the decontamination zone in plastic squeeze bottles. The plastic bottles will be marked with individual's names. Disposable cups with lids and straws may be used in place of the squeeze

bottles. Prior to drinking within the decontamination zone, the project personnel shall follow the following decontamination procedures:

A. Personnel shall wash and rinse their outer gloves and remove them.

B. Personnel shall remove their hard hats and respirators and place on table.

C. Personnel shall remove their inner gloves and place them on table.

D. Personnel shall wash and rinse their face and hands.

E. Personnel shall carefully remove their personal bottle or cup from the cooler to ensure that their outer clothes do not touch any bottles, cups, etc.

F. The used bottle or cups will not be returned to the cooler, but will be placed in a receptacle or container to be cleaned or disposed of.

G. Personnel shall replace their respirators, hard hats, gloves and tape gloves prior to re-entering the hazardous zone.

When personnel are working in situations where the ambient temperatures and humidity are high--and especially in situations where protection Levels A, B, and C are required-the SO must:

- Assure that all employees drink plenty of fluids ("Gatorade" or its equivalent);
- Assure that frequent breaks are scheduled so overheating does not occur; and
- Revise work schedules, when necessary, to take advantage of the cooler parts of the day (i.e., 5:00 a.m. to 1:00 p.m., and 6:00 p.m. to nightfall).

Cold Stress

Whole-body protection shall be provided to all site personnel that have prolonged exposure to cold air. The right kind of protective clothing shall be provided to site personnel to prevent cold stress. The following dry clothing shall be provided by the Contractor as deemed necessary by the SO:

- Appropriate underclothing (wool or other);
- Outer coats that repel wind and moisture;
- Face, head, and ear coverings;

- Extra pair of socks;
- Insulated safety boots; and
- Glove liners (wool) or wind- and water-repellant gloves.

The SO will use the equivalent chill temperature when determining the combined cooling effect of wind and low temperatures on exposed skin or when determining clothing insulation requirements.

Site personnel working continuously in the cold are required to warm themselves on a regular basis in the on-site hygiene facility. Warm, sweet drinks will also be provided to site personnel to prevent dehydration. The SO shall follow the work practices and recommendations for cold stress threshold limit values as stated by the 1991-1992 Threshold Limit Values for Chemical Substances and Physical Agents and Biological Exposure Indices by the American Conference of Governmental Industrial Hygienists or equivalent cold stress prevention methods.

22.0 Logs, Reports and Record Keeping

Security Log

A daily log of security incidents and visitors granted access to the site will be maintained, as well as a log of all personnel entering and exiting the site.

All approved visitors to the site will be briefed by the SO on safety and security, provided with temporary identification and safety equipment, and escorted throughout their visit. Site visitors will not be permitted to enter a hazardous work zone.

Project site shall be posted, "Warning: Hazardous Work Area, Do Not Enter Unless Authorized," and access restricted by the use of a snow fence.

Safety Log

The Contractor's SO will maintain a bound safety logbook. The log will include all health and safety matters on site and include, but not be limited to, the following information:

- Date and weather conditions on site;
- A description of the proposed work for the day;
- Times when site personnel arrive and depart;
- Air monitoring data;

- Heat and/or cold stress monitoring;
- Decontamination procedures;
- Type and calibration of air sampling/monitoring equipment used;
- Safety meeting summaries; and
- Accidents.

Emergency Or Accident Report

Any emergency or accident will be reported immediately to the SO. The NYSDEC and NYSDOH will also be notified. The Contractor will submit a written report immediately to the NYSDEC and the NYSDOH, but no later than 24 hours of its concurrence. The report will include, but not be limited to, the nature of the problem, time, location, areas affected, manner and methods used to control the emergency, sampling and/or monitoring data, impact, if any, to the surrounding community, and corrective actions the Contractor will institute to minimize future occurrences. All spills will be treated as emergencies.

Daily Work Report

The Contractor shall maintain a daily work report that summarizes the following:

- Work performed,
- Level of protection,
- Air monitoring results,
- Safety-related problems, and
- Corrective actions implemented.

23.0 Posting Regulations

The Contractor will post signs at the perimeter of the Exclusion Zone that state "Warning, Hazardous Work Area, Do Not Enter Unless Authorized." In addition, a notice directing visitors to sign in will be posted at the project site. Also, the Contractor will post a sign stating that any questions about the site should be directed to the New York State Department of Environmental Conservation.

Safety regulations and safety reminders will be posted at conspicuous locations throughout the project area. The following safety regulations and safety reminders are at a minimum to be posted around the job site.

SAFETY REGULATIONS

(To be Posted for Project Personnel)

The main safety emphasis is on preventing personal **contact** with gases, soils, sludge and water. Towards that end, the following rules have been established.

Regulations

A. Eating on the site is PROHIBITED except in specifically designated areas.

B. All project personnel on the site must wear clean or new gloves daily.

C. If you get wet to the skin, you must wash the affected area with soap and water immediately. If clothes in touch with the skin are wet, these must be changed.

D. You must wash your hands and face before eating, drinking or smoking.

E. Observe regulations on washing and removing boots before entering the dressing room or a clean area and showering before going home.

Recommendations

A. Do not smoke with dirty hands.

B. Check for any personal habit which could introduce soil or water into the body.

Examples: eating food off fingers, wiping face or nose with a dirty hand or running a dirty hand through hair.

C. Check that any regularly worn clothing is clean. Examples include dirty watchbands, neck chains and a dirty liner on your safety helmet.

SAFETY REMINDER FOR TOXIC CHEMICALS

(Post for Project Personnel)

Chemicals can't cause problems unless you breathe them, eat them, or put them on your skin.

Chemicals in Gases, Soils, Sludge, and Water

Don't let chemicals enter mouth, nose, or stay on skin.

Use common personal hygiene.

A. Don't eat or drink on the site.

B. No smoking in the area of work.

C. Wear protective clothing.

D. Glove liners must be **clean**.

E. Wash your hands whenever practical. Wash before eating, drinking, or smoking.

F. Don't carry chemicals home to your family. (For example, on clothing, mud in the car, dirty hands.)

G. Follow strictly the HASP.

24.0 Community Protection Plan

A. Community Protection Plan

The Contractor shall develop, as part of this HASP, a Community Protection Plan (CPP). The CPP shall outline those steps to be implemented to protect the health and safety of surrounding human population and the environment.

B. Air Monitoring

As part of the Air Monitoring Program, use real-time monitoring and documentation sampling as described in the Subpart "Air Monitoring Program" of this section to determine if off-site emissions, as a result of the site work, poses a threat to the surrounding community.

Provide real-time air monitoring for particulate levels at the perimeter of the work area. Including the following:

1. Particulates shall be continuously monitored at the 4 documentation sampling stations for a total of 4 dust monitors. If the downwind particulate level is 150 ug/m^3 greater than the upwind particulate level, dust suppressing techniques shall be employed. All readings shall be recorded and be available for State (NYSDEC and NYSDOH) personnel to review.

   Coordinate with local officials to arrange for notification and evacuation of the surrounding community in the event that off-site emissions pose a threat.

2. Off-Site Spill Response

Produce as part of the HASP a Spill Response Plan, also coordinated with local officials, in case of an off-site spill of either liquid or solid wastes. The plan shall include transportation routes and times, as well as the minimum requirements set forth in the Subpart titled "On-site Spill Containment Plan." The driver shall be supplied with Material Safety Data Sheets (MSDs), a 24-hour emergency phone number, and instructions for reporting emergencies to local agencies and the project site.

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APPENDIX B

CITIZEN PARTICIPATION PLAN

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CITIZEN PARTICIPATION PLAN FOR HANNA FURNACE SITE FORMER RAILYARD AREA (SUBPARCEL 1) VOLUNTARY CLEANUP

DEVELOPMENT DOWNTOWN, INC.
BUFFALO, NEW YORK

FEBRUARY 2002

MALCOLM PIRNIE, INC.

P. O. Box 1938
Buffalo, New York 14219

MALCOLM PIRNIE

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1.0 Introduction

This Citizen Participation Plan (CP Plan) establishes a framework for upcoming public information and community outreach activities related to voluntary cleanup of the Former Railroad Yard portion of the Hanna Furnace Site located in Buffalo, NY. These activities are designed to keep adjacent residents, businesses and the public in general, informed of the planned remediation, or clean-up of the site. This CP Plan includes:

- Background information about the site.
- A description of planned voluntary cleanup activities.
- A list of citizen participation activities that will be conducted prior to and during the voluntary cleanup.
- Information on whom to contact and where to get more information about the site and the planned clean-up.
- A glossary of terms and acronyms.

The CP plan will be periodically updated to include new information concerning the cleanup work.

2.0 Site Background Information

2.1 Site Description

The Former Railroad Yard Area is an approximately 43-acre portion of the Hanna Furnace Site, which occupies approximately 113 acres at the southern edge of the City of Buffalo, as shown on Figure 1-1. The Former Railroad Yard Area is located in the southern portion of the Hanna Furnace Site. The Hanna Furnace Site is bordered to the west by New York State Route 5, to the south by the Lackawanna Commerce Park, to the east by railroad tracks, and to the north by wetland areas and the Shenango Steel property. The Hanna Furnace Site surrounds the eastern portion of the Union Ship Canal.

2.2 Site History

The Buffalo Union Steel Corporation purchased the manufacturing area and the former railroad yard portions of the site in 1900. The Union Ship Canal was constructed near the northern edge of the Buffalo Union Steel property in 1910 to service the facility. Pig iron manufacturing commenced during the period of 1900 to 1915 with the construction of the blast furnaces. Following the construction of the blast furnaces, the Hanna Furnace Company acquired the property from Buffalo Union Steel. The National Steel Company subsequently purchased the property in 1929, and the corporate entity became known as the Hanna Furnace Corporation. During peak production, the Hanna Furnace Corporation employed over 800 personnel.

Iron ore, lime, coke and other raw materials were received via the canal, and were stockpiled along the northern and southern edges of the canal. It is likely that these raw materials were also shipped to the site on rail cars that were temporarily stored in the railroad yard. Additionally, the pig iron manufactured at the site was transported to customers via the network of railroad yards and railroads at and near the site.

The Hanna Furnace Corporation ceased all operations in 1982 due to foreign competition and to the closure of the Shenango Furnace Company, a primary recipient of pig iron from Hanna Furnace.

The Jordan Foster Scrap Corporation purchased the site in 1983 and subsequently dismantled many of the buildings and removed the rails from the Former Railroad Yard for scrap. The Jordan Foster Scrap Corporation filed for bankruptcy during 1986, and leased the site briefly to the Equity Scrap Processing Company. In 1998, the City of Buffalo gained title to the Hanna Furnace Site due to nonpayment of taxes.

The Hanna Furnace Site has been essentially unoccupied and unsecured since 1986. A large number of soil/debris piles from fugitive dumping are located in the Former Railroad Yard Area. The majority of the tires and railroad ties were removed from the Former Railroad Yard Area in June 1999.

2.3 Site Investigation History

A number of environmental site assessments and investigations have occurred at the Hanna Furnace Site, which included the Former Railroad Yard. This work has involved the collection and analysis of approximately 80 samples of soils, groundwater and fill materials across the site. Based on the information obtained from these investigations, the City of Buffalo and their environmental consultant, Malcolm Pirnie, Inc., worked with NYSDEC to develop a remedial approach for the site that will be protective of public health and the environment, and will facilitate redevelopment of the property for commercial and industrial end uses. The City of Buffalo has agreed to voluntarily implement the cleanup program under a formal Voluntary Cleanup Agreement with the NYSDEC.

The New York State Department of Environmental Conservation (NYSDEC) prepared an "Inactive Hazardous Waste Disposal Site Report" for the Hanna Furnace Site in 1983. The NYSDEC subsequently identified the property as Site # 915029, and initially assigned the site a classification of "2A," indicating that the site was a potential hazardous waste site but that insufficient data were available to properly characterize potential issues at the site. Following several environmental investigations of the Hanna Furnace Site, ABB Environmental Services (ABB) conducted a Preliminary Site Assessment of the site in 1995 for the NYSDEC. The results of this investigation confirmed that contaminants present on the Hanna Furnace Site did not pose a serious threat to human health or the environment. Based on the results of this investigation, the Hanna Furnace Site was delisted from the registry of potential hazardous waste sites.

The environmental assessments and investigations that have been completed at the site were documented in the following reports:

- Rupley, Bahler and Burke. Solid Waste Management Facility Report. 1979.
- Erie County Department of Environmental Protection. Inactive Site Profile Report. April 1982.
- Engineering Science. Phase I Investigation. January 1986.
- United States Geological Survey. Draft Report of Preliminary Evaluation of Chemical Migration to the Niagara River from Hazardous Disposal Sites in Erie and Niagara Counties. 1983.

- New York State Department of Environmental Conservation. Inactive Hazardous Waste Disposal Site Report. 1983.
- Recra Environmental. Site Characterization and Environmental Assessment. August 1988.
- ABB Environmental Services. Preliminary Site Assessment. November 1995.
- Ecology and Environment, Inc. Environmental Site Assessment. May 1997.
- Malcolm Pirnie, Inc. Characterization of the Former Railroad Yard. October 1999.
- Malcolm Pirnie, Inc. Supplemental Investigation Report. July 2000.

