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DRAFT

SITE SPECIFIC WORK PLAN FOR PRELIMINARY SITE ASSESSMENT

HOLIDAY PARK/BOTANICAL GARDENS SITE NORTH TONAWANDA, NEW YORK

WORK ASSIGNMENT D-002852-21

NEW YORK STATE DEPT. OF ENVIRONMENTAL CONSERVATION
DIVISION OF HAZARDOUS WASTE REMEDIATION

MAY 1997

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SITE SPECIFIC WORK PLAN
FOR PRELIMINARY SITE ASSESSMENT
AT HOLIDAY PARK/BOTANICAL GARDENS SITE

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MALCOLM PIRNIE

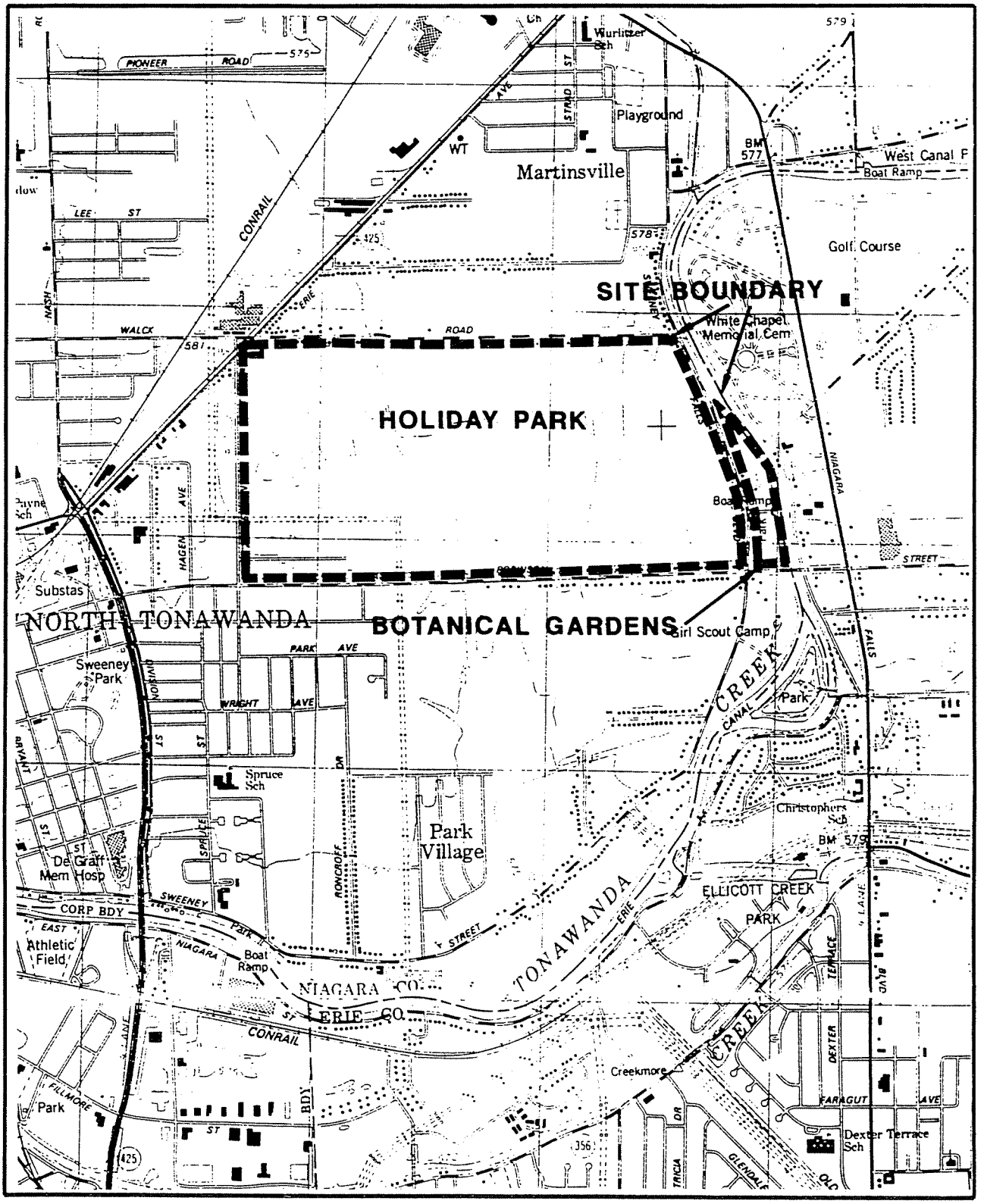
1.0 INTRODUCTION

1.1 BACKGROUND

The Holiday Park and Botanical Gardens sites are located in North Tonawanda, New York (Figure 1). The Holiday Park site is located to the west of Old Falls Boulevard and extends to Zimmerman Road encompassing an area approximately 370 acres in size between Walck Road and Robinson Road. Currently, a major portion of the Holiday Park property is a municipal golf course owned and operated by the City of North Tonawanda. A smaller area of the Holiday Park site off of Zimmerman Road is actively used by the City of North Tonawanda for the disposal of tree trimmings, grass clippings, leaves and street sweepings. Holiday Park has been divided into three areas of concern where municipal and industrial waste was reportedly disposed.

Botanical Gardens is located along a portion of the Tonawanda Creek/Barge Canal system east of Old Falls Boulevard (on the opposite side of the road from the Holiday Park site) and is approximately 11 acres in size. The Botanical Gardens site is currently used as a public park and operates a boat launch at the north end of the gardens.

Both sites were operated in the 1950s, 1960s or 1970s as refuse disposal sites by the City of North Tonawanda Department of Public Works and were both reported to have received phenolic resins and molding compounds from Hooker Durez (currently OxyChem). Subsequently, several investigations were performed at the sites and identified various organic and inorganic compounds at elevated levels. Both sites are designated Class 3 Inactive Hazardous Waste Disposal Sites by the New York State Department of Environmental Conservation (NYSDEC). Based on the site history and the detection of organic and inorganic compounds in the soil and groundwater respectively exceeding NYSDEC TAGM No. 4046 values and NYS Class GA groundwater quality standards, the NYSDEC has assigned Malcolm Pirnie Work Assignment Number D-002852-21 to perform a Preliminary Site Assessment (PSA) at these sites. Because these two sites have similar disposal histories and are in close proximity to each other, they will be reported as a single



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BOTANICAL GARDENS/ HOLIDAY PARK SITE
PRELIMINARY SITE ASSESSMENT

SITE LOCATION MAP

NYSDEC

APRIL 1997

site. The PSAs at these sites are two of four PSAs to be performed as part of this Work Assignment.

1.2 PURPOSE AND OBJECTIVES

The NYSDEC placed the Holiday Park site and Botanical Gardens site on its Registry of Inactive Hazardous Waste Sites in 1980. Currently both sites are designated Class 3; however, the NYSDEC has expressed interest in delisting the sites. Phase II investigations performed in 1985 are inadequate to clearly confirm the presence of listed or characteristic hazardous wastes. The Phase II investigations performed for both sites included only sampling of air quality and did not include other environmental media or wastes. The following are the main objectives of this PSA:

- confirmation of hazardous waste disposal on-site as defined by 6NYCRR Part 371 including characterization of waste, if present; and
- determination of the site's significance as to the threat to public health and the environment due to the presence of those hazardous wastes as defined by 6NYCRR Part 375.

Other objectives of this PSA include the identification and characterization of adversely impacted media at the site and to provide sufficient information for the NYSDEC to determine whether or not the site should be delisted or reclassified based upon risks to human health and the environment.

1.3 SITE HISTORY

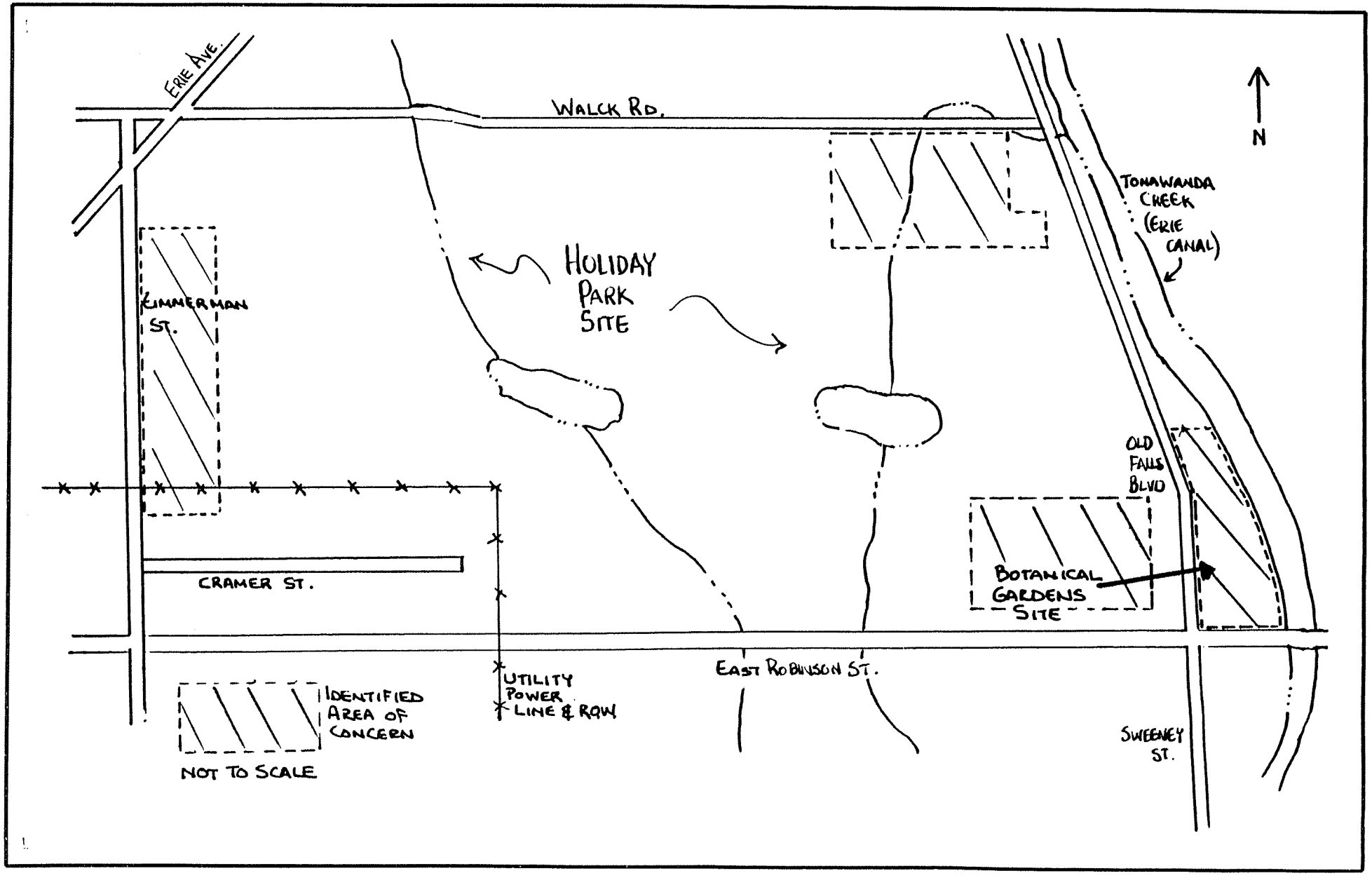
Holiday Park Site

The Holiday Park site is approximately 370 acres in size. Portions of the site were reportedly used by the City of North Tonawanda from the early 1960s to 1974 for disposal of municipal and industrial wastes. A Phase I investigation report prepared by Engineering-Science in 1983 identified potential disposal areas in the southeast corner, the northeast