2.4 Parameters of Interest

As indicated above, significant environmental sampling has been performed at the site in support of voluntary cleanup site assessment and planning activities. These samples indicated the presence of common byproducts of steel manufacturing operations in soils/fill and groundwater at a number of specific locations where these materials were stored, handled or produced. The soil/fill constituents or parameters of interest are:

2.4.1 Semivolatile Organic Compounds (SVOCs)

SVOCs detected at the site are almost exclusively limited to polyaromatic hydrocarbons (PAHs), which are byproducts of incomplete combustion and impurities in petroleum products. Because PAHs are formed through anthropogenic combustion processes such as the burning of coal, oil and gasoline, they are generally ubiquitous in soils, especially urban soils. The presence of PAHs at this site is consistent with its urban location and past use as a railroad yard.

2.4.2 Inorganic Analytes

The inorganic analytes that were considered as part of this CP Plan include metals and cyanide and are present in soils/fill across the property. Most of these elements exist in soils at the site at naturally occurring concentrations. Inorganic analytes present in site soils at elevated concentrations relative to "background" or typical concentrations include arsenic, calcium, chromium, copper, and zinc. Several of these parameters are

components of slag and are present in elevated concentrations as a result of slag deposited on the site.

2.4.3 Groundwater pH

Elevated pH was measured in groundwater collected from wells, borings, and test pits in the western portion of the Former Railroad Yard. The cause of the elevated pH may be lime used as a raw material in the pig iron manufacturing process or the material that was used as fill at the turn of the century prior to any construction at the site.

3.0 The Cleanup Plan

3.1 Description of Voluntary Cleanup Objectives

A detailed listing of the various cleanup objectives for the Hanna Furnace - Former Railroad Yard Site is presented in the Voluntary Cleanup Program Remedial Action Work Plan. The proposed cleanup has been designed to be protective of human health and the environment by covering the soil and fill material at the site with asphalt, concrete, or clean soil. Because VOCs were not detected in the samples collected in the Former Railroad Yard, the primary exposure pathway for contaminants at the site (metals and PAHs) is via direct contact. The proposed plan of covering the on-site fill material will eliminate the potential for direct contact with soil and is therefore protective of human health and the environment.

During invasive redevelopment activities such as the construction of buried utilities, fill material will be excavated in accordance with the Soil/Fill Management Plan contained in the Remedial Work Plan. It is expected that the material excavated will contain concentrations of contaminants similar to those encountered during investigations previously conducted at the site. However, due to the nature of subsurface investigations, it is possible that localized zones of more significant contamination may be encountered. To define areas of soil/fill that will require additional cleanup, site-specific action levels (SSALs) have been established for soil/fill at the site. The SSALs are specific concentration limits for the parameters of concern that, when exceeded, trigger the need for remediation. The list of SSALs for the site is presented in Table 3-1.

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TABLE 3-1
SITE-SPECIFIC ACTION LEVELS
CITIZEN PARTICIPATION PLAN
HANNA FURNACE - FORMER RAILROAD YARD AREA

PARAMETER	NYSDEC TAGM VALUES[1]	EASTERN U.S. BACKGROUND RANGE[1]	MAXIMUM CONCENTRATION DETECTED[2]	SITE-SPECIFIC ACTION LEVEL[3]
VOLATILE ORGANIC COMPOUNDS (ug/kg)				
TOTAL VOCs	10,000	-	265	10,000[5]
SEMIVOLATILE ORGANIC COMPOUNDS (ug/kg)				
TOTAL SVOCs	500,000	-	80,750	500,000[3,5]
PESTICIDES / PCBs (ug/kg)				
Total Pesticides	10,000	-	500	10,000[5]
Total PCBs (surface-0 to 1')	1000	-	3820	1000
Total PCBs (subsurface-below 1')	10,000	-	Not Detected	10,000
METALS (mg/kg)				
Arsenic	7.5 or SB	3 - 12	61.7	50
Barium	300 or SB	15 - 600	327	500
Cadmium	(10)	0.1 - 1	19.9	20
Chromium	(50)	1.5 - 40	4,700	200
Lead	(1000)	4 - 500	3,300	1,000
Mercury	0.1	0.001 - 0.2	0.67	1.0
Selenium	2 or SB	0.1 - 3.9	35.9	50
Silver	SB	-	1,170	1,000
Cyanide	1,600[4]	-	43	50

Notes:

(1) Soil Cleanup Guidelines and Eastern U.S. Background Range from NYSDEC TAGM 4046 (1/24/94). Value in parentheses are NYSDEC revised values for nonresidential sites but have not yet been incorporated into TAGM 4046.

(2) Maximum concentration detected during Recra Environmental, Inc.'s 1988 investigation, ABB Environmental Services' 1995 investigation, and Malcolm Pirnie's 1999 and 2000 investigations.

(3) In addition to the SSAL of 500,000 ug/kg for total concentrations of SVOCs, the SSAL for each individual SVOC is 50,000 ug/kg.

(4) USEPA Region 3 Soil Screening Level for cyanide.

(5) Total concentration is the sum of concentrations of Target Compound List (TCL) compounds plus estimated concentrations of Tentatively Identified Compounds (TICs).

- Soil cleanup guideline or background range not available.

Protection of the off-site community, which includes surrounding residents and businesses as well as potential future commercial and public users of the site during the redevelopment period, will be addressed through a Community Air Monitoring Plan and a Soil/Fill Management Plan. The Community Air Monitoring Plan establishes specific requirements for air monitoring and procedures to mitigate off-site migration of airborne particulates and vapors during the remediation and redevelopment periods. The Soil/Fill Management Plan provides requirements for handling of soils/fill excavated during redevelopment (i.e., for foundation and subsurface utilities) and for placement of final, clean vegetated cover material or paving over exposed soil/fill in all redeveloped areas of the site.

3.2 Summary of Voluntary Cleanup Activities

In order to eliminate potential exposure risks associated with direct contact with site fill material, the entire Former Railroad Yard Area will be covered as part of site redevelopment. The cover system will be placed directly on top of the regraded on-site fill material and will include clean soil for outdoor, vegetated areas, asphalt for roads and parking lots, or concrete for sidewalks, buildings and heavy use areas. Surface coverage over the entire redeveloped parcel or subparcel will be required by the site owner or developer as a pre-condition of occupancy. The site cover system will be maintained in accordance with the OM&M Work Plan and the Voluntary Cleanup Agreement.

During excavation activities at the site, the soil/fill will be inspected for staining and will be field screened for the presence of volatile organic compounds (VOCs) with a photoionization detector (PID). Excavated soil/fill that is visibly stained or produces elevated PID readings (i.e., sustained 10 ppm or greater) will be considered potentially contaminated and stockpiled on the Hanna Furnace site for further assessment. The potentially contaminated soil will be stockpiled on polyethylene sheeting and then sampled for reuse, treatment or disposal. The stockpiled potentially contaminated soil will also be completely covered using polyethylene sheeting to reduce the infiltration of precipitation and the entrainment of dust. Soil/fill containing one or more constituents in excess of the site-specific action levels (SSALs) will be transported off-site to a permitted waste management facility. Any analytes that do not have a corresponding SSAL and are detected at concentrations above the soil cleanup guidelines (TAGM 4046) will be transported off-site to a permitted waste disposal facility unless otherwise agreed by the NYSDEC. Soil/fill awaiting analytical results or awaiting transportation will be stored on-site under polyethylene sheeting.

Excavated or disturbed soil/fill, which exhibits no staining or elevated PID readings, and has been analyzed and found to meet SSALs, may be used as subgrade or excavation subgrade backfill. All excavations or disturbances must be backfilled as soon as the work allows.

3.3 Cleanup Schedule

Due to the nature of commercial and industrial site development, the specific schedule for the site redevelopment activities, including the remedial actions, is not currently known. However, it is anticipated that the railyard area will be completely redeveloped within ten years of execution of the Voluntary Cleanup Agreement.

4.0 Who To Contact & Where To Go For More Information

4.1 NYSDEC and NYSDOH Contacts

The list below identifies names, addresses and phone numbers of contact people within the NYSDEC and NYSDOH who can answer questions and address public concerns about the site:

Mr. Martin Doster, P.E.
Project Engineer
Division of Environmental Remediation
NY State Dept. of Environmental Conservation
270 Michigan Avenue
Buffalo, New York 14203
(716) 851-7220

Mr. Matthew J. Forcucci
NY State Dept. of Health
584 Delaware Ave.
Buffalo, New York 14202
(716) 847-4501

4.2 Document Repositories

Documents related to the Hanna Furnace Site Former Railroad Yard Site Voluntary Cleanup are available for public review at the document repositories that NYSDEC has established at the following locations:

Buffalo & Erie County Public Library
JP Dudley Branch
2010 So. Park Avenue
Buffalo, New York 14220
(716) 823-1854

Hours of Operation:
M/F/Sat 10:00 am - 6:00 pm
Tue: 12:00 pm - 8:00 pm
W: Closed
Th: 12:00 pm - 8:00 pm
Sun: 1:00 pm - 5:00 pm

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NYSDEC
Region 9 Offices
270 Michigan Avenue
Buffalo, New York 14203
(716) 851-7220
Contact: Mr. Martin Doster, Project Engineer

Hours of Operation:
M-F, 8:30 am - 4:45 pm
(by appointment only)

5.0 List Of Planned Citizen Participation Activities

Table 5-1 shows the citizen participation activities that will be performed during the cleanup at this site. The adjacent time line indicates when each activity is tentatively scheduled to be completed and will be updated as necessary to reflect the actual completion dates.

Additional citizen participation activities may be conducted based on the amount of citizen interest shown at the site. Community involvement is important to ensure that the voluntary cleanup of the Hanna Furnace - Former Railroad Yard Site does not impose a negative impact on people living and working near/on the site. Additional citizen participation-related activities that will be completed specific to voluntary cleanup design and construction will involve updating the document repositories with design and construction documentation, as they become available.

6.0 Mailing List

The mailing list is used to provide information to area residents, elected officials, media and other interested parties who want to be kept informed about the Hanna Furnace - Former Railroad Yard Site. A copy of the list is presented in Appendix A. If you would like to request your name be added to the list, please contact Mr. Michael Podd, Citizen Participation Specialist in the DEC Region 9 Office at (716) 851-7220.

7.0 References

ABB Environmental Services. Preliminary Site Assessment. November 1995.

Ecology and Environment, Inc. Environmental Site Assessment. May 1997.

Engineering Science. Phase I Investigation. January 1986.

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TABLE 5-1

CITIZEN PARTICIPATION ACTIVITIES - VOLUNTARY CLEANUP AGREEMENT

HANNA FURNACE - FORMER RAILROAD YARD SITE
CITIZEN PARTICIPATION PLAN

Activity	Activity Completion Point	Anticipated Activity Completion Date	Actual Activity Completion Date
Mail a Voluntary Cleanup Agreement Application Fact Sheet to Mailing List	At least 30 days prior to NYSDEC approval of VCA	March 2002	
Mail an End of Construction of Subparcel 1 Fact Sheet to Mailing List	When Construction is Complete	August 2012	
Update Mailing List	As Needed During Construction	March 2002 through August 2012	

Erie County Department of Environmental Protection. Inactive Site Profile Report. April 1982.

Malcolm Pirnie, Inc. *Characterization of the Former Railroad Yard.* October 1999.

Malcolm Pirnie, Inc. *Supplemental Investigation Report.* May 2000.

New York State Department of Environmental Conservation. *Inactive Hazardous Waste Disposal Site Report.* 1983.

Recra Environmental. *Site Characterization and Environmental Assessment.* August 1988.

Rupley, Bahler and Burke. *Solid Waste Management Facility Report.* 1979.

United States Geological Survey. *Draft Report of Preliminary Evaluation of Chemical Migration to the Niagara River from Hazardous Disposal Sites in Erie and Niagara Counties.* 1983.

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APPENDIX A

MAILING LIST

APPENDIX A – MAILING LIST

If you would like your name to be added to the list, please contact Mr. Michael Podd at the NYSDEC Region 9 Office at 716-851-7220.

ADJACENT PROPERTY OWNERS

Sherland Inc.
27 Forestview Dr.
Depew, NY 14043-1713

Republic Steel Corp.
Tax Division 1635 G4
1812 Republic Bldg.
P.O. Box 6778
Cleveland, OH 44101

Con-Rail/So. Buffalo Railway
Con-Rail
Property Tax Dept.
P. O. Box 8499
Philadelphia, PA 19103

Tomasello Contracting Corp.
2 North Steelawanna
Lackawanna, NY 14218

NYSDOT
Albany, NY 14220-9999

E.C.I.D.A.
Kurt Williams
C/o CanFibre of Lackawanna
300 Commerce Dr.
Lackawanna, NY 14218

The People f the State of NY
1755 Fuhrmann
Buffalo, NY 14203-3133

St. Lawrence Cement, Inc.
c/o Independent Cement Co.
3 Columbia Circle
Albany, NY 12203

Niagara Frontier Transportation Authority
181 Ellicott Street
Buffalo, NY 14203

City of Buffalo
Division of Real Estate
2501 City Hall
Buffalo, NY 14202-3325

Republic Steel Corp.
LTV Steel Corp.
D. Soika c/o Republic Steel
P.O. Box 6778
Cleveland, OH 14101

City of Buffalo
Division of Real Estate
111 Marilla St.
Buffalo, NY 14220-2120

Bob and Don S Area Parts, Inc.
49 Hopkins St.
Buffalo, NY 14220

Hopkins Tifft Realty Corp.
110 Hopkins St.
Buffalo, NY 14220

Niagara Cold Drawn Corp.
P.O. Box 339
110 Hopkins St.
Buffalo, NY 14220

Pravia Holding Corp.
88 Hopkins St.
Buffalo, NY 14220-2131

ADJACENT PROPERTY OWNERS (Continued)

Mazurek, Henry J. &. Kristina
541 Grove Road
East Aurora, NY 14052-1203

City of Buffalo
Parks & Recreation
511 City Hall
Buffalo, NY 14202

County of Erie
Botanical Gardens
95 Franklin St.
Buffalo, NY 14202-3094

CITIZENS GROUPS

Mr. Ausar Afrika
Harambee Books, Environmental
108 Sycamore St.
Buffalo, NY 14204

Mr. William Hilps, Sr.
Environmental Council
5115 Baer Road
Sanborn, NY 14132

Mr. Alfred Price
State Univ. of New York at Buffalo
Planning Dept.
3435 Main Street
Buffalo, NY 14214

Ms. Judy Robinson
Citizen Environmental Co.
425 Elmwood Ave.
Buffalo, NY 14202

Mr. Alex Cukan, Director
Interfaith Center for Environment
1260 Delaware Ave.
Buffalo, NY 14209

Mr. Don Kill
Erie County Sportsmen's Fed.
55 Winstead Road
Lackawana, NY 14218

Mr. Blake Reeves
State Univ. of New York at Buffalo
4 Cloister Court
Buffalo, NY 14226

Ms. Dawn Sanders
Citizen Action of New York
433 Franklin St.
Buffalo, NY 14202-1301

LOCAL OFFICIALS/GOVERNMENT REPRESENTATIVES

Councilman James Pitts
Buffalo Common Council, President
1408 City Hall
Buffalo, NY 14202

Mayor Anthony Masiello
Buffalo Mayor's Office, Room 201
City Hall
Buffalo, NY 14202

Mr. James Smith
Buffalo Environmental Office
916 City Hall
Buffalo, NY 14202

John Heffron, Esq.
Buffalo Economic Renaissance Corp.
617 Main Street
Buffalo, NY 14203

Councilman Mary Manley
Buffalo Common Council, South
1410 City Hall
Buffalo, NY 14202

NYSDEC/NYSDOH/USEPA REPRESENTATIVES

Gerald Mikol, Director
NYSDEC, Region 9
270 Michigan Ave.
Buffalo, NY 14203

Mr. Martin Doster
NYSDEC, Region 9
270 Michigan Ave.
Buffalo, NY 14203

Mr. David Locey
NYSDEC, Region 9
270 Michigan Ave.
Buffalo, NY 14203

Mr. Peter Buechi
NYSDEC, Region 9
270 Michigan Ave.
Buffalo, NY 14203

Mr. Michael Podd
NYSDEC, Region 9
270 Michigan Ave.
Buffalo, NY 14203

Mr. Joseph Ryan
NYSDEC, Region 9
270 Michigan Ave.
Buffalo, NY 14203

Mr. Lawrence Ennist
NYSDEC, Room 260A
50 Wolf Road
Albany, NY 12233-7010

Mr. Sam Thernstrom
NYSDEC, Room 602
50 Wolf Road
Albany, NY 12233-7010

Community Outreach File
NYSDEC, Region 9
270 Michigan Ave.
Buffalo, NY 14203

Mr. Cameron O' Connor
NYSDOH
584 Delaware Ave.
Buffalo, NY 14202

Mr. Mark Van Deusen
NYSDOH, Outreach Unit
547 River St.
Troy, NY 12180

Mr. Mark Van Valkenburg
NYSDOH, Room 205
547 River St.
Troy, NY 12180

Mr. Timothy Doolittle
NY State Dept. of State
65 Court St.
Buffalo, NY 14202-3471

Mr. Michael Basile
USEPA
Public Info. Office
Niagara Falls, NY 14303

MEDIA CONTACTS

Joseph Schmidbauer
Alternate Press
P.O. Box 729, Washington Sta.
Buffalo, NY 14205

Tracey Drury
Business First
472 Delaware Avenue
Buffalo, NY 14202

Paul MacClennan
Environmental Columnist
85 West Oakwood Place
Buffalo, NY 14214

Environmental News Desk
WBEN Radio 930
500 Corporate Pkwy.
Buffalo, NY 14226

Milis Hariston
WGRZ TV – CH. 2
259 Delaware Ave.
Buffalo, NY 14202

Environmental News Desk
WIVB – CH. 4
2077 Elmwood Ave.
Buffalo, NY 14207

Environmental News Desk
Front Page, Inc.
2703 South Park
Lackawanna, NY 14218

James Schrader
Metro Community News
P.O. Box 211
Buffalo, NY 14225

Jay Bonfatti
The Buffalo News
1 News Plaza
Buffalo, NY 14240

Environmental News Desk
WKBW News Channel 7
7 Broadcast Plaza
Buffalo, NY 14202

Michael Desmond
WNED, Environmental News
P.O. 1263
Horizons Plaza
Buffalo, NY 14240

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ATTACHMENT B

CITIZEN'S GLOSSARY OF ENVIRONMENTAL TERMS

APPENDIX B
Citizen's Glossary of Environmental Terms

This glossary lists common terms related to New York State Department of Environmental Conservation's voluntary cleanup, brownfield, and inactive hazardous waste disposal site programs. It includes some terms used by the United States Environmental Protection Agency"s (EPA) Superfund program. Glossary explanations should help you understand various environmental concepts. Some words within the definitions are in bold, which indicates that they are defined elsewhere in the glossary.

The following do not constitute the state's official use of terms and phrases for regulatory purposes, and nothing in this document should be construed to alter or supplant any other state document. The glossary includes brief definitions of some contaminants frequently found at remediation sites. However. not all contaminants found at remediation sites are included, nor are the listed contaminants found at every site.

Acid — Chemicals that have a high concentration of hydrogen ions. Acids have a **pH** of less than 7 on a scale of 0 to 14. Strong acids, closer to 0 on the scale are corrosive, and weak acids, with a pH closer to 7, are not. An acid is the opposite of a **base**.

Activated carbon — A highly absorbent form of carbon, formed primarily from coal and lignite, that absorbs organic compounds. "Activated carbon treatment systems" are used to remove odors and toxic substances from liquid or gaseous emissions.

Acute effects — Health effects that have a rapid onset, a short course, and pronounced symptoms and termination. A reaction that occurs shortly after exposure to a chemical.

Acute exposure — A single, short contact with a chemical. It may last a few seconds or a few hours, but no longer than a day.

Administrative order on consent — See **Consent order**

Administrative record — Part of a site's **Record of Decision** (ROD) which lists and defines documents used in the development of DEC's decision about selection of a **remedial action.**

Adsorb/ Adsorption — Molecules of gas, liquid, or dissolved solids that adhere or "stick" to the surfaces they come in contact with. Some chemicals adsorb strongly to soil particles. This differs from *absorb:* "to take up or make part of the existing whole," like a sponge absorbs (sucks up) water.

Air sparging — Injecting air or oxygen into an **aquifer** to strip or flush volatile contaminants as air bubbles up through the ground water. The air is captured by a vapor extraction system. (See **soil vapor extraction system).**

Air stripping — A treatment system that removes or "strips" **volatile organic compounds** from contaminated groundwater or surface water by forcing an airstream through the water and causing the compounds to evaporate.

Ambient	The surrounding environment. Ambient usually refers to the surrounding outdoor air, water, or land.
Anaerobic	Absence of oxygen. Some organisms, such as certain soil bacteria, thrive under anaerobic conditions in soil.
Arsenic	An element used in wood preservatives and pesticides.
Applicable or Relevant and Appropriate Requirements (ARARs)	Any state or federal statute that pertains to protection of human life and the environment in addressing specific conditions or use of a particular cleanup technology at a **Superfund** site.
Aquifer	An underground water-bearing formation of soil or rock commonly used for drinking water.
Aquifer recharge	See **Recharge**
Attenuation	The process by which a compound is reduced in concentration over time, through absorption, adsorption, degradation, dilution, and/or transformation.
Availability session	A scheduled gathering of program staff and members of the public in a casual setting, with or without a formal presentation or agenda but usually focusing on a specific aspect of a site's remedial process.
Background, Background level	The **concentration** of a substance in air, water, or soil that occurs naturally or is the result of human activities not related to a hazardous waste site; conditions in the area near, but not affected by, a hazardous waste site. "Background samples" are often taken to compare an area's natural or pre-existing conditions to conditions at a hazardous waste site.
Barrier protection layer	A layer of soil covering a **geomembrane** designed to protect the geomembrane from wear and tear caused by the weather, animals, etc.
Base	Bases are chemicals that have a large concentration of hydroxyl (one hydrogen plus one oxygen atom) ions. A basic compound has a **pH** of more than 7 on a scale of 0 to 14. Strong bases, pH closer to 14, are corrosive. Weak bases, with pH closer to 7, are not. An **acid** can neutralize the effects of a base.
Bedrock	The continuous solid rock of the continental crust. Bedrock can be found anywhere from the surface to hundreds of feet below ground. Bedrock can be solid or it can contain numerous cracks (fractures). Groundwater and chemicals can move through fractured bedrock.
Bentonite	A very fine clay, expansible when moist, commonly used to provide a tight seal around a monitoring well. Also used in **slurry walls.**

Bioaccumulation	The build-up of toxic materials in body tissues of fish and animals.
Bioavailability	The extent to which a substance can readily be absorbed by an organism or is ready to interact in an organism's metabolism
Bioremediation	The **degradation** (breakdown) or stabilization of contaminants in the environment by microorganisms. There are many **remedial** techniques that use microorganisms, such as bacteria, to break down contaminants. Any of these techniques may be called bioremediation.
Biota	All the living organisms in a given area.
Borehole	Hole made with drilling equipment.
Boring	See **Soil boring**
Brownfield	Abandoned, idled, or under-used properties where expansion or redevelopment is complicated by real or perceived environmental contamination. Brownfield sites can pose environmental, legal, and financial burdens on a community and its taxpayers. New York State provides funds through the **1996 Clean Water/Clean Air Bond Act** to help municipalities that own brownfields but are not responsible for the contamination to investigate and clean up these sites. Brownfields cleaned up using Bond Act funds are also called Environmental Restoration Projects. The U.S. Environmental Protection Agency has a similar brownfield initiative.
Cap	See **Landfill cap/ Landfill cover system**
Carbon adsorption	A process by which contaminants are removed from groundwater or surface water when the water is forced through tanks containing **activated carbon,** a material that attracts the contaminants.
Carbon tetrachloride	A colorless, nonflammable liquid with a characteristic odor used as a solvent and in the synthesis of fluorocarbons.
Carcinogen	A cancer-producing substance.
Carcinogenic	Capable of producing or inciting cancer.
CERCLA	See **Comprehensive Environmental Response, Compensation, and Liability Act**
Chlorinated hydrocarbons	Chemicals containing only chlorine, carbon, and hydrogen. These include some pesticides, such as DDT and heptachlor, and solvents such as **trichloroethene and chloroform.**
Chlorinated organics	See **Chlorinated Solvents**

Chlorinated solvents

A group of organic (carbon-containing) solvents which contain chlorine as a part of their molecular structure. Chlorinated solvents are widely used for metal parts cleaning, chemical processing, and photographic film making. Common chlorinated solvents include **chloroform, methylene chloride, carbon tetrachloride, trichloroethene, tetrachloroethene, and 1,1,1-trichloroethane.**

Chloroform

A clear, colorless liquid with a characteristic odor. Chloroform was one of the earliest general anesthetics but this use was abandoned due to toxic effects. Now it is widely used as a solvent in the production of lacquer, pharmaceuticals, fluorocarbons, and plastics.

Chronic effects

A long-term or repeated reaction that occurs after an exposure to a chemical. Chronic effects are the opposite of **acute effects**.

Citizen participation (CP)

A process to inform and involve citizens in the decision-making process during identification, assessment and **remediation of inactive hazardous waste sites.** This process helps to assure that sound decisions are made from environmental, human health, economic, social and political perspectives.

Citizen participation plan

A document that describes the site-specific citizen participation activities that will take place to complement the investigation and clean-up activities at a hazardous waste site. A plan may be updated or altered as public interest or the technical aspects of the program change.

Citizen participation record

A series of documents prepared at a major remedial stage which describes the citizen participation activities required at that stage. A CP record also directs a scoping process to determine if additional citizen participation activities are appropriate and feasible.

Citizen participation specialist

A DEC staff member within the Division of Public Affairs and Education who provides guidance, evaluation and assistance to help the project manager carry out the site-specific citizen participation program.

Classification

See **Site classification**

1996 Clean Water/ Clean Air Bond Act

Provides $1.75 billion for priority environmental programs to ensure further protection of New York's air, water and natural resources, $200 million of which funds the Environmental Restoration Program, also known as the **Brownfield** Program, to provide financial assistance to municipalities for the investigation and for cleanup of municipally-owned potentially contaminated properties. The municipality may then return these properties to productive use or can market them for redevelopment.

Cleanup

Action taken to respond to a hazardous material release or threat of a release that could affect humans and/or the environment. Also called **remedial action, removal action,** response action, or corrective action.

Combustion Burning.

Comment period A time period for the public to review and comment on various documents and **Division of Environmental Remediation** (DER) actions. For example, a 30 day comment period is provided when DER issues a **Proposed Remedial Action Plan** (PRAP).

Community relations The Environmental Protection Agency's program to inform and involve the public in the **Superfund** process and respond to community concerns.

Community Relations Plan (CRP) The formal plan for Environmental Protection Agency community relations activities at a **Superfund** site. The CRP is designed to ensure citizen opportunities for public involvement and allow citizens the opportunity to learn about a site.

Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA) A Federal law passed in 1980 and modified in 1986 by the Superfund Amendments and Reauthorization Act. CERCLA created a special tax that goes into a trust fund, commonly known as **Superfund,** to investigate and clean up abandoned or uncontrolled hazardous waste sites. Under the program, EPA can either pay for site cleanup when parties responsible for the contamination cannot be located or are unwilling or unable to perform the work; or take legal action to force parties responsible for site contamination to clean up the site or pay back the federal government for the cost of cleanup.