corner, and the extreme western edge off of Zimmerman Road at the 370-acre site (see Figure 2). The dates of disposal at individual areas within the site are not exactly known. According to the Phase I report prepared by Engineering-Science, the western area appears to be the first disposal area, possibly beginning in 1964. The southeast area was opened in 1967 and the northeast area operated from 1972 to 1974. These three areas received municipal wastes and are suspected of receiving industrial wastes including phenolic resins and molding compounds from Hooker Durez. A Phase II Investigation report prepared by Wehran in 1985 reported that 625 tons of phenolic compounds were disposed of in these areas, the majority assumed to have been disposed of in the northeast area. The southeast and western areas may have received ash from a municipal garbage incinerator. The southeast area and western area off Zimmerman Road were used to test a prototype solid waste disposal machine from 1964 to at least 1967. A test patch was reportedly located in the southeast area. Trenches observed in the northeast plot by the Niagara County Department of Health inspections were assumed to be the locations of refuse disposal. Currently, the Deerwood Golf Course is planning an expansion into the northeast area of the site. This expansion extends into an area that may have been used for waste disposal.

Botanical Gardens Site

The City of North Tonawanda Department of Public Works operated a refuse disposal site at this location from the 1950s until roughly 1965 when permission was given by the Canal Commission to fill a low area along the canal with refuse. In 1964, the State Health Department reported that disposal of putrescible material was occurring and that inadequate application of cover material was causing potential health problems. The City was then ordered to apply daily cover to wastes and to restrict the width of the working face to 50 feet. The use of this site was phased out with the opening of Gratwick Park (formerly known as the River Road site) in 1965 and the area across Old Falls Boulevard (known as Holiday Park) in 1967. NYSDEC files indicate that the Durez Division of Hooker Chemical used this site in 1958 and 1959 to dispose of industrial wastes including 125 tons of phenolic resins and molding compounds.



MALCOLM PIRNIE

BOTANICAL GARDENS/HOLIDAY PARK SITE
PRELIMINARY SITE ASSESSMENT

AREAS OF CONCERN

NYSDEC

MAY 1997

FIGURE 2

1.4 HISTORICAL INVESTIGATIONS

Holiday Park Site

A United States Geological Survey (USGS) investigation of the site began in 1979 when two on-site monitoring wells were installed; one near the northeast corner of the site and a second near Zimmerman Street. The USGS continued investigation of the property in 1982 by installing and sampling five new wells and sampling the two older wells. In addition, the USGS study included the sampling of pond water and three sediment samples. Analytical sampling results from this study are summarized on Table 1-1 with NYSDEC surface water and sediment guidance criteria for comparison. Surface water sampling analytical results identified iron, lead, manganese, and zinc at concentrations below the Surface Water Quality Guidance Values. Organic parameters were not detected in the surface water.

Sediment sample's analytical results indicate that the two inorganic compounds detected (viz. copper and iron) were both below NYS Sediment Criterion. Dibutyl phthalate (a semivolatile organic compound [SVOC]) was the only organic compound detected.

Groundwater was analyzed from seven wells located near the disposal areas. As shown on Table 1-2, only two organic compounds were detected in the groundwater. Dibutyl phthalate was detected at 32 ppb (below NYSDEC Class GA Groundwater Standards) in a well located in the western area and ethylbenzene (a volatile organic compound [VOC]) was detected at 17 ppb (slightly above NYSDEC Class GA Groundwater Standards) in a well located near the northeast plot. Of the inorganic compounds analyzed, only copper and iron were detected. Iron was detected above Class GA Groundwater Quality Standards.

As part of a planned expansion of the Deerwood Golf Course at the Holiday Park site, Parsons-Engineering Science, Inc. excavated test pits and collected soil samples from areas where golf course expansion is proposed. Soil samples were analyzed for VOCs, SVOCs, and metals. Results are summarized in Table 1-3. Methylene chloride and acetone (VOCs) and bis (2-ethylhexyl) phthalate (an SVOC) were detected in the laboratory method blank indicating that these compounds are laboratory contaminants. Other SVOCs detected

TABLE 1-1
NEW YORK STATE DEPT. OF ENVIRONMENTAL CONSERVATION
PRELIMINARY SITE ASSESSMENT
HOLIDAY PARK SITE

USGS Surface Water and Sediment Analytical Results

Sample Number Matrix	NYSDEC Surface Water Quality Guidance Values	10 SW (ug/l)	10D SW (ug/l)	NYSDEC Lowest Effect Level Sediment Criteria	7 Sed (ug/kg)	7D Sed (ug/kg)	9 Sed (ug/kg)	11 SED (ug/kg)	12 SED (ug/kg)
Inorganic Compounds									
Copper	200			16,000	6,000	6,000	8,000	5,000	14,000
Iron	300	198	205	20,000,000	2,200,000	2,300,000	3,600,000	1,800,000	370,000
Lead	50	33	36	31,000					
Manganese	300	21	24	460,000					
Zinc	300	17	16	120,000					
Organic Compounds									
Dibutyl phthalate	50			NA					20

SW = Surface Water
SED = Sediment
NA = None Available

TABLE 1-2
NEW YORK STATE DEPT. OF ENVIRONMENTAL CONSERVATION
PRELIMINARY SITE ASSESSMENT
HOLIDAY PARK SITE

USGS Groundwater Analytical Results

Sample Number Matrix	NYSDEC Class GA Groundwater Standards	1 GW	2 GW	3 GW	3D GW	4 GW	5 GW	5D GW	6 GW	8 GW
Inorganic Compounds, ug/L										
Copper	200	46	11	8	9	25	7	7	110	60
Iron	300	90,000	49,000	4,700	5,200	19,000	12,000	14,000	96,000	37,000
Lead	25									
Manganese	300									
Zinc	300									
Organic Compounds, ug/L										
Dibutyl phthalate	50					31.8		2		
Ethylbenzene	5	17								

NOTE: Shading represents concentrations that exceed the NYSDEC Class GA water quality standards.

TABLE 1-3
NEW YORK STATE DEPT. OF ENVIRONMENTAL CONSERVATION
PRELIMINARY SITE ASSESSMENT
HOLIDAY PARK SITE

October 1996 Soil Analytical Results [1]

Parameter	NYSDEC TAGM Values	18651A	18651B	18652A	18652B	18656A	18656B	18657A	18657B	18658A	18658B	18659A	18659B
Volatile Organic Compounds, ug/Kg													
Methylene Chloride	100	2 BJ	2 BJ	2 BJ	3 BJ	2 BJ	2 J	2 BJ		2 BJ	2 BJ	2 BJ	2 BJ
Acetone	200	5 BJ	6 BJ	5 BJ	21 B	6 BJ	11 BJ	8 BJ	7 BJ	4 BJ	14 B	5 BJ	6 BJ
Semivolatile Organic Compounds, ug/Kg													
bis(2-ethylhexyl)phthalate	50,000	58 BJ	130 BJ	240 BJ	87 BJ	110 BJ	130 BJ	110 BJ	250 BJ	260 BJ	260 BJ	920 B	250 BJ
Pentachlorophenol	1000			55 J	93 J								
Benzoic acid	2700				63 J								
Hexanedioic acid	NA					140 J		200 J	140 J		110 J	150 J	
Inorganic Compounds, mg/Kg													
Aluminum	SB	6740	4170	19700	10600	10500	3450	11100	10200	10900	5430	11600	6350
Arsenic	7.5 or SB	5	5.3	5.7	6.5	6.3	6.5	3	4.1	7.3	4.2	4.6	1.3
Barium	300 or SB	45.6	25	180	93.9	51.6	41.4	93.1	61.7	70.7	38.3	80.7	55.4
Beryllium	1 or SB	0.34	0.25	0.92	0.5	0.68	0.42	0.77	0.43	0.75	0.31	0.5	0.26
Calcium	SB	37100	62300	5480	81400	4070	62500	2910	16900	3900	59700	10900	83300
Chromium	10 or SB	7.8	5.2	25.7	16.9	12.7	10.3	14.6	10.9	14.8	8.1	12.1	12.5
Cobalt	30 or SB	5.4	4.4	7.6	11.7	7.4	8.4	7.4	8.8	8.8	6.4	4.2	4.5
Copper	25 or SB	13.7	14.4	22.4	33.5	17.9	20.3	18.3	10.5	25.4	13	11	14.5
Iron	2000 or SB	13700	13000	29700	21700	23200	16900	18900	14100	29800	14200	13700	15300
Lead	30 or SB	7.9	6.1	16.7	8.7	7.8	9.4	8.6	13.9	10.5	6.6	16.7	6.4
Magnesium	SB	10800	15500	4770	16100	3380	16900	2720	5200	2990	14700	4000	14700
Manganese	SB	335	323	187	650	138	389	115	216	606	379	96.8	331
Mercury	0.1 or SB			0.11									
Nickel	13 or SB	9.5	5	19.4	15.9	17.3	14.7	15.7	9.6	18.3	7.3	10.9	5.9
Potassium	SB	700	1190	2740	2710	1700	2550	681	915	1120	1390	1230	1110
Selenium	2 or SB			2.8									
Sodium	SB	68.8	276	418	340	460	388	141	126	381	294	360	
Thallium	SB			0.8						0.79			
Vanadium	150 or SB	15.7	12.7	42.5	24.2	26.5	19.3	29.1	20.7	41.3	15.8	23	18.1
Zinc	20 or SB	40.8	37.6	96.1	64.6	49.6	57.8	58.8	48.7	62.2	41.6	52.1	51.9

NOTES:
Shading represents concentrations that exceeded the NYSDEC TAGM 4046 Values
NA - NYSDEC TAGM 4046 Value is not available
1. Soil sampling was performed by Parsons Engineering Science

SB - Site Background
J - Indicates an estimated value.
B - Analyte was found in the associated blank

include pentachlorophenol, benzoic acid, and hexanedioic acid. The reported concentrations are laboratory qualified and are considered estimated concentrations. Pentachlorophenol and benzoic acid concentrations are well below the NYSDEC TAGM 4046 value. No TAGM 4046 value exists for hexanedioic acid. Inorganic compounds detected above the NYSDEC TAGM values included chromium, copper, iron, mercury, nickel, selenium, and zinc. Mercury and selenium were detected in only one sample slightly above the TAGM value. No site background concentrations exist for comparison.