Cone of depression/ Cone of influence A depression in the **water table** that develops around a pumped well.

Concentration The amount of one substance in another substance. For example, a concentration of 10 milligrams per liter means there are 10 milligrams of a substance in 1 liter of another substance.

Conceptual design The general outline of planned actions that will be taken to address a hazardous waste site, such as building a **landfill cover system.** The conceptual design is incorporated into detailed design documents during **Remedial Design.**

Consent order A legal and enforceable negotiated agreement between DEC and responsible parties where **responsible parties** agree to undertake investigation and cleanup or pay for the costs of investigation and cleanup work at a site. Also called an "Order on Consent."

Construction and demolition (C&D) debris/ waste Waste building materials, dredging materials, tree stumps, and rubble resulting from construction, remodeling, repair, and demolition of homes, commercial buildings and other structures and pavements.

Contact list Names, addresses and/or telephone numbers of individuals, groups, organizations and media interested and/or affected by a particular hazardous waste site. The DEC mails site-related information to the contact list, also called a mailing list.

Contaminant	Any physical, chemical, biological, or radiological substance or matter that has an adverse effect on air, water, or soil.
Contamination	Microorganisms, chemicals, toxic substances, wastes, or wastewater introduced into water, air, or soil in a concentration that makes the medium unfit for its next intended use. Objects such as building surfaces can also contain contamination.
Contaminant mass	The volume and area of contaminants in a polluted material, such as soil or groundwater. The goal of waste cleanup is to reduce the contaminant mass (e.g., reduce the amount and area of contaminants in soil).
Contaminant plume	see **Plume**
Contract Laboratory Program (CLP)	The Environmental Protection Agency's program that approves laboratories that provide chemical testing services of known quality using a wide range of standard methods and maintaining consistent quality control.
Corrosive	Having the power to degrade or wear away a material by chemical action.
Cost recovery	A legal process where **potentially responsible parties** can be required to pay back the federal or state government for money spent on cleanup actions. Cost recovery actions usually begin after the government has completed a site cleanup.
Cover material	(1) Soil used to cover compacted solid waste in a sanitary landfill. (2) See **Landfill cap/landfill cover system.**
Cover system	See **Landfill cap/landfill cover system**
Deed notification	A notice placed on a property deed to alert future buyers about contamination on a property.
Deed restriction	A legal restriction placed on a property deed to restrict future uses of a contaminated property. For example, a deed restriction may prohibit future housing development on a contaminated industrial site, or prohibit use of contaminated groundwater on a piece of property.
Degradation products	**Chlorinated solvents,** when released in the environment, will naturally degrade by microbial and physical processes in soil and/or groundwater into similar compounds that have fewer chlorine atoms. These new compounds are known as degradation products. For instance, **tetrachloroethylene,** which has 4 chlorine atoms, degrades to **trichloroethylene,** which has only 3 chloride atoms.
Degreaser	Chemical used to remove grease, usually from metal or plastic.

Delist/delisted/delisting	Many sites that have been cleaned up are delisted, meaning they are removed from the **State's Registry of Inactive Hazardous Waste Disposal Sites** Sites that are delisted can fall into one of three categories: D1: No consequential amount of hazardous waste was confirmed at the site. D2: **Remedial actions** have been completed at the site and no further action is required. D3: Site was combined with another site on the **Registry of Inactive Hazardous Waste Disposal Sites.**
Dense Non-Aqueous Phase Liquid (DNAPL)	Liquids denser than water that represent a special class of soil and groundwater contaminants with unique behavior and problems. Since they are denser than water, DNAPLs can sink deeper into the ground and can act as a continuing source of groundwater contamination, as small amounts of the material can dissolve in groundwater.
Density	The mass of a substance per unit of volume. Substances with a density greater than 1.0 are denser than water, substances with a density less than 1.0 are lighter than water.
Dermal	By or through the skin. "Dermal contact" refers to a substance coming in contact with skin.
Desorption	The opposite of **adsorption** or absorption; molecules detach from a surface (such as soil particles).
Detection limit	The lowest concentration of a chemical that can be reliably measured by a testing method.
Dewater	(1) Remove a portion of the water in soil or sludge to dry the soil/ sludge so it can be treated or disposed of. (2) Remove or drain the water from a tank or trench.
1,1-Dichloroethane (1,1-DCA) and 1,2-Dichloroethane (1,2-DCA)	Chemicals with similar molecular structures used to produce a variety of consumer and industrial products, such as specialty chemicals and cleaning products. These chemicals are sometime found at hazardous waste sites as the **degradation** products of other chemicals, such as **trichloroethane.**
Dichloroethene or 1,1-Dichloroethene (DCE) and 1,2-Dichloroethene	Chemicals with similar molecular structures used to make specialty chemicals and pharmaceuticals. These chemicals are sometimes found at hazardous waste sites as the **degradation products of trichloroethene.**
Diffusion	Movement of a substance from an area of high concentration to an area of low concentration. Diffusion can also refer molecules of gas or vapor moving from a source, such as a bottle, to a receptor, such as a human nose.

Division of Environmental Enforcement	A unit within the DEC which works with the **Division of Environmental Remediation** to negotiate agreements with responsible parties for the investigation and remediation of hazardous waste sites. A negotiated agreement is contained in a **consent order.**
Division of Environmental Remediation	Formerly the Division of Hazardous Waste Remediation, a major unit within the DEC created to manage the hazardous waste site remedial program from site discovery through **Operation and Maintenance** activities. Staff include: engineers, geologists, chemists, attorneys, citizen participation specialists, environmental program specialists and support staff.
Document Repository	Typically, a DEC regional office and/or a public building, such as a library, near a particular site, at which documents related to **remedial** and **citizen participation** activities at the site are available for public review. Environmental Management **Councils (EMCs),** Conservation Advisory Committees (CACs) and active local groups can also serve as document repositories.
Downgradient	The direction that groundwater flows similar to "downstream" for surface water.
Drainage Swale	See **Swale**
Drum	A metal or plastic container, usually with a 55 gallon capacity.
Dual-Phase Vacuum Extraction System	A treatment system designed to remove both contaminated groundwater and **soil gas** from a common groundwater well or wells. By removing ground-water, the system lowers the groundwater level around the well, allowing a strong vacuum to be applied to remove contaminated soil gas. The contaminated water and air can then be removed or treated and released.
Effluent	Treated or untreated wastewater that flows out of a treatment plant, sewer, or industrial outfall. Generally refers to wastes discharged to surface waters.
Enforcement	DEC's efforts, through legal action if necessary, to compel a responsible party to perform or pay for site remedial activities.
Engineered/ engineering controls	Method of managing environmental and health risks by placing a barrier between the contamination and the rest of the site, thus limiting exposure pathways.
Environmental Notice Bulletin	A weekly DEC publication used to announce a variety of DEC activities. The ENB announces proposals to **delist** or change the **site classification** of **hazardous waste sites,** as well as **voluntary cleanup agreements.**
Environmental Restoration Program/ Project	See **Brownfield**
1986 Environmental Quality Bond Act	An act passed in 1986 that gives New York State bonding authority of up to $1.2 billion to fund the State's share of the total cost of remediating hazardous waste sites

in New York State.

Epidemiology — The study of diseases as they affect population, including the distribution of disease, the factors (e.g., age, sex, occupation) that influences this distribution; and the application of this study to control health problems.

EP Tox Test — See **Extraction Procedure**

Explanation of Significant Differences (ESD) — A document prepared by the **Division of Environmental Remediation** explaining changes to a cleanup plan called for in a **Record of Decision** and the reason for those changes.

Explosive limits — The amounts of **vapor** in air which form explosive mixtures. Explosive limits are expressed as "lower explosive limits" and "upper explosive limits;" these give the range of **vapor** concentrations in air that will explode if heat is added. Explosive limits are expressed as percent of vapor in air.

Exposure — Contact. No matter how dangerous a substance or activity, without exposure, it cannot harm you.

Exposure routes — A means by which a toxic substance can come into contact with or enter the body. The three major exposure routes are: inhalation (breathing), direct contact (touching), and ingestion (swallowing).

Ex-situ — Outside the original location. For example, contaminated that soil is dug up and removed before it is treated is being treated ex-situ. This is the opposite of **in-situ.**

Exceedance — Violation of the pollutant levels permitted by environmental protection standards.

Extraction procedure (EP Tox Test) — Determining toxicity by a procedure which simulates leaching; if a certain concentration of a toxic substance can be leached from a waste, that waste is considered hazardous, i.e., "EP Toxic."

Extraction well — A discharge well used to remove contaminated groundwater or air.

Feasibility Study (FS) — A report examining the pros and cons of alternative methods to address contamination at a hazardous waste site. The feasibility study usually recommends a certain alternative. The FS is usually based on the results of a **remedial investigation**; together, they are commonly referred to as the RI/FS.

Federal Register — A weekly publication covering federal government activity including rulemaking, proposed plans, response to public comments, etc.

Fill — Man-made deposits of natural soils or rock products and waste materials.

Fish and wildlife impact analysis — Part of a **remedial investigation** that looks at the effects or potential effects of contamination on fish and wildlife.

Flammable	Catches on fire easily and burns rapidly.
Flash point	The lowest temperature at which the vapor of a substance will catch on fire, even momentarily, if heat is applied. Provides an indication of how **flammable** a substance is.
Gas venting system	A system of pipes and vents installed in a **landfill** to prevent the build up of **landfill** gases, such as methane, that could potentially explode. Sometimes the gas vents have flares on them to burn the gas as it is released into the atmosphere. At some very large landfills, the gas is collected and used to generate electricity.
Geomembrane	A low **permeability** plastic sheet that is placed over a landfill to deter rain and snow from entering a landfill's waste. Geomembranes are often made from a plastic called HDPE (high density polyurethane). The geomembrane is covered with soil (**barrier protection layer**) and top soil to protect it.
Geophysical surveys	Techniques used to characterize the subsurface without having to dig up large areas. Examples include seismic refraction (commonly used to determine depth to bedrock), ground-penetrating radar (used to define sub-surface structures and buried objects), and **magnetometry** (used to detect buried iron objects).
Geoprobe	A special machine used to make **soil borings** and to create temporary **groundwater monitoring wells**.
Gram (g)	The unit of mass in the metric system. An ounce is about 28 grams, and a pound is approximately 450 grams.
Granular activated carbon treatment	A filtering system often used in small water systems and individual homes to remove **organic compounds**. See **activated carbon.**
Groundwater	Water found beneath the earth's surface that fills pores between soil particles such as sand, clay, and gravel or that fills cracks in bedrock. Precipitation that does not evaporate or runoff to surface waters **percolates** downward through soil and becomes groundwater. Groundwater flows from areas of high elevation to low elevation at generally low velocities (usually ranging from 10-1000 feet/year) and eventually discharges into surface waters such as rivers, lakes, and wetlands. Groundwater often provides a source of drinking water via wells. The chemical composition of the groundwater reflects the soil or bedrock through which it passes; groundwater dissolves minerals in the soil and bedrock. If a source of contamination exists at or below the earth's surface, percolating rainfall or snowmelt can transport contaminants downward where they can migrate with the groundwater.
Groundwater collection/ extraction and treatment system	A system of wells or trenches fitted with pumps and piping used to pump out or extract contaminated groundwater from the subsurface. Properly designed and operated systems can effectively contain a groundwater contaminant **plume** and

prevent further contaminant migration.

Groundwater table — See **Water Table**

Half-life — (1) The time required for a pollutant to lose half its effect on the environment. (2) The time required for half of the atoms of a radioactive element to undergo decay. (3) The time required for the elimination of one half a total dose from the body.

Hammer mill — A high-speed machine that uses hammers and cutters to crush, grind, chip, or shred solid waste.

Hazardous ranking system (HRS) — A scoring system used to evaluate potential relative risks to public health and the environment from releases or threatened releases of hazardous materials. EPA and States use the HRS to calculate a site score (0 to 100) based on the actual or potential release of hazardous materials from a site through air, surface water, or groundwater. This score is the primary factor used to decide if a hazardous waste site should be placed on the **National Priorities List**

Hazardous Substances — (1) Under the **Comprehensive Environmental Response, Compensation, and Liability Act**, a hazardous substance is any element, compound, mixture, solution, or substance that, when released to the environment, may present a substantial danger to the public health or welfare or to the environment, including, but not limited to, toxic and certain other pollutants under the Federal Water Pollution Control Act, **Resource Conservation and Recovery Act**, hazardous air pollutants regulated by parts of the Clean Air Act, and **Toxic Substance Control Act** The term is much broader than the term **hazardous waste**. Sites that contain only hazardous substances are excluded from New York's **Superfund** program. (2) Any substance designated reportable by the EPA if a designated quantity of the substance is spilled in the waters of the United States or if it is otherwise emitted to the environment.

Hazardous waste(s) — By-products of society that can pose a substantial or potential hazard to human health or the environment when improperly managed. To be considered hazardous waste, the waste must possess at least one of four characteristics (ignitability, corrosivity, reactivity, or toxicity) or appear on special EPA lists.

Hazardous Waste Site — A place where **hazardous wastes** have been dumped, buried or improperly stored. Sites range from a crest of land containing thousands of tons of chemical wastes to a few drums of solvents dumped in a vacant lot. See also **inactive hazardous waste disposal site.**

Health and safety plan — A plan included in investigation or **cleanup** work plans which outlines protective measures for site workers and the community during investigation or cleanup activities.

Health hazard — Anything which can have harmful effects on health. There can be both acute and chronic health hazards.