Botanical Gardens Site

Two monitoring wells were installed on-site in approximately 1979 to assess of groundwater quality (see Figure 3). Samples were collected and analyzed for total organic halogens (TOX). Analytical results detected concentrations of 19.1 ppb.

Four surface soil samples (viz S-1 through S-4) were collected by the Niagara County Health Department and analyzed for VOCs, SVOCs, pesticides, PCBs and metals. Table 1-4 summarizes detected compounds from the Botanical Gardens site with NYSDEC TAGM 4046 values for comparison. Three VOCs were detected in the soil samples including acetone, methylene chloride, and chloroform. Only acetone was detected at levels greater than the NYSDEC TAGM value. Several SVOCs were detected, mostly in sample S-4, south of the boat launch near the parking area. All of the detected SVOCs were below the NYSDEC TAGM values.

Several pesticide compounds were detected below the TAGM values. PCB compounds were also detected at low levels.

Detected inorganic compounds above the TAGM values included arsenic, mercury, barium, cadmium, chromium, copper, nickel, zinc, and lead. Elevated levels of arsenic, mercury, and cadmium were only detected in one sample, designated S-2 near the lower discharge area from the fountain pool.

Based on the waste disposal of phenolic resin and molding compounds at both sites, the preliminary contaminants of concern are acid extractible compounds.

FIGURE 3

BOTANICAL GARDENS
SITE SKETCH
N.T.S.

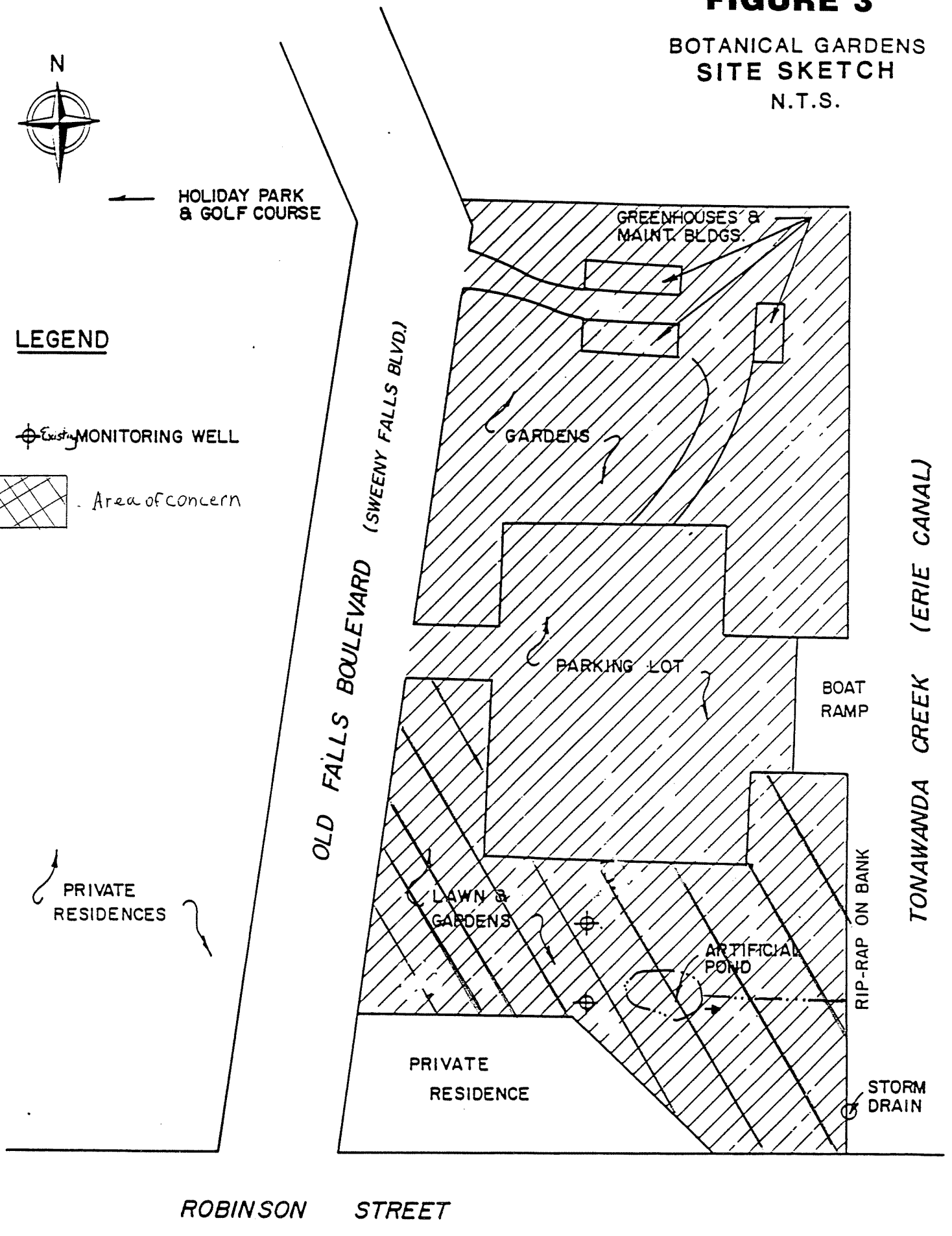


TABLE 1-4
NEW YORK STATE DEPT. OF ENVIRONMENTAL CONSERVATION
PRELIMINARY SITE ASSESSMENT
BOTANICAL GARDENS SITE

Niagara County Health Dept. Soil Analytical Data

Parameter	NYSDEC TAGM Values	S-1	S-2	S-3	S-4
Pesticides/PCBs, mg/Kg					
4,4'-DDE	2.1	0.001		0.001	0.005
4,4'-DDD	2.9	0.001		0.001	0.004
4,4'-DDT	2.1	0.001		0.001	0.004
Arochlor 1016/1242	NA	0.01		0.001	
Arochlor 1260	NA				0.02
Arochlor 1254	NA			0.001	
Inorganic Compounds, mg/Kg					
Arsenic	7.5 or SB	6.8	11	2.5	3.7
Mercury	0.1 or SB	0.1	0.15	0.04	
Beryllium	1 or SB				0.7
Barium	300 or SB	440	287	244	166
Cadmium	1 or SB		3.3		
Cobalt	30 or SB	6.2	3.8	4.8	6.7
Chromium	10 or SB	24.6	24.5	18	24.9
Copper	25 or SB	52.9	48.8	22.1	31.3
Iron	2000 or SB	132000	115000	38800	21100
Manganese	SB	249	255	191	411
Nickel	13 or SB	18.7	21.7	17.1	23.4
Strontium	NA	136	84.7	52.2	56.3
Titanium	NA	121	174	127	246
Vanadium	150 or SB	21.8	27.7	20.5	32.7
Zinc	20 or SB	387	267	93	117
Lead	30 or SB	63.3	64.2	38.1	65.3
Aluminum	SB	11700	13400	11100	17800
Calcium	SB	53200	21800	21200	31000
Potassium	SB	2620	3390	2550	4300
Magnesium	SB	6940	7320	6350	9700
Sodium	SB	281	290		219

NOTES: Shading represents concentrations that exceeded the NYSDEC TAGM 4046 Values
NA - NYSDEC TAGM 4046 Value is not available
SB - Site Background

TABLE 1-4 (cont'd)
NEW YORK STATE DEPT. OF ENVIRONMENTAL CONSERVATION
PRELIMINARY SITE ASSESSMENT
BOTANICAL GARDENS SITE

Niagara County Health Dept. Soil Analytical Data

Parameter	NYSDEC TAGM Values	S-1	S-2	S-3	S-4
Volatile Organic Compounds, ug/Kg					
Acetone	200	490		230	100
Methylene Chloride	100			20	11
Chloroform	300				46
Semivolatile Organic Compounds, ug/Kg					
4-Methyl Phenol	900				2 J
2,4,5-Trichlorophenol	100				8 J
Acenaphthylene	41,000				6 J
Acenaphthene	50,000			10 J	6 J
Dibenzofuran	6200			15 J	7 J
Fluorene	50,000			27 J	14 J
Pentachlorophenol	1000				39 J
Anthracene	50,000				27 J
Phenanthrene	50,000	160 J		160 J	160 J
Fluoranthene	50,000	350 J		170 J	180 J
Pyrene	50,000	200 J		95 J	100 J
Chrysene	400				14 J
Benzo(b)fluoranthene	1100				9 J
Benzo(k)fluoranthene	1100				6 J
Benzo(a)pyrene	61				8 J
Butyl Benzyl Phthalate	50,000				6 J
Di-n-butyl phthalate	8100				29 J
bis(2-ethylhexyl)phthalate	50,000	190 JB		320 JB	50 JB

NOTES: Shading represents concentrations that exceed the NYSDEC TAGM 4046 Values
J - Indicates an estimated value.
B - Analyte was found in the associated blank

2.0 SCOPE OF WORK

This section describes the proposed investigation data, assessment, and reporting tasks designed to generate information sufficient to enable the NYSDEC to identify the potential presence and characteristics of chemical constituents at the site. Detailed quality control and field procedures are presented in the QAPP/Field Sampling Plan. The scope has been developed as a two-phased approach. The following activities comprise the Phase I site characterization:

- Preparation of a site base map;
- Geophysical survey encompassing a total of approximately 60 acres located on both sites in the areas of concern;
- Completion of a site reconnaissance to attempt to locate wells installed during previous investigations;
- Completion of a maximum of 50 boreholes in suspected areas identified during the geophysical survey;
- Collection and analysis of a maximum of 50 soil samples for acid extractable compounds;
- Collection and analysis of a maximum of four groundwater samples, a minimum of one from each area of concern, for acid extractable compounds during the completion of the boreholes;
- Collection and analysis of a total of five surface soil samples for Target Compound List (TCL) VOCs, SVOCs, pesticides/PCBs, Target Analyte List (TAL) metals and cyanide; and
- Collection and analysis of a total of two surface water samples from the drainage swales in the northeast area and the western area for TCL VOCs, SVOCs, pesticides/PCBs, TAL metals, and cyanide.