Health risk assessment — A process which estimates the likelihood that people who could be exposed to chemicals may have health effects. The four steps of a risk assessment are: (1) hazard identification (Can this substance damage health?), (2) dose-response assessment (What dose causes what effect?), (3) **exposure** assessment (How and how much do people contact it?), and (4) risk characterization (combining the other three steps to estimate **risk**).

Heavy metals — Metals with high atomic weights, such as mercury, chromium, cadmium, arsenic, and lead. They can damage living things at low concentrations and tend to accumulate in the food chain.

Herbicide — A chemical used to control, suppress, or kill plants, or to severely interrupt their normal growth process.

Heterogeneous — Consisting of dissimilar ingredients or constituents.

Homogeneous — Having a uniform consistency or ingredients; composed of similar ingredients.

Hydraulic — Operated, moved or effected by means of water.

Hydraulic conductivity — The rate at which water can move through a **permeable medium.**

Hydraulic gradient — In general, the direction of **groundwater flow** due to changes in the depth of the **water table.** Just as water flows downhill, water in the ground moves from areas of high elevation to areas of low elevation. The slope of the water table is the hydraulic gradient. The hydraulic gradient determines the speed of groundwater flow. A steep gradient causes groundwater to mover faster than a nearly horizontal gradient.

Hydrocarbon — Any of a series of chemical compounds that consist entirely of carbon and hydrogen.

Hydrogeologic testing — Physical tests performed to obtain specific groundwater and geologic data. A pump test, for example, is used to determine the permeability (a measure of how readily **groundwater flows)** and storage capacity (a measure of the amount of water available) of an **aquifer.**

Hydrogeology — The geology of **groundwater,** with particular emphasis on the chemistry and movement of water.

Hydrology — The study of the movement and properties of water on the earth's surface, underground and in the atmosphere.

Impermeable — Unable to be penetrated, as by liquids. For example, an "impermeable membrane" can be a thin plastic sheet through which rainwater cannot move.

Inactive hazardous waste disposal site	A hazardous waste site where disposal of hazardous wastes has been confirmed and wastes are no longer being disposed of there ("inactive" site).
Incineration	Burning of certain types of solid, liquid, or gaseous materials under controlled conditions to destroy hazardous wastes
Infiltration	The penetration of water through the ground surface into subsurface soil or the penetration of water from the soil into sewer or other pipes through defective joints, connections, or manhole walls. (See: **percolation.)**
Influent	Water, wastewater, or other liquid flowing into a reservoir, basin, or treatment plant. The opposite of **effluent**.
Ingestion	Swallowing. This is one way a person can be exposed to chemicals.
Inhalation	Breathing. This is one way a person can be exposed to chemicals.
Inorganic chemicals/ compounds	Chemicals that do not contain carbon. Metals are inorganic chemicals.
In-Situ	In the original place. In-situ treatment is carried out at a hazardous waste site without having to dig up and move the contaminated material. In-situ is the opposite of **ex-situ**.
Insoluble	Incapable of being dissolved in water or another liquid.
Institutional controls	A variety of methods used to control access to a contaminated site and/or exposure to contaminants at a site. Examples of institutional controls include fencing or **deed notifications/ restrictions.**
Interim remedial measures (IRM)	Action(s) that can be conducted at a site relatively quickly to reduce the risk to people's health and the environment from a well-defined hazardous waste problem. An IRM can involve removing contaminated soil and drums, providing alternative water supplies or securing a site to prevent access.
Landfill	Any place where wastes were disposed of by dumping waste and covering it. There are three main kinds of landfills: (1) Sanitary landfills are disposal sites for nonhazardous solid wastes at which the waste is spread in layers, compacted to the smallest practical volume, and covered with material at the end of each operating day. (2) Secure chemical landfills are disposal sites for hazardous waste. They are selected and designed to minimize the chance of release of hazardous substances into the environment. (3) Old landfills were built without modern day protections; these may contain hazardous wastes. Many of these landfills are being investigated and cleaned up under the State's remediation program.

Landfill cap/ landfill cover system

A layering of material over a landfill to deter rain and snowmelt from moving through the waste pile. A typical landfill cover will include a **geomembrane** or a layer of clay covered with a layer of low **permeability** soil, which in turn is covered by a layer of topsoil and seeded to encourage grass to grow. Landfill cover systems can also include gas vents to prevent gases such as **methane** from building up inside the landfill. The cover system is designed so rain and snowmelt is directed into a drainage ditch or **swale.**

Landfill gas

As organic wastes within a landfill break down, gases such as methane and hydrogen sulfide are produced. The production of these gases drops off over time.

Leachate

Surface or groundwater that is contaminated while moving through a landfill's wastes.

Leachate collection system

A system that gathers leachate and pumps it to the surface for treatment.

Light non-aqueous phase liquid (LNAPL)

Liquids lighter than water that represent a special class of soil and groundwater contaminants with unique behavior and problems. See also **NAPL**.

Liner

A relatively **impermeable** barrier designed to keep leachate inside a landfill. Liner materials include plastic and dense clay.

List / listing

When DEC adds a hazardous waste site to the **Registry of Inactive Hazardous Waste Disposal Sites,** this is called "listing" a site.

Liter

The unit of volume in the metric system. A liter is about the same as a quart.

Magnetometer / magnetometer survey

A magnetometer is an instrument that can detect metal objects buried underground. When this instrument is used to look for buried drums or other metal objects at a hazardous waste site, this is called a magnetometer survey.

Maximum contaminant level

The maximum permissible level of a contaminant in water delivered to any user of a public water system. MCLs are enforceable standards.

Media/medium

Specific environments that can contain contaminants. Air, water, sediment and soil are media.

Metals

A number of chemical elements that share certain special characteristics. Many metals can be toxic in high doses and can **bioaccumulate** in the food **chain.** Metals sometimes found at **hazardous waste sites** include: arsenic, barium, cadmium, chromium, copper, lead, mercury, nickel, silver, and zinc.

Methane

An odorless gas produced in newer landfills as organic material (previously living things or material derived from living things) breaks down. Methane production drops off as a landfill gets older.

Methylene chloride

A colorless nonflammable liquid, with a pleasant aromatic odor, used as a solvent, paint remover, and **degreaser**.

Micrograms per kilogram (μg/kg)

A way of expressing dose: micrograms (μg) of a substance per kilogram (kg) of body weight or soil.

Micrograms per liter (μg/l)

A unit of measure: the number of micrograms of one substance in a liter of liquid: One microgram per liter means one microgram of chemical per liter of water, and is essentially equivalent to one **part per billion** (ppb). Theoretically one μg/l of a substance equals one part per billion of the substance multiplied by its **density**.

Milligrams per kilogram (mg/kg)

A way of expressing dose: milligrams (mg) of a substance per kilogram (kg) of body weight or soil.

Milligrams per liter (mg/1)

A unit of measure: the number of milligrams of one substance in a liter of liquid. One milligram per liter means one milligram of chemical per liter of water, and is essentially equivalent to one **part per million** (ppm) at very low concentrations. Theoretically one mg/l of a substance equals one part per million of the substance multiplied by its **density**.

Monitoring well

(1) A well used to obtain water quality samples or measure groundwater levels. (2) A well drilled to collect groundwater samples for testing to determine the amounts, types, and distribution of contaminants in the groundwater beneath the site. The well enables samples of groundwater to be collected at a specific horizontal and vertical location for chemical analysis. Sometimes soil samples are also collected as the well is being drilled.

National Priorities List (NPL)

The U.S. Environmental Protection Agency's list of the most serious uncontrolled or abandoned hazardous waste sites identified for possible long-term **remedial** response using money from a special trust fund **(Superfund).**

New York State Department of Health

Agency within the executive branch of New York State government which: determines potential risk from environmental exposure at hazardous waste sites; conducts health related community outreach around sites; and reviews remedial actions to assure that public health concerns are addressed.

New York State Department of Law

Agency within the executive branch of New York State government which takes the lead on hazardous waste site litigation. Litigation can involve negotiations and court action with responsible parties to clean up sites, natural resources damage claims, and recovery of remedial costs.

New York State Registry of Inactive Hazardous Waste Disposal Sites	See **Registry of Inactive Hazardous Waste Disposal Sites in New York State**
Non-aqueous phase liquids (NAPL)	Liquids, commonly a mixture of several different chemicals, that are either denser or less dense than water. **Dense NAPL** (DNAPL), such as chlorinated solvents, will sink if it enters groundwater; less dense, or **light NAPL** (LNAPL), such as gasoline, will float on the water table. NAPL in the subsurface can be a persistent source of groundwater contamination due to its low **solubility and viscosity.**
Occupational exposure limits	Maximum allowable concentrations of toxic substances in workroom air for workers.
Odor threshold	The lowest concentrations of a substance's **vapor,** in air, that can be smelled. Odor thresholds are highly variable, depending on the individual who breathes the substance and the nature of the substance.
Operable unit	An administrative term used to identify a portion of a site that can be addressed by a distinct investigation and/or cleanup approach. For example, groundwater contamination at a site may be considered as one operable unit, and soil contamination at the same site may be dealt with as a second operable unit. An operable unit can receive specific investigation, and a particular remedy may be proposed. A **Record of Decision** is prepared for each operable unit.
Operation and maintenance (0&M)	The period following construction of a remedy during which elements of the remedy must be operated and maintained. For example, after a groundwater collection and treatment system is installed (the **remedial construction** phase), operation of the groundwater collection system and treatment of the water would be part of the "Operation and Maintenance" phase of the remedial program. Activities could also include site inspections, groundwater well monitoring and other sampling.
Order on Consent	See **Consent Order**
Organic	(1) In chemistry, any compound containing carbon. (2) Referring to or derived from living organisms.
Organic compounds	Chemicals that contain carbon.
Overburden	The rock and soil in the ground above **bedrock**.
Oxidizer	A material which may cause combustible materials to ignite without the aid of an external ignition source (such as flame) or which, when mixed with combustible materials, increases the rate of burning of these materials.

Part 375	The portion of New York State regulations governing **inactive hazardous waste disposal sites.**
Part 360	New York State landfill regulations, including some regulations related to old landfills that contain hazardous waste.
Particulates	Fine liquid or solid particles such as dust, smoke, mist, fumes, or smog, found in air or emissions.
Parts per billion (ppb)	The concentration of a substance of air, water or soil. One ppb means that there is one part of a substance for every billion parts of the air, water or soil in which it is measured. One ppb is about one drop of dye in 18,000 gallons of water or about one second in 32 years. One ppb is 1,000 times less than one **part per million.**
Parts per million (ppm)	The concentration of a substance in air, water or soil. One ppm means that there is one part of a substance for every million parts of the water or soil in which it is measured. One ppm is about one drop of dye in 18 gallons of water, about the one inch in 16 miles, or one penny in $10,000.
Parts per trillion (ppt)	The concentration of a substance in air, water or soil. One ppt means that there is one part of a substance for every trillion parts of the water or soil in which it is measured. One ppt is 1,000 times less than one **part per billion.**
PCBs (polychlorinated biphenyls)	A group of toxic, persistent chemicals used in transformers for insulating purposes, in gas pipeline systems as a lubricant, and in some florescent light ballasts. The sale of PCBs was banned by law in 1979, but many old transformers still contain them.
Perchloroethene	See **Tetrachloroethene**
Percolate/ percolation	The movement of water through a porous substance such as soil.
Permeable/ permeability	The rate at which liquids pass through soil or other materials in a specified direction. Water moves easily through a "high permeability" soil (such as gravel) and very slowly through a "low permeability" soil (such as clay).
Pesticide	Substance or mixture of substances intended for preventing, destroying, repelling, or mitigating any pest. Some pesticides can accumulate in the food chain and/or contaminate the environment if misused.
pH	A measure of the acidity or alkalinity (how basic) of a liquid or solid material. It is related to the number of hydrogen ions in a substance.
Photo ionization detector (PID)	A hand-held instrument used to measure the overall level of **volatile organic compounds** in air.
Piezometer	An instrument used to measure the elevation of the **water table,** i.e. how far below the surface groundwater is located.