The results of the Phase I site characterization will be used to identify proposed future locations of groundwater monitoring wells, additional borings, or test pits to be

installed during the Phase II site characterization. The Phase II site characterization includes the following activities:

- Installation of a maximum of four overburden monitoring wells based on the findings of contamination in the boreholes;
- Collection and analysis of soil samples for grain size and Atterberg Limits testing in the screened section of each well location;
- Collection and analysis of a total of six subsurface soil samples for TCL VOCs, SVOCs, pesticides/PCBs, TAL metals and cyanide;
- Collection and analysis of a total of four groundwater samples for TCL VOCs, SVOCs, pesticides/PCBs, TAL metals and cyanide;
- Completion of an additional 10 soil borings to collect and analyze 10 soil samples for TCL VOCs and SVOCs to delineate contaminated areas identified during Phase I activities;
- Collection and analysis of a maximum of four samples for TCLP if waste is encountered; and
- Collection and analysis of a maximum of two samples for RCRA characteristics if waste is encountered.

Field investigation methodologies and procedures for each investigative element identified above are presented in Section 2.1 below. The scope of work identified in this SSWP for the Holiday Park site and Botanical Gardens site is based on information provided by the NYSDEC and the Project Work Plan (Malcolm Pirnie, 1997). A generic Quality Assurance Project Plan and a Field Sampling Plan (QAPP/FSP) has been prepared for use during each of the four PSAs identified in this Work Assignment. The QAPP/FSP describes the quality assurance and specific field sampling procedures that will be used during the performance of these site assessments. Field activities conducted at the Holiday Park and Botanical Gardens sites will be performed in accordance with a Site Specific Health and Safety Plan included as Appendix A.

2.1 FIELD INVESTIGATION METHODOLOGY AND PROCEDURES

2.1.1 Phase I Site Characterization

Site Visit/Mobilization

A site reconnaissance was conducted at the Holiday Park site and Botanical Gardens site on October 29, 1996 to verify site access and preliminarily identify potential environmental sampling locations. Prior to site mobilization, the owner of the sites will be contacted by Region 9 NYSDEC personnel. In addition, the site owner will be requested to assist with delineating the location of underground electric and water utilities.

Base Map Development

A base map will be developed to describe site features, identify sample locations, and present site characterization data. The objective of the site survey is to provide the necessary data to prepare a detailed site map which delineates topography and surface features such as buildings, roadways, above ground utilities, and drainage. Topographic contours will be provided at an interval of 2 feet.

In addition to site features, each sampling location will be identified on the map and will include horizontal coordinates and ground surface elevation related to mean sea level. For each monitoring well, the ground surface, top of the protective casing, and top of the PVC inner casing elevation will be provided.

Geophysical Survey

An EM-31 geophysical survey will be performed at the Holiday Park/Botanical Gardens site at portions of the confirmed or suspected disposal areas identified on Figure 2. A total of approximately 60 acres will be included in the EM-31 survey. The survey will be used to identify anomalous areas of subsurface conductivity to locate potential waste disposal areas. The survey grid will be established prior to conducting the EM-31 survey. Since many of the areas are covered with thick vegetative growth, survey lines will be

cleared to facilitate the EM survey. After reviewing the results of EM-31 survey, borehole locations will be identified and an EM-61 geophysical survey will be used to identify subsurface drilling hazards in the vicinity of each borehole. The survey will encompass an area 25 feet by 25 feet with line spacing 5 feet apart. A maximum of approximately 65 locations will be surveyed for subsurface drilling hazards.

Phase I Site Characterization

Subsurface soil characterization will involve the collection and analysis of soil samples at a maximum of 50 borehole locations completed within the three areas of concern on the Holiday Park site and the area of concern on the Botanical Gardens site (see Figures 2 and 3). Borehole locations will be selected based on the results of the geophysical survey. Approximately 12 to 13 borings will be completed at each area of concern using a Geoprobe sampler by continuously sampling soil to a depth of five feet below saturated soil conditions. Actual sample locations will be surveyed and recorded by Om Popli Engineering for placement on the site map.

Soil samples at each location will be inspected and logged by a geologist to characterize subsurface soil and any waste conditions. Each sample will be screened immediately upon retrieval from the borehole with a photoionization detector (PID) and the maximum value recorded on the boring log. A subsample from each sample interval exhibiting the highest PID reading, the presence of visually contaminated soil and/or olfactory evidence of contamination will be placed in laboratory pre-cleaned jars, labeled and placed in a storage chest filled with ice. Of the multiple samples collected from each borehole, one sample will be selected from each borehole and submitted to the laboratory for analysis of the acid extractable compounds listed on Table 2-1. During the completion of the boreholes, one groundwater sample from each area of concern will be collected and analyzed for the acid extractable compounds. Analytical results will be available within 24 hours of sample submission. With this rapid turnaround of analytical results, the boring investigation can be modified in the field to delineate contaminated areas.

TABLE 2-1
NYSDEC
MULTIPLE SITE PSAs
HOLIDAY PARK/BOTANICAL GARDENS

Sampling and Analysis Summary for Proposed Activities

Sample Type	Laboratory Analysis	Field Samples		Lab QC Samples[1]			
		No. of Samples	Equipment Blanks	MS/MSD	MSB/LCS	Total	Trip Blanks[2]
Surface Soil	Full TCL[3]	5	0	2	1	8	0
	Metals[4]	5	0	2	1	8	0
Groundwater - Mon. Wells	Full TCL[3]	4	0	2	1	7	1
	Metals[4]	4	0	2	1	7	0
Groundwater - GC Scan	Acid Extractable (GC Scan[7])	4	0	0	0	4	0
Subsurface Soil	Acid Extractable (GC Scan[7])	50	0	0	0	50	0
	Full TCL[3]	6	1	0	0	7	0
	Metals[4]	6	1	0	0	7	0
	TCL VOCs	10	0	0	0	10	1
	TCL SVOCs	10	0	0	0	10	0
	TCLP[5]	4	0	0	0	4	0
	RCRA Char.[6]	2	0	0	0	2	0
Surface Water	Full TCL[3]	2	0	0	0	2	0
	Metals[4]	2	0	0	0	2	0

NOTES:

1. Laboratory QC Analyses: MS/MSD-Matrix spike/matrix spike duplicate sample; MSB-matrix spike blank sample; LCS-lab control sample. Perform MS/MSD/MSB for organic analyses & MS/MSD/LCS for inorganic analysis.
2. Trip blanks are water samples analyzed for VOC only; trip blanks are collected with water samples only.
3. Full TCL: Target Compound List volatiles, semivolatiles, pesticide/PCBs as specified in NYSASP-95 (Category B Deliverables)
4. Metals: Target Analyte List metals and cyanide
5. TCLP: Target Compound Leaching Potential volatiles, semivolatiles, pesticides, metals (compounds identified in Table 2-2)
6. RCRA characteristics include: flammability, corrosivity, reactivity
7. Acid Extractable (GC Scan): Ten specific compounds include total phenol, pentachlorophenol, 2,4,5-trichlorophenol, 2,4,6-trichlorophenol, and 6 TICs.

Surface Soil and Water Sampling

A total of 5 surface soil samples will be collected: a maximum of one from each area of concern and one from a NYSDEC selected background location. Samples will be collected from areas that exhibit staining or stressed vegetative growth or in the vicinity of a boring with detection of acid extractable compounds. Analysis of samples includes the TCL VOCs, SVOCs, pesticides/PCBs, TAL metals and cyanide. One of the samples will also be identified as the matrix spike/matrix spike duplicate (MS/MSD).

Two surface water samples will be collected from the Holiday Park site; one in the northeast area and one in the western area from the ditches flowing through the area. The samples will be analyzed for TCL VOCs, SVOCs, pesticides/PCBs, TAL metals and cyanide. The samples will be collected at a point mid-depth in the water column using a surface water sampler or bailer or by directly submersing the sample bottles into the water. Surface water collection details are provided in the QAPP.

2.1.2 Phase II Site Characterization

Installation and Development of Monitoring Wells

If the results of the Phase I site characterization indicate a potential for adverse impacts to groundwater quality, groundwater monitoring wells will be installed to properly assess groundwater quality.

A maximum of four overburden monitoring wells will be installed in the areas of concern based on the findings of the preliminary screening. Groundwater is expected to be within ten feet of ground surface. Monitoring wells will be installed using conventional hollow stem auger techniques. Monitoring well installation and development will be conducted as described in the QAPP/FSP.

Each well will be constructed of 2-inch diameter, flush joint PVC riser pipe with a ten-foot screen straddling the surface of the water table. Morie No. 0 filter sand will surround the 0.010-inch slot screen extending two feet above the top of the screen. Well installation is described in the QAPP/FSP.

The wells will be developed in accordance with the QAPP/FSP. Well development will continue until the specific capacity of the well does not increase and field measurements stabilize. A turbidity goal of 50 NTU will be used to ensure clear samples. Well development options include bailing, and pumping. Development water will be disposed of by allowing it to infiltrate the ground surface in the vicinity of the well.

Soil Sampling

During the monitoring well drilling, continuous split spoon sampling will be employed. Soil samples will be collected to perform jar headspace testing at each location. One unsaturated soil sample will be collected from each of the well boreholes and analyzed for TCL VOCs, SVOCs, pesticides/PCBs, TAL metals, and cyanide. Samples will be selected based on elevated PID readings, the presence of visually contaminated soil and/or olfactory evidence of contamination. If more than one soil sample exhibits evidence of contamination, a maximum of two additional soil samples will be analyzed. If no evidence of contamination is present, the interval from two to four feet will be collected and analyzed. Table 2-1 includes a sampling and QC summary. In addition, a maximum of three soil samples will be collected from each of the screened intervals at each well location and analyzed for grain size and Atterberg Limits.

Additional Subsurface Soil Sampling

If necessary, a maximum of ten additional soil samples will be collected from the completion of ten borings to the fill/native soil interface to further delineate the extent of soil contamination identified during the Phase I site characterization. Soil samples will be analyzed for TCL VOCs and SVOCs.

If ash or other non-soil industrially-derived waste material (product) is encountered in the unsaturated zone during the advancement of the borings, a maximum of four samples will be collected and analyzed for TCLP compounds as indicated on Table 2-2. In addition, two of the samples will be analyzed for the RCRA characteristics listed on Table 2-1.

TABLE 2-2
NYSDEC
MULTIPLE SITE PSAs
HOLIDAY PARK/BOTANICAL GARDENS SITES

List of TCLP Compounds With Maximum Concentration Values[1]

Analyte	Maximum Concentration Value ppm
Arsenic	5
Barium	100
Cadmium	1
Chromium	1
Lead	5
Mercury	0.2
Selenium	1
Silver	5
Endrin	0.02
Lindane	0.4
Methoxychlor	10
Toxaphene	0.5
2,4-Dichlorophenoxyacetic Acid	10
2,4,5-Trichlorophenoxypropionic Acid (silvex)	1
Benzene	0.5
Carbon Tetrachloride	0.5
Chlordane	0.03
Chlorobenzene	100
Chloroform	6
M-Cresol	200
O-Cresol	200
P-Cresol	200
1,4-Dichlorobenzene	7.5
1,2-Dichloroethane	0.5
1,1-Dichloroethene	0.7
2,4-Dinitrotoluene	0.13
Heptachlor	0.008
Hexachloro-1,3-butadiene	0.5
Hexachlorobenzene	0.13
Hexachloroethane	3
Methyl Ethyl Ketone	200
Nitrobenzene	2
Pentachlorophenol	100
Pyridine	5
Tetrachloroethene	0.7
Trichloroethene	0.5
2,4,5-Trichlorophenol	400
2,4,6-Trichlorophenol	2
Vinyl Chloride	0.2

Note: 1. EPA Method 1311

Water Level Measurements

One complete round of static water level measurements will be obtained from the four newly installed monitoring wells and any monitoring wells found during site reconnaissance. Measurements will be taken according to the QAPP/FSP.

Monitoring Well Sampling

At the completion of well development, one round of groundwater sampling will be conducted. Groundwater samples will be analyzed for TCL volatiles, semivolatiles, pesticide/PCBs and TAL metals/cyanide. One groundwater sample will be identified as the MS/MSD. Sample collection will proceed as described in the QAPP/FSP. Generally, each monitoring well will be purged by removing a minimum of three (3) well volumes. Samples will be collected using polyethylene disposable bailers. Temperature, pH, conductivity, and turbidity will be measured and recorded on field purging/sampling forms. If the groundwater is above 50 NTUs when sampling, only volatiles and semivolatiles will be sampled. The metals and pesticides/PCBs will be sampled 24 hours after purging to minimize the potential to collect and submit turbid samples for laboratory analysis. If the groundwater is still greater than 50 NTUs, filtered and unfiltered sampling will be performed. The NYSDEC will need to be contacted prior to performing the metal analyses. Purge water will be disposed of by allowing it to infiltrate the ground surface in the vicinity of the well.

Analysis/Data Usability

Laboratory analysis of environmental samples by Mitkem will be conducted in accordance with NYSDEC ASP Methods with a Category B deliverable package. Samples collected during soil screening (i.e. the acid extractable compounds) will be analyzed by Waste Stream Technology using EPA SW-846 protocols. Other environmental samples discussed in this work plan will be analyzed by Mitkem and a Data Usability Report (DUSR) will be prepared by Chemworld. Samples will be analyzed as outlined in Table 2-1. The

QAPP/FSP presents, in detail, the laboratory analysis and quality assurance methods to be used for this project. The contents and purpose of a DUSR are included in the QAPP/FSP.

Report

At the completion of field activities and data usability review, data generated during the investigation will be evaluated and a draft report summarizing the site characterization data will be prepared for submittal to the NYSDEC for review. A PA Score Package with documentation along with supporting investigation data will be included in the Draft PSA report. A final report will be prepared which incorporates revisions specified by the NYSDEC.

Schedule

Preparation of the base map has been initiated and is anticipated to be complete by June 1, 1997. Phase I site characterization activities can begin upon completion of the base map during the month of June. If required, the Phase II site characterization work will be initiated within three weeks of receiving Phase I site characterization data. It is anticipated that a draft report will be submitted to the NYSDEC in October 1997.

MALCOLM PIRNIE

HEALTH AND SAFETY PLAN FOR PRELIMINARY SITE ASSESSMENT

NEW YORK STATE SUPERFUND STANDBY CONTRACT BOTANICAL GARDENS/HOLIDAY PARK TONAWANDA, NEW YORK

WORK ASSIGNMENT D-002852-21

NEW YORK STATE DEPT. OF ENVIRONMENTAL CONSERVATION
DIVISION OF HAZARDOUS WASTE REMEDIATION

APRIL 1997

Judith Vangalio
Site Health and Safety Officer

Anne Marie C. McManus, P.E.
Project Manager

Mark McGowan, C.I.H.
Corporate Health & Safety Manager

MALCOLM PIRNIE, INC.
P. O. Box 1938
Buffalo, New York 14219

MALCOLM PIRNIE

HEALTH AND SAFETY PLAN FOR PRELIMINARY SITE ASSESSMENT

NEW YORK STATE SUPERFUND STANDBY CONTRACT
BOTANICAL GARDENS/HOLIDAY PARK
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MALCOLM PIRNIE, INC.
P. O. Box 1938
Buffalo, New York 14219

MALCOLM PIRNIE

We, the undersigned, being employed by Malcolm Pirnie, Inc., have read in full and understand this Health and Safety Plan:

Signature	Print	Date
Signature	Print	Date
Signature	Print	Date
Signature	Print	Date
Signature	Print	Date
Signature	Print	Date
Signature	Print	Date
Signature	Print	Date
Signature	Print	Date
Signature	Print	Date

MALCOLM PIRNIE

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MALCOLM PIRNIE

HEALTH AND SAFETY PLAN FOR PRELIMINARY SITE ASSESSMENT HOLIDAY PARK/BOTANICAL GARDENS

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MALCOLM PIRNIE

- PROJECT MANAGER

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- CORPORATE HEALTH AND SAFETY MANAGER:

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Name:	Judith Vangalio	
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- SITE SAFETY TECHNICIAN

Name:	Rick Frappa	
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	Home:	(716) 662-6847

The following roles have been identified for Malcolm Pirnie project personnel:

Project Manager - The Project Manager has full responsibility for implementing and executing an effective program of employee protection and accident prevention. She may delegate authority to expedite and facilitate any application of the program.

Corporate Health and Safety Manager - The Corporate Health and Safety Manager serves as the administrator of the corporation's health and safety program. He is responsible for ensuring that Malcolm Pirnie field personnel are properly trained, that they have obtained medical clearance to wear respiratory protection (per 29 CFR Part 1910.134(b)(10)), and that they are properly trained in the selection, use and maintenance of personal protective equipment, including qualitative respirator fit testing.

MALCOLM PIRNIE

1.0 INTRODUCTION

1.1 GENERAL

In accordance with Malcolm Pirnie, Inc. corporate policies and OSHA regulations, this Health and Safety Plan (HASP) describes specific health and safety practices and procedures to be used during the Preliminary Site Assessment (PSA) at the Botanical Gardens/Holiday Park Site located in Tonawanda, New York. This HASP covers Malcolm Pirnie employees and activities, and is not intended to cover the activities of other employers on the site. Malcolm Pirnie, Inc. accepts no responsibility for the Health and Safety of subcontractor personnel. This HASP presents information on known site health and safety hazards and includes the equipment, materials and procedures that will be used to eliminate or control these hazards and is based on an assessment of potential health and safety hazards at the site using available historical information. Environmental monitoring will be performed during the course of field activities to provide real-time data for an on-going assessment of potential physical and chemical hazards.

Malcolm Pirnie personnel involved with geologic surveys, multi-media environmental sampling, and other assessment activities will be required to comply with this Health and Safety Plan. Tasks on this site will be completed using methods that meet the requirements set forth in the OSHA Health and Safety regulations contained in 29 CFR 1910 and 1926. Subcontractor(s) conducting any intrusive operations are required to provide their own Health and Safety Plans.

1.2 ORGANIZATION

The Malcolm Pirnie Project Manager, the Health and Safety Officer and the Site Safety Technician (or his designee) identified below will determine and enforce compliance.

When unsafe work conditions are identified, the Site Safety Technician is authorized to order Malcolm Pirnie personnel to stop work. Resolution of all on-site health and safety problems will be coordinated through the Project Manager with assistance from the Corporate Health and Safety Manager and Site Health and Safety Officer as well as the Subcontractor's designated Health and Safety personnel.

The following roles have been designated for non-Malcolm Pirnie personnel:

Subcontractor Site Health and Safety Officer - The Subcontractor's Site Health and Safety Officer will be responsible for protecting the health and safety of subcontractor personnel and will provide evidence of training and medical clearance for subcontractor personnel. The Subcontractor's Site Health and Safety Officer will also be responsible for site security during normal work hours and will control access of non-essential personnel into the work zone.

Public Information Officer - The Public Information Officer is responsible for answering any questions from the general public regarding the on-site activities. The Public Information Officer is an employee of the New York State Department of Environmental Conservation (NYSDEC).