Plume	An area of chemicals moving away from its source in a feather-like (hence the name, plume) shape. A plume, for example, can be a column of smoke drifting away from a chimney. An area of dissolved chemicals moving with groundwater is called a "groundwater contaminant plume."
Polychlorinated biphenyls	See **PCBs**
Polycyclic aromatic hydrocarbons (PAHs)	See **polynuclear aromatic hydrocarbons**
Polynuclear aromatic hydro-carbons (PAHs)	A group of over 100 different chemicals that form during the incomplete burning of coal, oil and gas, garbage, or other organic substances like tobacco or charbroiled meat. PAHs are usually found as a mixture con-raining two or more of these compounds, such as soot. Some PAHs are manufactured. PAHs are found in coal tar, crude oil, creosote, and roofing tar, but a few are used in medicines or to make dyes, plastics, and pesticides. Most do not dissolve easily in water and stick tightly to soil particles.
Porosity	The percentage of the total volume of a given body of rock that is pore space. It is the portion of void (air) space in rock, soil, or sediment.
Potable	Drinkable.
Potentially responsible party (PRP)	Persons identified by the EPA under **CERCLA** or by New York State law as being responsible for the contamination at a hazardous waste site. By law, PRPs may be generators, present or former owners or operators of a site, or transporters of the hazardous substances.
PRAP	See **Proposed Remedial Action Plan**
Precipitation	(1) Rain or snow. (2) Removal of solids from liquid waste so that the hazardous solid portion can be disposed of safely.
Preliminary site assessment (PSA)	A PSA is the **Division of Environmental Remediation's first** investigation of a. site A PSA is performed to determine if a site meets New York State's definition of an **inactive hazardous waste disposal site** by confirming the presence of hazardous waste and determining if the site poses a significant threat to public health or the environment.
Presumptive remedy	Cleanup technique(s) that can be applied to hazardous waste sites with common characteristics. For example, old municipal landfills built without a liner often have similar characteristics. The presumptive remedy for these sites is a cover system.
Project manager	A DEC staff member within the **Division of Environmental Remediation** (usually an engineer, geologist, or hydrogeologist) responsible for the **remedial program** at

	a hazardous waste site. The project manager works with the Division of Public Affairs and Education as well as fiscal and legal staff to accomplish site-related goals and objectives.
Proposed Remedial Action Plan (PRAP)	A document outlining alternatives considered by the Division of Environmental Remediation for the **remediation** of a hazardous waste site and highlighting the alternative preferred by DEC. The PRAP is based on information developed during the site's **Remedial Investigation and Feasibility Study.** The PRAP is reviewed by the public and other state agencies.
Public hearing	A formal hearing at which the public has the opportunity to submit comments and testimony on proposed actions for the public record.
Public meeting	A scheduled gathering of DEC staff and the public to give and receive information, ask questions and discuss concerns.
Publicly owned treatment works (POTW)	A wastewater system, owned by a municipality, state, or tribe that is used for the collection, treatment, and/or disposal of sewage. Usually POTW refers specifically to the sewage treatment plant.
Pump and treat	A method used to collect and treat contaminated groundwater. Typically, groundwater is collected in a well or trench and pumped to a treatment system
Quality assurance (QA)/ quality control (QC)	A system of procedures, checks, audits, and corrective actions to ensure that environmental sampling and testing are of the highest achievable quality.
Reactivity	The ability of a substances to undergo change, usually by combining with another substance or by breaking down. Certain conditions, such as heat and light, may cause a substance to become more reactive. Highly reactive substances may explode.
Real-time monitoring	During construction or investigation activities, continuous monitoring of air with equipment that gives immediate read-outs; that is, samples don't need to be sent to a laboratory to obtain results.
Recharge	The replenishment of **groundwater** by infiltration of rain and snow through the soil.
Reclassification	A process by which the Division of Environmental Remediation redefines the threat posed by a hazardous waste site to public health and the environment by developing and assessing site information and, based on findings and conclusions, assigning the site a new classification code (see **Site Classification).**
Record of decision (ROD)	A document which provides the definitive record of the cleanup alternative that will be used to **remediate** a hazardous waste site. The ROD is based on the **Remedial Investigation I Feasibility Study** and public comment.

Registry of Inactive Hazardous Waste Disposal Sites in New York State

Often referred to as "the Registry," this is a compilation of all known and suspected hazardous waste sites (meeting certain criteria) in New York State. The Registry is compiled in a series of documents published every spring and can be purchased by the public. The document included a one page description and map of each site.

Remedial/ remediate/ remediation

Refers to any procedures or strategies used to address a hazardous waste site. For example, a Remedial Investigation determines what areas of a site need to be addressed (cleaned up or remediated), a **proposed remedial action plan** describes remedial actions (cleanup methods or corrective actions) that have been recommended for a specific site; remediation of a site could include removing contaminated soil.

Remedial action (RA)

Action taken to remove, destroy, reduce, or prevent the spread of contamination at a hazardous waste site.

Remedial alternatives report (RAR)

In New York State's **Brownfield** program, a RAR is the equivalent of a **feasibility** study.

Remedial construction

The physical development, assembly and implementation of tile alternative selected to **remediate** a site. For example, remedial construction could include installing a groundwater collection and treatment system. Construction follows a **remedial design** stage.

Remedial design (RD)

The process following finalization of a Record of Decision in which plans and specifications are developed for the implementation of the alternative selected to remediate (clean up) a site.

Remedial investigation (RI)

Studies designed to gather the data necessary to determine the type (nature) and extent (location) of contamination at a **hazardous waste site.** The RI is usually performed at the same time as a **Feasibility Study** in a process known as the "RIIFS." This process is designed to:

- Establish criteria for cleaning up the site.
- Identify and screen cleanup alternatives for remedial action; and
- Analyze in detail the technology and costs *of* the alternatives.

Remedial program

DEC's efforts to investigate and clean up **inactive hazardous waste disposal sites.** A remedial program is designed to correct or "cure"(remedy) releases or potential releases of hazardous materials into the environment. DEC takes several steps as part of each site's remedial program: it investigates contamination **(Remedial Investigation),** analyzes different methods to address threats posed by the site **(Feasibility Study),** proposes a cleanup plan **(Proposed Remedial Action Plan),** selects a final plan **(Record of Decision),** and designs and implements the plan **(Remedial Design and Remedial Construction).**

Remediation

See **remedial**

Remedy	Actions taken to prevent or mitigate the release of hazardous materials into the environment at **hazardous waste sites** and **brownfield** sites. The word "remedy", is used in the sense of a "cure" or "corrective action."
Removal action	Often less burdensome and extensive than **remedial actions,** a removal action is intended to be a quick, temporary response to a release or the threat of release of a hazardous material at a hazardous waste site. A removal action could involve removing drums of hazardous material, contaminated soil or contaminated sediment and taking these items to a proper disposal facility.
Residual / residue	The quantity of a substance, its degradation products, and/or its metabolites remaining on or in the soil or groundwater. "Residual contamination" usually refers to low levels of chemicals that may be left in soil, bedrock or groundwater after cleanup of hazardous wastes.
Resource Conservation and Recovery Act (RCRA)	Federal law governing the treatment, storage, handling, disposal, and overall management of solid and hazardous wastes.
Responsible parties	See **Potentially responsible parties**
Responsiveness summary	A formal or informal written summary and response by the DEC to public questions and comments. A responsiveness summary is prepared following a public meeting about a **Proposed Remedial Action Plan** and may also be prepared after other public meetings. The responsiveness summary may list and respond to each question, or summarize and respond to questions in categories.
Reverse osmosis	A type of pressurized filtration system in which water is forced through a semipermeable membrane that allows the passage of water but restricts many contaminants.
Risk	The chance of an injury, illness, or death caused by exposure to a hazard.
Risk assessment	The qualitative and quantitative evaluation performed in an effort to define the risk posed to human health and/or the environment by the presence or potential presence and/or use of specific pollutants.
ROD	See **Record of Decision**
Sampling	Small amounts of air, water, or soil are obtained and tested to determine the levels of different hazardous chemicals contained in them.
Sanitary landfill	See **Landfill**
Saturated zone	A subsurface area in which all pores and cracks in rock and/or soil are filled with water.

Scrubber

A device for removing unwanted gases or particles from an air stream by spraying the air with liquid (usually water) or forcing air through a series of baths. Scrubbers are often put on smoke stacks.

Sediment

Soil, sand, and minerals washed by rain from land into water that accumulates on the bottom of ditches, streams, rivers and lakes.

Selected alternative

(1) The cleanup alternative selected by the state as the most feasible. (2) The cleanup alternative selected for a site on the **National Priorities List** based on technical feasibility, permanence, reliability, and cost.

Semi-volatile organic compounds (SVOCs)

Chemicals similar to **volatile organic compounds** but that do not evaporate as readily. **Polynucleated aromatic hydrocarbons** are semi-volatile compounds.

Site classification

DEC assigns **inactive hazardous waste disposal sites** classifications established by state law, as follows:

- Class 1 - A site causing or presenting an imminent danger of causing irreversible or irreparable damage to the public health or environment - immediate action required.
- Class-2 - A site posing a significant threat to the public health or environment - action required.
- Class 2a - A temporary classification for a site that has inadequate and/or insufficient data for inclusion in any of the other classes.
- Class 3 - Site does not present a significant threat to the public health or the environment - action may be deferred.
- Class 4 - A site which has been properly closed - requires continued management.
- Class S - A site which has been properly closed, with no evidence of present or potential adverse impact - no further action required.

Site Investigation/ Remedial Alternatives Report (SI/RAR)

In New York's **Brownfield** program, this is the equivalent of a **Remedial Investigation / Feasibility Study** report. The site investigation is similar to a Remedial Investigation, and the Remedial Alternatives Report is similar to a Feasibility Study.

Sludge

A semi-solid residue from any of a number of industrial processes or air or water treatment processes. Sludge can be a **hazardous waste.**

Slurry

A watery mixture that does not contain a significant amount of dissolved materials.

Slurry Wall

An underground wall designed to stop groundwater flow; constructed by digging a trench and backfilling it with a **slurry** rich in bentonite clay.

Soil boring

A circular hole made in the ground by an auger or mechanical drill rig to collect soil samples deep in the ground. Representative samples are collected for testing to see if the subsoil has been contaminated. Sometimes these borings are converted into groundwater monitoring wells.

Soil gas — Air in the spaces between soil particles. Contaminants can be trapped in this air.

Soil gas survey — A method for investigating underground distributions of **volatile organic compounds** (VOCs) by looking for their vapors in the shallow **soil gas**. A small amount of soil gas is pumped out of the ground through a hollow probe driven into the ground and tested for the presence of contaminants. The presence ofVOCs in shallow soil gas indicates the VOCs may be in the unsaturated (dry) soil or in the groundwater below the probe. This survey is used to trace the outline of a groundwater contaminant **plume** and help determine the best location to install groundwater monitoring wells.

Soil Vapor Extraction System (SVE) — An **in-situ** remediation technique that applies a vacuum to a series of wells ("vapor extraction wells") and induces air flow through contaminated soil. As the air migrates through the soil, **volatile organic compounds** (VOCs) volatilize (evaporate) and move with the air to the extraction wells where they are removed from the subsurface. If the concentration of VOCs in the extracted air is high, the air maybe treated by a carbon adsorption system before being released to the atmosphere. In some cases, **dual phase vacuum extraction** is used to treat both groundwater and the overlying soil.

Solid waste — Non-liquid, non-soluble materials ranging from municipal garbage to industrial wastes that contain complex, and sometimes hazardous, substances. Solid wastes also include sewage sludge, agricultural refuse, demolition wastes, and mining residues.

Solubility — The amount of a substance that can be dissolved in water or (sometimes) another substance.

Solvent — A substance (usually a liquid) capable of dissolving one or more other substances. For example, paint remover is a paint solvent.

Sorb — To take up and hold by either **adsorption** or absorption.

Source area — An area from which groundwater contamination is believed to originate. For example, Company A spilled a 55 gallon drum of **trichloroethene** (TCE) onto the ground near a loading dock at their facility. The TCE spread through the soil and contaminated groundwater around the facility. Because the contamination originated in the loading dock area, this area is the "source area." Over time, the highly concentrated TCE in the source area would continue to slowly spread through groundwater and soil, acting as a continuous "'source" of groundwater contamination.

SPDES permit (pronounced SPEEDIES) — See **State Pollution Discharge Elimination System**

Split samples

A soil sample from a hazardous waste site that is divided between the **potentially responsible parties (PRPs)** and the DEC or the Health Department. It functions as a system of checks and balances since both the PRPs and the DEC analyze their half of the sample. The results of the two analyses can then be compared.

Split-spoon Sample

A sample of **unconsolidated** material taken by driving a sampling device (split spoon) into the soil ahead of a drill bit in a **soil boring.** A split-spoon sampler is typically driven into the soil by repeatedly dropping a weight.

Standards, criteria and guidance values

Values that indicate acceptable or normal levels of various contaminants in the environment. These values are used to establish cleanup goals at hazardous waste sites. Depending on the chemical, the values are developed by the U.S. Environmental Protection Agency, DEC and/or the New York State Department of Health.

State assistance contract (SAC)

In DEC's **brownfield** program, the official agreement between a municipality and the state that outlines both party's responsibility for a brownfield investigation and/or cleanup.

State Pollution Discharge Elimination System (SPDES) permit

A permit issued by the DEC as part of the SPDES program, which is designed to maintain New York's waters with reasonable standards of purity. State law requires a SPDES permit before construction or use of an outlet or discharge pipe for wastewater discharging into **surface water or groundwater,** and for construction or operation of disposal systems such as sewage treatment plants.

Sump

A pit or tank that catches liquid runoff for drainage or disposal.

Superfund

Federal and state programs to investigate and clean up inactive hazardous waste disposal sites. The federal program gives the U.S. Environmental Protection Agency the funding and authority to investigate, rank and conduct or supervise cleanup of sites on the **National Priority List** New York State's program gives the DEC the same authority to deal with sites that do not qualify for the federal superfund list, but meet certain other qualifications.

Superfund Amendments and Reauthorization Act (SARA)

Modifications to CERCLA enacted in 1986. Sometimes referred to as the "Right to Know Law," it requires, among other things, that industry provide the government with information on the use and release of certain chemicals into the environment. This information is then made available to the public.

Surface water

All water naturally open to the atmosphere. Refers to water in rivers, lakes, reservoirs, streams, impoundments, seas, estuaries, and so on.

Swale

A slight depression, sometimes swampy, in the midst of generally level land.