1.3 BACKGROUND

The New York State Department of Environmental Conservation (NYSDEC), Division of Hazardous Waste Remediation, has assigned to Malcolm Pirnie, Inc. (Work Assignment #D002852-21) a Preliminary Site Assessment at the Botanical Gardens (9-32-068)/Holiday Park (9-32-033), City of North Tonawanda, Niagara County, New York (Figure 1). The Botanical Gardens/Holiday Park sites are located on opposite sides of Old Falls Boulevard. The City of North Tonawanda Department of Public Works operated a refuse disposal site at the Botanical Gardens from the 1950's until roughly 1965, and at the Holiday Park site from the early 1960's until 1974. These sites received municipal waste and are suspected of receiving industrial waste including phenolic resins, molding compounds

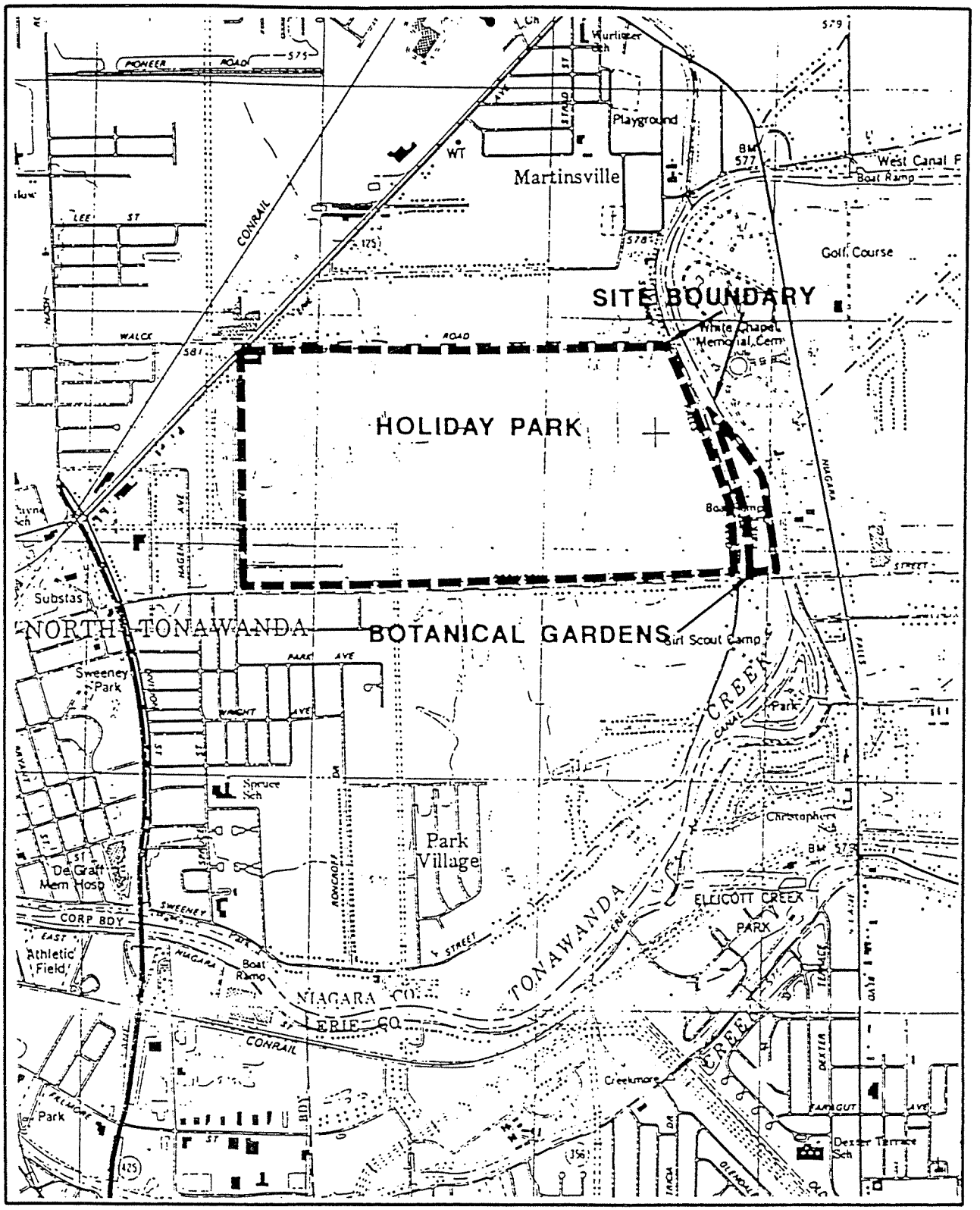
The Corporate Health and Safety Manager will also serve as scientific advisor for the duration of the project, providing guidance on data interpretation and the determination of appropriate levels of worker protection.

Site Health and Safety Officer - The Site Health and Safety Officer is knowledgeable in safety and worker protection techniques as they relate to the project. Responsibilities include the development of the specific provisions of this HASP, including the level of personnel protection to be employed, identification of emergency procedures, and personnel/equipment decontamination procedures. This individual will provide technical assistance to project management on problems relating to industrial hygiene and work site safety.

Any health and safety briefings required during the course of the project will be conducted by the Site Health and Safety Officer. Examples of briefings might include accident prevention, respirator refresher courses or current issues. The frequency of safety briefings will be based upon the potential hazards specific to the designated work tasks and any new information relative to such hazards which are discovered during the project.

Site Safety Technician - Malcolm Pirnie's Site Safety Technician or his designee will be responsible for the implementation of this HASP for Malcolm Pirnie employees at the site and for monitoring the personal exposures of employees to hazardous substances contained in air, soil or water. This will consist of spot checking workplace air sampling performed by the Subcontractor such as organic vapor monitoring and the documentation of such data. Malcolm Pirnie's Site Health and Safety Officer will communicate directly with Malcolm Pirnie's Site Safety Technician on a regular basis to advise him/her of monitoring results and any unexpected conditions found at the site. As data are received and evaluated, the Site Health and Safety Officer will adapt this Health and Safety Plan to fit the current Malcolm Pirnie employee protection needs at the site. All affected Malcolm Pirnie employees and the Subcontractor's designated Site Health and Safety Officer will be informed of the air sampling results.

FIGURE 1



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MALCOLM PIRNIE

DWG NO. 0266F001

BOTANICAL GARDENS/ HOLIDAY PARK SITE
PRELIMINARY SITE ASSESSMENT

SITE LOCATION MAP

NYSDEC

APRIL 1997

and rubbish from Hooker-Darez. There have been several disposal areas on the Holiday Park property through the years. One area may have received ash from a municipal garbage incinerator. The Holiday Park property is now a municipal golf course and the Botanical Gardens property is currently used as a boat launch and park.

1.4 PRELIMINARY SITE ASSESSMENT

Primary objectives of the PSA will be to:

- To establish the existence of conductive contaminant plumes.
- To characterize the site in terms of geologic and hydrogeologic condition.
- To present physical characteristics of site soils including detection of contaminant impacts.
- Present conclusions and recommendations regarding the need for and extent of additional studies or actions at these sites.

In addition, soil and groundwater will be more fully characterized to completely assess any risks to human health and the environment, and to evaluate groundwater/soil remedial alternatives.

1.5 SCOPE OF REMEDIAL INVESTIGATION

Malcolm Pirnie, Inc. personnel will be responsible for the oversight of drilling activities and all sample collection associated with the PSAs. The major activities to be completed during fieldwork as part of the PSA include:

- Geophysical Survey
- Surface Soil Sampling
- Geoprobe Sampling
- Development and Sampling of Monitoring Wells
- Monitoring Well installation
- Test Pits, if necessary

2.0 HAZARD EVALUATION

2.1 SUMMARY OF PROJECTED RISKS

Due to the variety of potential contaminants at the site, the possibility exists that workers will be exposed to hazardous substances during field activities (see Table 2-3). The principal points of exposure would be through direct contact with contaminated fill/soils and groundwater, through the inhalation of contaminated particles or vapors. In addition, the use of a drill rig and backhoe on-site will present conditions for potential physical injury to workers. Further, since work may be performed during summer/winter time periods, the potential exists for heat/cold stress to impact workers especially those wearing protective equipment and clothing.

Although no work can be considered completely risk-free, logical and reasonable precautions will be implemented to provide an adequate level of protection for workers. The integration of medical evaluations, worker training relative to chemical hazards, safe work practices, proper personal protection, environmental monitoring, work zones and site control, appropriate decontamination procedures and contingency planning into the project approach will minimizes the chance of unnecessary exposures and physical injuries.

2.2 CHEMICAL HAZARDS

Previous sampling from both sites has provided information concerning the types of contaminants which are likely to be encountered during the PSA. Table 2-1 identifies contaminants determined to be present during previous sampling at the sites. Potential contaminants include volatile organics, phenols, and heavy metals. Heavy metals are not generally considered a health concern unless there is a potential for inhalation or ingestion. Table 2-2 lists toxicity and exposure data for the "contaminants of concern" identified in Table 2-1. Brief descriptions of the toxicology of these materials and related health and safety guidance and criteria taken from Fate and Exposure Data for Organic Chemicals (Howard 1990) and Toxicological Profiles from the Agency for Toxic Substances and Disease Registry are provided below:

TABLE 2-1

HEALTH AND SAFETY PLAN
FOR PRELIMINARY SITE ASSESSMENT
HOLIDAY PARK/BOTANICAL GARDENS

COMPOUNDS DETECTED

Chemical	Maximum Concentration in Soil (ug/l)
Compounds:	
Copper	53
Dichlorobenzene	Detected
Trichlorobenzene	Detected
Ethylbenzene	17
2-Butanone	Detected
2-Hexanone	Detected
Phenol	10

Source: NYSDEC Project Files

TABLE 2-2

HEALTH AND SAFETY PLAN
FOR PRELIMINARY SITE ASSESSMENT
HOLIDAY PARK/BOTANICAL GARDENS

TOXICITY AND EXPOSURE DATA

Contaminant of Concern	Inhalation Hazard		IDLH (mg/m^3)	Dermal Hazard
	PEL (mg/m^3)	TLV (mg/m^3)		
2-butanone	590	590	9000	YES
copper	1.0	1.0	--	NO
dichlorobenzene	450	150	1200	YES
ethylbenzene	435	434	3500	YES
2-hexanone	410	20	6700	YES
phenol	19	19	980	YES
trichlorobenzene	40	37[c]	N.D	YES

Notes:

PEL = Permissible Exposure Limit Established by OSHA, equals the maximum exposure concentration allowable for 8 hours per day @ 40 hours per week.

TLV = Threshold Limit Value established by ACGIH, equals the maximum exposure concentration allowable for 8 hours per day @ 40 hours per week.

C = Ceiling Level, equals the maximum exposure concentration allowable during the work day.

* = Respirable function.

- **2-butanone** is also known as methyl ethyl ketone. Exposure to 2-butanone is mainly from inhalation. Mild irritations of the eyes, nose and throat occur when 2-butanone is inhaled.

- **Copper** dust can cause irritation of the upper respiratory tract, a metallic taste in the mouth, nausea, and in some cases discoloration of the skin and hair. Ingestion of copper dust can irritate your nose, mouth, and eyes, and cause headaches, dizziness, nausea, vomiting and diarrhea.

- **Dichlorobenzene** exposure is caused mostly from inhalation. Extremely high exposures can cause dizziness, headaches and liver problems. This chemical is used in common household products. There is no evidence that low to moderate exposure results in harmful effects.

- **Ethylbenzene** occurs naturally in coal tar and petroleum. Exposure to low levels of ethylbenzene in the air for short periods of time have complained of eye and throat irritation. Exposure to higher levels has resulted in more severe effects such as decreased movement and dizziness.

- **2-Hexanone** dissolves very easily in water, and can evaporate easily into the air as a vapor. Breathing 2-hexanone can harm your nervous system. Workers who were exposed to 2-hexanone in the air for almost a year felt weakness, numbness, and tingling in the skin of hands and feet.

- **Phenol** exposure may occur through skin contact or breathing contaminated air. Repeated exposure to low levels of phenol in drinking water has been linked with diarrhea and mouth sores. Inhalation of phenol may be irritating to lungs and exposure for several days causes muscle tremors and loss of coordination.

- **Trichlorobenzene** exposure may cause irritation to the eyes, skin and mucus membranes. In animals, liver and kidney damage and possible teratogenic effects were observed at high exposure concentrations.

With respect to the anticipated Preliminary Site Assessment activities defined in Section 1.2, possible routes of exposure to the above-mentioned contaminants are presented in Table 2-3.

The use of proper respiratory equipment, as outlined in Section 7.0, will minimize the potential for exposure to airborne contamination. Further, exposure to contaminants through dermal and other routes will also be minimized through the use of protective

MALCOLM PIRNIE

TABLE 2-3

HEALTH AND SAFETY PLAN FOR PRELIMINARY SITE ASSESSMENT
HOLIDAY PARK/BOTANICAL GARDENS

POTENTIAL ROUTES OF EXPOSURE TO CONTAMINANTS-OF-CONCERN

Activity	Direct Contact with Soil	Direct Contact with Water	Inhalation of Vapors/Dust Particles
Geophysical Survey	X		
Collect Surface Soil Samples	X		X
Geoprobe Sampling	X	X	X
Monitoring Well Installation	X	X	X
Develop Wells and Collect Groundwater Samples		X	X
Test Pits, if necessary	X	X	X

clothing (Section 6.0), safe work practices (Section 5.0), and proper decontamination procedures (Section 10.0).

2.3 PHYSICAL HAZARDS

Installation of monitoring wells, borehole drilling and test pit excavation at the Botanical Gardens/Holiday Park Site may present the following physical hazards:

- The potential for physical injury during heavy construction equipment use, such as drill rigs and backhoes.
- The potential for heat/cold stress to employees during the summer/winter months (see Section 8.0).
- The potential for slip-and-fall injuries due to rough, uneven terrain.
- Potential for test pit walls to collapse.
- Potential for injury due to fire/explosion of methane and/or carbon disulfide gas released during drilling and/or test pit excavations (see Section 11).

3.0 MEDICAL SURVEILLANCE

Medical monitoring, including initial employment, annual and employment termination examinations are be provided to Malcolm Pirnie employees whose work may result in potential chemical exposure or present unusual physical demands. Medical evaluations are to be performed by an occupational physician designated by Malcolm Pirnie, Inc. The medical evaluations are conducted according to the Malcolm Pirnie, Inc. Medical Monitoring Program and include an evaluation of the workers' ability to use respirator protective equipment (as per 29 CFR 1910). The examination includes:

- Occupational history;
- Medical history;
- Medical review;
- Medical certification of physical requirements (sight, hearing, musculoskeletal, cardiovascular) for safe job performance; and
- Laboratory testing to include a complete blood count, white cell differential count, blood biochemistry and urinalysis.

The purposes of the medical evaluation are to: (1) determine fitness for duty on hazardous waste sites (such an evaluation is based upon the employee's occupational and medical history, a comprehensive physical examination and evaluation of the ability to work while wearing protective equipment); and (2) establish baseline medical data.

Supplemental examinations may be performed whenever there is an actual or suspected excessive exposure to chemical contaminants or upon experience of exposure symptoms, or following injuries or temperature stresses.

In conformance with OSHA regulations, Malcolm Pirnie will maintain and preserve medical records for a period of 30 years following termination of employment. Employees have access to the results of medical testing and to full medical records and analyses.

The subcontractor's Site Health and Safety Officer will be responsible for providing evidence of medical clearance for any subcontractor personnel (see Section 1.2).

4.0 EMPLOYEE TRAINING PROGRAM

All employees who may be exposed to hazardous substances, health hazards, or safety hazards are adequately trained prior to engaging in any on-site work activities. At a minimum, such training includes an initial 40-hour Hazardous Waste Site Worker Protection Course, an 8-hour Annual Refresher Course subsequent to the initial 40-hour training, and 3 days of actual field experience under the direct supervision of a trained, experienced supervisor (i.e., the branch Health and Safety Coordinator or his/her designee). This training is conducted by a qualified instructor and is specifically designed to meet the requirements of OSHA Standard 29 CFR 1910.120(e)(2). At a minimum, the initial 40-hour training course includes the following:

TOPICS

- OSHA/SARA/EPA/RCRA/HCS Requirements
- Decontamination of Personnel & Equipment
- Fire, Explosion & Accident Prevention
- Respiratory Protection Selection & Use
- Preparation of Health & Safety Plans
- Emergency Preparedness & Escape
- Protective Clothing Use & Selection
- Air Monitoring & Surveillance
- Work Practices to Minimize Risk
- Waste Site Safety
- Hazard Recognition
- Medical Surveillance
- Cold & Heat Stress
- Site Entry & Set-Up
- Permissible Exposure Limits
- Site Control & Work Zones
- Chemical & Physical Hazards
- Confined Space Entry

WORKSHOPS/EXERCISES

- Self-Contained Breathing Apparatus
- Air Monitoring Equipment Workshop
- Air Purifying Respirator Workshop
- Decontamination
- Qualitative/Quantitative Fit Test
- Level A/B Field Exercise
- Level B/C Field Exercise
- Air Tank Refilling Workshop

Records and certifications received from the course instructor documenting each employee's successful completion of the training identified above are maintained on file in Malcolm Pirnie's Buffalo and White Plains corporate headquarters offices. Subcontractor(s) are required to provide similar documentation of training for all their personnel who will be involved in on-site work activities.

Any employee who has not received adequate training and has been so certified is prohibited from engaging in on-site work activities that may involve exposure to hazardous substances, health hazards or safety hazards.

Periodic health and safety briefings will be conducted by Malcolm Pirnie's Site Health and Safety Officer for Malcolm Pirnie employees on an as-needed basis. Problems relative to respiratory protection, inclement weather, heat/cold stress or the interpretation of newly-available environmental monitoring data are examples of topics which might be covered during these briefings.

5.0 SAFE WORK PRACTICES

All Malcolm Pirnie employees shall obey the following safety rules during on-site work activities conducted within the exclusion and support zones:

General:

- Eating, drinking, chewing gum or tobacco, smoking, or any practice which increases the probability of hand-to-mouth transfer of contaminated material is strictly prohibited;
- The hands and face must be thoroughly washed upon leaving the work area and prior to engaging in any activity indicated above.
- Any required respiratory protective equipment and clothing **must** be worn by all personnel going on-site. Excessive facial hair (i.e., beards, long mustaches or sideburns), which interferes with the satisfactory respirator-to-face seal is prohibited;
- Contact with surfaces/materials either suspected or known to be contaminated will be avoided to minimize the potential for transfer to personnel, cross contamination and need for decontamination;
- Medicine and alcohol can potentiate the effects of exposure to toxic chemicals. Due to possible contraindications, use of prescribed drugs should be reviewed with the Pirnie occupational physician. Alcoholic beverage and illegal drug intake are strictly forbidden during site work activities;
- All personnel shall be familiar with standard operating safety procedures and additional instructions contained in this Health and Safety Plan;
- On-site personnel shall use the "buddy" system. No one may work alone, i.e., out of earshot or visual contact with other workers in the exclusion zone;
- Personnel and equipment in the contaminated area shall be minimized, consistent with effective site operations;
- All employees have the obligation to correct or report unsafe work conditions;

- Use of contact lenses on-site will not be permitted. Spectacle kits for insertion into full-face respirators will be provided for Malcolm Pirnie employees, as required.

- The drilling subcontractor will employ lockout/tagout procedures when the drill rig is not in operation (i.e., after normal work hours).

The recommended general safety practices for working around the drilling Subcontractor's and/or backhoe operator's equipment (i.e. drill rigs and backhoes) are as follows:

Subcontractor's Duties:

- The drilling Subcontractor is responsible for the condition of his equipment and its safe operation on the site. Malcolm Pirnie personnel are responsible for their own safety when working around this equipment. The inspection will include a check for obvious structural damage, loose nuts and bolts, loose or missing guards, cable guides or protective covers, fluid leaks, damaged hoses, cables, pressure gauges or pressure relief valves, and damaged drilling tools and equipment. The equipment should also have a fire extinguisher. The subcontractors are expected to conduct daily inspections of their equipment and report any potential problems to the Malcolm Pirnie Site Safety Technician. If the condition of the equipment is considered to be unsafe based on the Subcontractor's inspection, and/or the Malcolm Pirnie Site Safety Technician's inspection, have the Subcontractor make the necessary repairs prior to beginning work. If the Subcontractor refuses to fix the equipment or is not operating the equipment safely, the job site will be closed down and the Project Manager contacted for additional instructions.

- Drilling/excavation will not be initiated without first clearing underground services such as; gas, water, telephone, sewer, hydrogen, steam, and cable T.V.

- Drill rigs and backhoes should not be operated within 20 feet of overhead wires. This distance may be increased if windy conditions are anticipated. The site should also be clear to ensure the project staff can move around the heavy machinery safely.

- Slippage is one of the most common causes of accidents around drill rigs and test pits. Drainage should be provided to divert mud and water away from the construction site.

- The Subcontractor should keep the construction site tidy. This will prevent personnel from tripping and will allow for fast emergency exit from the site.
- A drill rig must not be moved from site to site with the drill mast in the raised position.
- Proper lighting will be provided if drilling/excavating at night.
- Drilling/excavation will be discontinued during an electrical storm.
- The drilling subcontractor will employ lockout/tagout procedures when the drill rig is not in operation (i.e., after normal work hours).