Technical and Administrative Guidance Memorandum (TAGM)

An **official internal Division of Environmental Remediation** document that outlines divisional policies or recommended guidance for topics such as determining cleanup goals at **hazardous waste sites.**

Technical Assistance Grant Program (TAG Program)	A federal grant program that provides funds for qualified citizens" groups to hire independent technical advisors to help them understand and comment on technical decisions relating to federal **Superfund** cleanup actions.
Technical and Operational Guidance Series (TOGs)	DEC Division of Water"s documents listing water quality standards and guidance values.
Terraprobe	A van-mounted, hydraulically-operated earth probe that pushes or hammers rods and specialized rod tips into soil. It is used to obtain samples of soil gas, soil, and groundwater relatively rapidly and in tight quarters.
Test pit	A small excavation at a hazardous waste site. Investigators dig test pits to get an idea of subsurface conditions at hazardous waste sites.
Tetrachloroethene (Perchloroethene)	A clear, colorless, non-flammable liquid with a characteristic odor. It is a widely used solvent, especially as a dry cleaning agent and as a **degreaser**.
Threshold	A dose or exposure below which there is no measurable adverse effect.
Title 3 program/ project	Part of New York State's Superfund program whereby the State pays 75 percent of eligible costs for **remediation** of municipally owned hazardous waste sites and the municipality pays 25 percent.
Toxicity	The degree of danger posed by a substance to animal or plant life.
Toxic substances	A chemical or mixture that may present an unreasonable risk of injury to health or the environment.
Toxic Substances Control Act (TSCA) of 1976	A federal law that provides for testing of manufactured substances to determine toxic or otherwise harmful characteristics and regulation of the manufacture, distribution, use, and disposal of regulated substances.
Treatability studies	(1) Tests of potential cleanup technologies conducted in a laboratory. (2) Pilot-scale type tests conducted at hazardous wastes sites to determine if a treatment technology will work for that site's particular set of environmental conditions.
Treatment, storage, and disposal facility (TSDF)	A site where a hazardous substance is treated, stored or disposed of. TSDF facilities are regulated *by EPA* and states under the **Resource Conservation and Recovery Act**.
1,1,1-Trichioroethane (1,1,1 TCA)	**Colorless, non-flammable,** man-made liquid **solvent** used as a **degreaser,** a dry cleaning agent, and a propellant.
Trichloroethene or Trichloroethylene	A colorless, man-made liquid used primarily as a solvent for removing grease from metal. It has a variety of other uses such as a dry cleaning solvent and in the

(TCE)	production of other chemicals. It generally gets into drinking water by improper waste disposal.
Unconfined aquifer	An **aquifer** in which water is not contained by an **impermeable** layer of rock or soil. The water level in the aquifer may rise or fall according to the volume of water stored, which varies according to seasonal cycles of natural recharge.
Unsaturated zone	The area of soil and rock between the land surface and the **water table.** The spaces between soil particles (pore spaces) in the unsaturated zone contain mostly air, but water occurs there as soil moisture.
Vadose zone	The underground zone between the land surface and the water table essentially the **unsaturated zone.**
Vapor	The gas given off by a solid or liquid substance at ordinary temperatures.
Vinyl chloride	A colorless gas used in the manufacture of polyvinyl chloride and other resins, and as a chemical intermediate and as an industrial solvent. Vinyl chloride is a **carcinogen.**
Viscosity	The property of a fluid describing its resistance to flow.
Volatile	Description of any substance that evaporates easily.
Volatile organic compounds (VOCs)	Carbon-containing chemicals which readily evaporate (cleaning solvents, gasoline, etc.). Many common industrial chemicals are VOCs, including **trichloroethene, 1,1,1-trichloroethane, and tetrachloroethene.**
Voluntary cleanup agreement	A legal document signed by DEC and another party (volunteer) for investigation and/or cleanup of a contaminated site. The volunteer is a party that is not legally responsible for the waste at a site. In return for cleaning up the site, the volunteer receives a limited liability release for past environmental contamination of the site.
Voluntary cleanup program	A program designed to promote voluntary cleanup of contaminated sites including inactive hazardous waste sites, petroleum contaminated sites and solid waste disposal sites, whereby the volunteer enters into a **Voluntary Cleanup Agreement** with the DEC.
Waste	(1) Unwanted materials left over from a manufacturing process. (2) Refuse from places of human or animal habitation.
Water table	The level of groundwater; the boundary between the **unsaturated zone** and the **saturated zone.** The water-table generally reflects surface topography and varies with changes in land surface elevations.
Wetlands	An area that is regularly saturated by surface water or groundwater. Examples of wetlands include swamps, bogs, fens, marshes, and estuaries.

References

This glossary and list of acronyms was assembled from various EPA sources, in addition to the following:

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- *Environmental Reporter's Handbook,* Glossary of Technical and Scientific Terms.
- New York State Department of Environmental Conservation, *New York State Hazardous Waste Site Remedial Program Fact Sheets,* June 1995.
- New York State Department of Health, Glossary of *Environmental Health Terms,* May 1991.
- United States Environmental Protection Agency, *Analysis of Selected Enhancements for Soil Vapor Extraction,* December 1997.

This glossary was compiled for DEC by Stacie E. Cornelius, DEC Citizen Participation Office Intern with assistance from Region 8 Citizen Participation staff. November, 1998.

APPENDIX C - REMEDIATION PROGRAM ACRONYMS

Guide to Environmental Acronyms

This list of acronyms includes abbreviations for agency names, chemicals, units of measure, and various documents and technical terms used by the NYSDEC Department of Environmental Remediation.

AG	Attorney General
AOC	Area of Concern
ARARs	Applicable or Relevant and Appropriate Requirements
AST	Above-Ground Storage Tank
ATSDR	Agency for Toxic Substances and Disease Registry *(Federal)*
BERC	Buffalo Economic Renaissance Corporation
C&D	Construction & Demolition
CERCLA	Comprehensive Environmental Response, Compensation and Liability Act of *1980 (Federal)*
CO	Consent Order
COC(s)	Contaminant(s) of Concern
CP	Citizen Participation
CPP	Citizen Participation Plan
CPS	Citizen Participation Specialist
DDI	Downtown Development, Inc.
DDT	Dichloro-diphenyltrichloroethane (pesticide)
DEC	Department of Environmental Conservation *(New York State)*
DEE	Division of Environmental Enforcement *(within DEC*
DEP	Division of Environmental Permits *(within DEC)*
DER	Division of Environmental Remediation *(within DEC)*
DNAPL	Dense Non-Aqueous Phase Liquid
DOD	Department of Defense *(Federal)*
DOH	Department of Health *(New York State)*
DOL	Department of Law *(New York State)*
DOW	Division of Water *(within DEC)*
EIS	Environmental Impact Statement
ENB	Environmental Notice Bulletin
EPA	United States Environmental Protection Agency
EQBA	1986 Environmental Quality Bond Act *(New York State "Superfund ")*
ESD	Explanation of Significant Differences *(DEC document)*
F&W	Division of Fish & Wildlife *(within DEC)*
FOIA	Freedom of Information Act *(Federal)*
FOIL	Freedom of Information Law *(New York State)*
FS	Feasibility Study
FSF	Federal Superfund
FY	Fiscal Year
GPM	Gallons Per Minute
HDPE	High Density Polyurethane (plastic)
HRS	Hazard Ranking System
IIWA	Immediate Investigation Work Assignment
IRM	Interim Remedial Measure

LEL	Lowest Effect Level
LNAPL	Light Non-aqueous Phase Liquid
mg/kg	Milligrams per Kilogram
MW	Monitoring Well
NAPL	Non-Aqueous Phase Liquid
ND	Non-detect (not detected)
NIOSH	National Institutes of Occupational Safety and Health
NPL	National Priorities List
NYCRR	New York Codes, Rules and Regulations
NYSDEC	New York State Department of Environmental Conservation
NYSDOH	New York State Department of Health
O&M	Operation & Maintenance
OSHA	Occupational Safety and Health Administration
OU	Operable Unit
PAH	Polynucleated Aromatic Hydrocarbon
PCB	Polychlorinated Biphenyls
PCE	Perchloroethene (Tetrachloroethene)
PID	Photoionization Detector
POTW	Publicly Owned Treatment Works
ppb	Parts per Billion
ppm	Parts per Million
ppt	Parts per Trillion
PRAP	Proposed Remedial Action Plan *(DEC document)*
PRP	Potentially Responsible Party
PRS	Priority Ranking System
PSA	Preliminary Site Assessment
QA/QC	Quality Assurance/Quality Control
RA	Remedial Action
RAR	Remedial Alternatives Report
RCRA	Resource Conservation and Recovery Act *(Federal)*
RD	Remedial Design
RHWRE	Regional Hazardous Waste Remediation Engineer
RI	Remedial Investigation
RI/FS	Remedial Investigation/Feasibility Study
ROD	Record of Decision (DEC *document)*
RP	Responsible Party
SAC	State Assistance Contract
SARA	Superfund Amendments and Reauthorization Act
SCGs	Standards, Criteria and Guidance Values
SI	Site Investigation
SI/RAR	Site Investigation/Remedial Alternatives Report
SPDES	State Pollution Discharge Elimination System
SSMB	State Superfund Management Board
SVOCs	Semi-volatile Organic Compounds
2,4,5-T	2,4,5-trichlorophenoxyacetic acid (pesticide)
TAG	Technical Assistance Grant *(Federal)*
TAGM	Technical and Administrative Guidance Memorandum *(DEC)*

TCA	Trichloroethane
TCE	Trichloroethene or Trichloroethylene
TCLP	Toxicity Characteristic Leaching Procedure
TLV	Threshold Limit Value
TOGS	Technical and Operational Guidance series (DEC)
TSCA	Toxic Substances Control Act *(Federal)*
TSDF	Treatment, Storage and Disposal Facility
TWA	Time-Weighted Average
µg/l	Micrograms per Liter
USGS	United States Geological Survey
UST	Underground Storage Tank
VOC	Volatile Organic Compound

MALCOLM PIRNIE

APPENDIX C

PHOTOGRAPHS

Photograph 1. Blue-green soil sample from boring SB-213.

Photograph 2. Same soil sample as above from boring SB-213 after exposure to air.

Photograph 3. Test Pit 8 completed during pH Investigation. Note blue-colored material.

Photograph 4. Test Pit 5, completed during pH Investigation. Note blue-colored material

Photograph 5. Test Pit 4, completed during pH Investigation.

Photograph 6. Test Pit 6, completed during pH Investigation.

Photograph 7. Test Pit 9, completed during pH Investigation.

Photograph 8. Test Pit 10, completed during pH Investigation.

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APPENDIX D

OPERATION, MONITORING, AND MAINTENANCE WORK PLAN

MALCOLM PIRNIE

OPERATION, MONITORING AND MAINTENANCE WORK PLAN
HANNA FURNACE SITE

THE FORMER RAILROAD YARD AREA (SUBPARCEL 1)

DEVELOPMENT DOWNTOWN, INC.
BUFFALO, NEW YORK

FEBRUARY 2002

MALCOLM PIRNIE, INC.

P. O. Box 1938
Buffalo, New York 14219

4080-001/omwp

MALCOLM PIRNIE

OPERATION, MONITORING, AND MAINTENANCE WORK PLAN THE HANNA FURNACE SITE FORMER RAILROAD YARD AREA

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1.0 INTRODUCTION

This Operation, Monitoring and Maintenance (OM&M) Work Plan has been prepared for the former Hanna Furnace Site – the Former Railroad Yard Area (Subparcel 1) (the Site). The Site is the subject of a Voluntary Cleanup Agreement (the Agreement) entered into by Downtown Development Inc and the New York State Department of Environmental Conservation (NYSDEC). The Agreement requires that the Site owner maintain the institutional and physical components that shall comprise the completed voluntary cleanup. This OM&M Work Plan describes the conditions and procedures for maintaining the physical components of the completed Site voluntary cleanup, and as an appendix to the Remedial Action Work Plan (RAWP), it shall be an enforceable part of the Agreement.

The owner (Owner) of the Site (or any portion thereof) should evaluate the criteria presented in this plan and should recommend changes to the NYSDEC, as appropriate, depending on actual post-closure site conditions. As a minimum, this plan should be reviewed annually during the post-closure period and updated when necessary.

Prior to initiation of the OM&M Work Plan, the Owner shall prepare and submit appropriate organizational documents to the NYSDEC for review and approval. The organizational documents shall include:

- An organizational chart outlining the responsible party□s personnel (with qualifications) who will be responsible for implementing the post-closure operation, maintenance and monitoring program.
- A health and safety plan.
- Example inspection report forms.
- A schedule for the annual inspections and reporting.

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2.0 BACKGROUND

The Hanna Furnace Site is a vacant industrial property currently owned by the City of Buffalo. The Hanna Furnace Site surrounds the eastern portion of the Union Ship Canal, and encompasses approximately 113 acres, including the Former Railroad Yard. The Former Railroad Yard Area occupies approximately 43 acres in the southern portion of the Hanna Furnace Site. The Hanna Furnace Site is bordered to the west by New York State Route 5, to the south by the Lackawanna Commerce Park, to the east by railroad tracks, and to the north by wetland areas and the Shenango Steel property. The Hanna Furnace Site surrounds the eastern portion of the Union Ship Canal.

The Hanna Furnace Site has been characterized during several previous investigations, the results of which are summarized in Section 2.0 of the RAWP. Based on the findings of those investigations, together with the size of the parcel, its historic use, and the City's current developmental needs and plans, the Hanna Furnace Site has been subdivided into four subparcels for future developmental considerations (see Figure 1-2 of the RAWP). The Former Railroad Yard has been designated Subparcel 1. Subparcel 2 is comprised of the Former Manufacturing Area. Subparcel 3 consist of an area surrounding the Union Ship Canal 200-feet wide on each side. Subparcel 4 includes the Former Filter Cake/Flue Ash Disposal Area located to the north of the Union Ship Canal. These subparcels will be considered separately during future environmental investigatory and remedial activities, as well as during redevelopment activities at the Site.

A voluntary cleanup of the Former Railroad Yard (Subparcel 1) allows for the future redevelopment of the Former Railroad Yard for commercial and industrial purpose. The current proposed transitional development plan for the Site includes lower profile, flex-type product in closest proximity to the canal and high-bay distributors/light manufacturing buildings on the outer perimeter of the Site. The estimated average land coverage is 25 percent.

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3.0 REMEDIAL ACTION WORK PLAN

The Remedial Action Work Plan (RAWP) was prepared in February 2002 to be implemented during the voluntary cleanup of the Former Railroad Yard portion of the Hanna Furnace Site (Subparcel 1).

According to the RAWP, in order to eliminate potential exposure risks associated with direct contact with site fill material the entire Former Railroad Yard will be covered as part of site redevelopment. The cover system will be placed directly on top of the re-graded on-site fill material and will include clean soil for outdoor, vegetated areas, asphalt for roads and parking lots, or concrete for sidewalks, buildings and heavy use areas. Surface coverage over the entire redeveloped parcel or subparcel will be required by the site owner or developer as a pre-condition of occupancy.

The proposed cover system has been designed to be protective of human health and the environment. Because VOCs were not detected in the samples collected in the Former Railroad Yard, the primary exposure pathway for contaminants at the site (metals and polycyclic aromatic hydrocarbons) in soil and high pH in groundwater is via direct contact. The proposed plan of covering the on-site fill material will eliminate the potential for direct contact with soil and is therefore protective of human health and the environment. Groundwater will not be used at the site and therefore no direct contact with elevated pH groundwater is anticipated except during invasive construction activities.

The Qualitative Risk Assessment performed as part of the Supplemental Investigation (Malcolm Pirnie, 2000) evaluated the risk posed by chemicals of potential concern ("COPCs") to human health and wildlife. The Risk Assessment also evaluated the adequacy of the cover system planned for placement during site redevelopment and determined that the above-described cover system would protect human health and wildlife from these COPCs.

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4.0 SUMMARY OF THE REMEDIAL CLOSURE DESIGN

4.1 PREPARATION OF SITE SURFACE

The Site will require grading prior to cover placement activities, in accordance with the Remedial Action Work Plan (RAWP) and appended Soil/Fill Management Plan (SFMP). The fill material and debris piles in the Former Railroad Yard Area will be graded to a regular topographic surface as planned for redevelopment. All trees, shrubs, roots, brush, masonry, rubbish, scrap, debris, pavement, curbs, fences and miscellaneous structures will either be removed and disposed of off-site at a permitted disposal facility. Prior to placement of the cover system, all protruding material will be removed from the ground surface. Burning shall not be allowed on the Site.

4.2 COVER SYSTEM

4.2.1 Soil

In areas that will not receive significant equipment or vehicular use, the cover system will be composed of soil fill from a NYSDEC-approved borrow source and tested in accordance with Sections 2.2, 2.3 and 2.4 of the Soil/Fill Management Plan and found to contain constituent concentrations less than those specified in NYSDEC TAGM 4046. The soil cover will be placed in accordance with Section 3.2.1 of the RAWP.

An alternative source of cover system material may be residuals that are presently stored at the Erie County Water Authority's Sturgeon Point Water Treatment Plant in the Town of Evans, Erie County, New York. A Beneficial Use Determination (BUD) application has been prepared for use of those residuals as a component of the proposed cover system. This material will consist of a mixture of water treatment plant residuals and clean fill obtained from off-site sources. If the BUD is approved by the NYSDEC, the materials would be handled/placed in accordance with the NYSDEC-approved BUD and the Remedial Action Work Plan.

It will be the responsibility of the Owner to annually verify that the soil cover has remained in good condition (e.g., grass or other vegetation is maintained) and sufficiently covers the soil/fill material at the Site (i.e., eroded areas are repaired and the soil cover is maintained). Certification as to this verification is included on the site inspection form on Attachment A.

4.2.2 Asphalt

The cover system in areas that will become roads, sidewalks, and parking lots will consist of a minimum of two inches of asphalt that will be placed over the soil/fill material at the site. The asphalt will be placed on a minimum four-inch gravel subbase to provide stability for construction and to limit subsidence, in accordance with Section 3.2.2 of the RAWP. Prior to placement of the subbase, all protruding material will be removed from the ground surface and the area re-graded to a regular surface.

It will be the responsibility of the Owner to annually verify that the asphalt has remained in good condition and sufficiently covers the soil/fill material.

4.2.3 Concrete

The cover system in areas that will become structures will consist of a minimum of two inches of concrete that will be placed above the soil/fill material. The concrete will be placed on a minimum four-inch gravel subbase to provide stability for construction and to limit subsidence. A polyethylene vapor barrier with a minimum thickness of 8-mils will be installed under all structures to provide additional protection for on-site workers. Concrete may also be used instead of asphalt for roads, sidewalks, and parking lots. Prior to placement of the subbase, all protruding material will be removed from the ground surface and the area re-graded to a sufficient regular surface.

It will be the responsibility of the Owner to annually verify that the concrete has remained in good condition and sufficiently covers the soil/fill material at the Site as per Attachment A.

MALCOLM PIRNIE

4.3 EROSION CONTROL MEASURES

In accordance with Section 2.5.2.2 of the SFMP, design and permanent construction features shall be incorporated into the site construction plans to control erosion. It will be the responsibility of the Owner to annually certify that storm water channel slopes, vegetation and any synthetic erosion control fabrics placed in such channels remain in good condition.

4.4 FENCING AND ACCESS CONTROL

In accordance with Section 3.1 of the RAWP and Section 2.7 of the SFMP, fencing shall be constructed and signs posted around all areas with exposed soil/fill or areas where excavation will occur. If the entire Site is completely hydroseeded or completely graded and covered at the same time, fencing the entire Site will not be necessary, but gates shall be installed across obvious access points to limit the potential for illegal dumping. It will be the responsibility of the Owner to annually certify that fences, gates and signs are in place and that access is restricted, to the best of the Owner's ability.

MALCOLM PIRNIE

5.0 INSPECTION PROCEDURES

The physical components of cover system shall be inspected annually by a representative of Owner (or its delegated agent) qualified to carry out such inspections. The inspector should be, at minimum, a certified industrial hygienist or a person with a four-year college degree in environmental sciences. The inspection will be coordinated with facility personnel at least one week prior to ensure that most, if not all, of the paved areas will be accessible for inspection. Indoors, in office spaces with floor coverings, the inspection should at minimum make note of areas with settled or uneven surfaces, seepage or flooding. Arrangements to repair those areas that the inspector requires to be maintained, if any, will be initiated as may be required by the inspector.

The annual inspection shall include, but not be limited to, those matters set forth on the Environmental Inspection Form, attached hereto as Exhibit A. These inspection reports, which shall include a map that shows areas of damage or required maintenance, shall be kept on file by the Owner. If the inspections reveal that maintenance is necessary, then the Owner shall notify the NYSDEC, and arrange to complete the repairs. The NYSDEC shall be informed by Owner when repairs are complete.

MALCOLM PIRNIE

6.0 FINAL COVER SYSTEM CONDITION

The final cover system shall be observed by traversing the cover on foot and making appropriate observations, notes and photographic records as necessary, for inclusion with the report. It is anticipated that some maintenance activities will be necessary during the closure period. The following characteristics shall be looked for during the observation of the cover system, fencing and signs, and erosion control features:

- Sloughing.
- Cracks.
- Settlement (depression and puddles).
- Erosion features.
- Distressed vegetation/turf.
- Damaged fencing, gates and signs.

The following paragraphs describe actions that should be taken to address the conditions described above. Maintenance and repairs that are typically necessary during the closure period are also described.

6.1 SLOUGHING

Sloughing of the soil cover may occur. Areas where sloughing has occurred shall be repaired. Cover soil shall be placed in accordance with the requirements of the Remedial Action Work Plan (RAWP), Section 3.2.1 and Sections 2.3 and 2.4 of the Soil/Fill Management Plan (SFMP).

6.2 CRACKS

The locations of any cracks in the soil, asphalt or concrete cover should be noted on the inspection log and site map, including width, length and depth of the crack. The appropriate maintenance procedure will be determined by the inspector. Small willow cracks in the soil cover can be repaired by minor re-grading of the cracked area and re-seeding the area. Larger cracks that appear to extend into the fill material shall be filled with soil similar to that used for construction of the cover soil layer prior to re-seeding, in accordance with

Section 3.2.1 of the RAWP. Repairs to the asphalt and/or concrete will be completed when and in the fashion deemed necessary by the inspector.

6.3 SETTLEMENT

Settlement features such as depressions or areas of ponding water shall be re-graded by placing additional soil cover so that surface water drains in the appropriate direction. Previous investigations approximately defined a portion of the Site where the pH of the groundwater was found to be elevated (see Figure 2-1 of the RAWP). Ponded water within this approximate area shall be examined for elevated pH prior to any regrading activity and if necessary, contained and disposed in accordance with the RAWP.

6.4 EROSION FEATURES

Erosion features shall be repaired by backfilling to the original grade with soil and re-seeding. Torn or displaced synthetic erosion control fabric in storm water channels shall be repaired or replaced as directed by the inspector.

6.5 DISTRESSED VEGETATION/TURF

Areas of distressed turf shall be re-seeded and a starter fertilizer applied. Large-root growth may also compromise the integrity of the soil cover and shall be discouraged with regular mowing. Reasonable efforts shall be taken to avoid damage to the turf from traffic and other unintended uses.

6.6 FENCING AND ACCESS CONTROL

To the best of owner's ability, physical discontinuities in fence material shall be repaired; fence posts and foundations that show evidence of structural weakness shall be repaired or replaced as necessary; gates and locks shall be maintained to deter unauthorized entry; and warning signs shall be kept secured in place and trees shall be trimmed to ensure the signs are visible.

MALCOLM PIRNIE

7.0 INSPECTION REPORTING

Annual inspection reports shall be reported by the Owner to the NYSDEC. If the inspection finds that corrective action is required, a followup inspection will be made after the repairs have been completed. If the inspector determines that correction action is required, the Corrective Action Form will be included with the inspection report, confirming that the repairs were completed, and in accordance with the Remedial Action Work Plan.

Any analytical data that may be gathered during the course of the inspection or corrective action shall also be included with the inspection report and submitted to the NYSDEC within 21 days of the inspection. The inspection reports will be submitted by the Site Owner with an attached Annual Certification form, signed and notarized by the Site Owner, certifying that the specified engineering and institutional controls are in place and functioning.

ENVIRONMENTAL INSPECTION FORM

Hanna Furnace - Former Railroad Yard Area (Subparcel 1)

Property Name: _____ Inspection Date: _____

Property Address: _____

City: _____ State: _____ Zip Code: _____

Property ID: (Tax Assessment Map)

Section:_____ Block:_____ Lot(s):_____

Total Acreage: _____

Weather (during inspection): Temperature: _____ Conditions:

SIGNATURE:

The findings of this inspection were discussed with appropriate personnel, corrective actions were identified and implementation was mutually agreed upon:

Inspector: _____ Date: _____

Next Scheduled Inspection Date: _____

SECURITY AND ACCESS

	Yes	No
1. Access controlled by perimeter fencing?	_____	_____
Are there sections of the fence material damaged or missing?	_____	_____
Are the fence or gate post foundations structurally sound?	_____	_____
2. "No Trespass" signs posted in appropriate languages?	_____	_____
Are the signs securely attached to the fencing or posts?	_____	_____
Are there sufficient signs; are the signs adequately spaced around the perimeter of the property?	_____	_____
3. Is there evidence of trespassing?	_____	_____
Is there evidence of illegal dumping?	_____	_____

COVER & VEGETATION

4. Final cover in acceptable condition?	_____	_____
Is there evidence of sloughing, erosion, ponding or settlement?	_____	_____
Is there evidence of unintended traffic; rutting?	_____	_____
Is there evidence of distressed vegetation/turf?	_____	_____

	Yes	No
5. Final cover sufficiently covers soil/fill material?	_____	_____
Are there cracks visible in the soil or pavement?	_____	_____
Is there evidence of erosion in the stormwater channels or swales?	_____	_____
Is there damage to the synthetic erosion control fabric in the channels or swales?	_____	_____

ACTIVITY ON SITE

6. Any activity on site that mechanically disturbed soil cover?	_____	_____

ADDITIONAL FACILITY INFORMATION

Development on or near the site? (Specify size and type: e.g., residential, 40 acres, well and septic)

COMMENTS

Item #

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

ATTACHMENTS

1. Site Sketch
2. Photographs
3. Laboratory Report (s)

Annual Certification of Institutional/Engineering Controls

Hanna Furnace - Former Railroad Yard Area (Subparcel 1)

Property Name:
Property Address:

County: Erie
City/Town: Buffalo
Property ID: (Tax Assessment Map)
Section:_____ Block:_____ Lot(s):_____

I (name), residing at (address), as owner of the property(ies) listed above which are located wholly or partially within the boundaries of the Voluntary Cleanup Site named above; do certify that the engineering and/or institutional controls, as specified in the Declaration of Covenants and Restrictions for the Voluntary Cleanup Site are in-place and functioning as designed within the property(ies) listed above.

Signature:_____

(This area for notary public)

CORRECTIVE ACTION FORM

Hanna Furnace - Former Railroad Yard Area (Subparcel 1)

Property Name: _____

Property Address:

City: _____ State: _____ Zip Code: _____

Property ID: (Tax Assessment Map)

Section:_____ Block:_____ Lot(s):_____

Total Acreage: _____

Weather (during inspection): Temperature: _____ Conditions:

An inspection of the subject property on (date) identified the need for corrective action.

CORRECTIVE ACTION TAKEN

Description: (attach site sketch and photographs)

Date Completed:

SIGNATURE:

The corrective action described above was completed in accordance with all relevant requirements of the Remedial Action Work Plan.

Inspector: _____ Date: _____

ATTACHMENTS

1. Site Sketch
2. Photographs
3. Laboratory Report (s)