Malcolm Pirnie's Duties:

- Hard hats and safety boots must be worn at all times in the vicinity of the drill rig and/or backhoe. Hearing protection is also recommended. Safety glasses are necessary.
- The presence of combustible gases should be checked before igniting any open flame (e.g., during welding).
- Malcolm Pirnie personnel shall stand upwind of any drilling/excavating operation when not immediately involved in sampling/logging activities.
- Malcolm Pirnie personnel will not enter trenches unless the trenches are shored or back sloped according to OSHA 29CFR 1926.652.
- Malcolm Pirnie personnel will not approach the edge of a unsecured trench closer than 2 feet.

6.0 PERSONAL PROTECTIVE EQUIPMENT

6.1 PROTECTION LEVELS

Personnel must wear protective equipment when work activities involve known or suspected atmospheric contamination; when vapors, gases, or particulates may be generated; or when direct contact with dermally active substances may occur. Full-face respirators will be used to protect the lungs, the gastro-intestinal tract and the eyes against air toxicants. Chemical-resistant clothing will be used to protect the skin from contact with skin-destructive and skin-absorbable chemicals. Good personal hygiene and safe work practices, as identified in Section 5.0, are also necessary to limit or prevent the ingestion of potentially harmful substances.

Based upon current information regarding the contaminants suspected to be present at the Botanical Garden/Holiday Park Site and the various tasks that are included in the Preliminary Site Assessment minimum required Levels of Protection shall be as identified in Table 6-1. Work shall be conducted in Level D, with upgrade to Level C, if needed.

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TABLE 6-1

HEALTH AND SAFETY PLAN
FOR PRELIMINARY SITE ASSESSMENT
HOLIDAY PARK/BOTANICAL GARDENS

REQUIRED LEVELS OF PROTECTION:[1]

Activity	Respiratory*	Clothing[2]	Gloves[2]	Boots[2]	Other Modifications[3]
Surface Soil Sampling	D/C	PT	N	L	Hard Hat, Safety Glasses.
Geoprobe Sampling	D/C	PT	N	L	Hard Hat, Respirator, Safety Glasses, Hearing Protection
Monitoring Well Installation	D/C	PT	N	L	Safety Glasses, Respirator, Hard Hat, Hearing Protection.
Develop Wells and Collect Groundwater	D/C	PT	N	L	Safety Glasses, Hard Hat
Test Pits	D/C	PT	N	L	Hard Hat, Safety Glasses, Respirator.
Geophysical	D/C	PT	N	L	Safety Glasses, Hard Hat, Respirator
Survey	D/C	PT	N	L	Safety Glasses, Hard Hat, Respirator.
Site Clearing	D/C	PT	N	L	Safety Glasses, Hard Hat, Respirator.
Non-Intrusive Site Work	D/C	—	—	—	Safety Glasses, Hard Hat.

Notes:

(1) PT = Polyethylene-coated Tyvek; L = Latex; N = Nitrile; S = Saranex; SS = Silver Shield; B = Butyl

(2) To be worn when Level C conditions are present (mandatory) or when Level D conditions are present (optional).

(3) At the discretion of the Site Health and Safety Officer, respirators will be donned whenever potentially contaminated airborne particulate (i.e., dust) are generated in significant amounts in the breathing zone.

* Respiratory protection shall correspond to guidelines presented in Section 8.2. The Level C requirement is an air-purifying cartridge respirator equipped with Organic Compound/Acid Gases/Dust cartridges.

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7.0 ENVIRONMENTAL MONITORING

7.1 GENERAL APPROACH

7.1.1 On-Site Monitoring

Modifications to the level of protection established for Malcolm Pirnie employees for each task will be based upon measurements of the contaminants present in the work environment. Tasks and activities proposed for this site along with the estimated potential of exposure to contaminants known to be present in the groundwater and soil at the site have been used to determine the minimum required levels of personal protection described in Section 6.0. Based upon the existing data base, a release of organic vapors is anticipated during both intrusive investigations and sampling activities. Ambient breathing zone concentrations may, at times, exceed the permissible exposure limits (PEL) established by OSHA for the individual compounds (see Table 2-2). Respiratory and dermal protection may be modified (upgraded or downgraded) based upon real-time field monitoring data.

Contaminated soil and groundwater are most likely to be encountered during geoprobe, monitoring well installation, test pit excavation and sampling activities. The air monitoring program to be implemented by Malcolm Pirnie will monitor volatile contaminants as well as the presence of respirable dust when the soil is physically disturbed by drilling equipment and backhoes. A combustible gas meter and total organic vapor analyzer (HNu) shall be used by Malcolm Pirnie personnel to verify field conditions during drilling/excavating operations. Real time monitoring will be performed by Malcolm Pirnie personnel on a periodic basis during other on-site activities such as sample collection and reconnaissance surveys. The level of respiratory and dermal protection in use will be based upon an evaluation of general and chemical specific air monitoring data.

Monitoring instruments will be protected from surface contamination during use to allow for easy decontamination. When not in use, the monitoring instruments will be placed on plastic sheeting to avoid surface contact. Additional monitoring instruments may be required if the situations or conditions change.

During drilling/excavating and soil examination operations, the work area surrounding the borehole will be monitored at regular intervals using an HNu photo-ionization detector, (or similar organic vapor monitoring device) as well as an explosimeter and radiation meter. Observed values will then be recorded and maintained as part of the permanent field record. Breathing zone monitoring with an HNu will be at ½-hour intervals during drilling and continuously during test pit work. The explosimeter and radiation meter monitoring will be continuous during all intrusive work. The actual frequency of breathing zone monitoring with an HNu will be dependent primarily upon values generated by screening the cuttings and the proximity of the worker's breathing zones to the source of contamination. Contaminant values which are in excess of established action levels appropriate for the prescribed level of protection will be immediately addressed. These action levels are given in Section 7.2 of this HASP.

Any split-spoon samples which are collected will be surveyed with the HNu, or similar equipment as each sample is retrieved. These values will be recorded with the respective sample number and will assist in the determination of the adequacy of employee protective equipment. In addition, to minimize dermal contact with potentially contaminated fill/soils, long-handled spoons and knives shall be used during split-spoon sampling and examination of the soil-core sample by the hydrogeologist.

7.2 MONITORING ACTION LEVELS

7.2.1 On-Site Levels

The HNu (10.2 eV) or other appropriate instrument(s) will be used by either Malcolm Pirnie, Inc. personnel or the Subcontractor to monitor organic vapor concentrations as specified in this plan and in the Subcontractor's Health and Safety Plan. Methane gas will be monitored with the "combustible gas" option on the explosimeter/tritector or other appropriate instrument(s) in accordance with the drilling Subcontractor's Health and Safety Plan. Readings obtained in the breathing zone may be interpreted (with regard to other site conditions) as follows for on-site Malcolm Pirnie personnel:

- Total atmospheric concentrations of unidentified vapors or gases ranging from 0 to background on the Hnu - Continue Operations Under Level D (see Attachment 1).

- Total atmospheric concentrations of unidentified vapors or gases yielding sustained readings above background to 3 ppm on the Hnu (vapors not suspected of containing high levels of chemicals toxic to the skin) - Continue Operations Under Level C (see Attachment 1).

- Total atmospheric concentrations of unidentified vapors or gases yielding sustained readings of 3 to 30 ppm above background on the Hnu - continue operations under Level B (see Attachment 1), re-evaluate and alter (if possible) Work Plan to achieve lower vapor concentrations.

- Total atmospheric concentrations of unidentified vapors or gases above 30 ppm on the Hnu - discontinue engineering operations and exit the work zone immediately.

The explosimeter will be used to monitor levels of both combustible gases and oxygen during drilling and/or test pit excavation activities. Action levels based on the instrument readings shall be as follows:

- Less than 10% LEL - Continue drilling or test pit excavation operations with caution.

- 10-25% LEL - Continuous monitoring with extreme caution, determine source/cause of elevated readings.

- Greater than 25% of LEL - Explosion hazard; evaluate source and leave the work zone.

- Less than 19.5% oxygen - Leave work zone immediately.

- 19.5% to 25% oxygen - Continue drilling or test pit excavation with caution.

- Greater than 25% oxygen - Fire hazard potential; Leave work zone immediately.

The radiation meter (RAD-Mini) will be used by Malcolm Pirnie to monitor for potential exposure to radiation on-site. Action levels based on instrument readings shall be as follows:

- Less than 0.5 mR/hr work may continue.
- Greater than 0.5 mR/hr and less than 1 mR/hr, notify Corporate Health and Safety Officer and Corporate Health Physicist. Continue monitoring.
- Greater than 5 mR/hr, Radiation Work Zone. Work must stop.

Readings with the explosimeter, radiation meter, and organic vapor analyzer will be recorded and documented in the Health and Safety logbook. All instruments will be calibrated before use and the procedure will be documented in the Health and Safety logbook.

7.2.2 Community Air Monitoring

Real-time air monitoring for volatile compounds and particulate levels will be performed at the perimeter of the work area . For purposes of this monitoring activity, the perimeter of the work areas are determined to be 50 feet from the outside edge of the excavation or boring. Air monitoring will include the following:

- Volatile organic compounds will be monitored at the downwind perimeter of the work area daily at 2-hour intervals. If total organic vapor levels at the downwind perimeter exceed 5 ppm above background, work activities will be halted and monitoring continued under the provisions of a Vapor Emission Response Plan. All readings will be recorded and be available for New York State (DEC and DOH) personnel to review.

7.2.2.1 Vapor Emission Response Plan

If the ambient air concentration of organic vapors exceeds 5 ppm above background at the perimeter of the work area, activities will be halted and monitoring continued. If the organic vapor level decreases below 5 ppm above background, work activities can resume but more frequent intervals of monitoring, as directed by the Site Health and Safety Coordinator must be conducted. If the organic vapor levels are greater than 5 ppm over background but less than 25 ppm over background at the perimeter of the work area, activities can resume, provided:

- the organic vapor level 200 feet downwind of the work area or half the distance to the nearest residential or commercial structure, whichever is less, is below 5 ppm over background, and
- more frequent intervals of monitoring, as directed by the Safety Officer, Are conducted.

If the organic vapor level is above 25 ppm at the perimeter of the work area, activities will be shut down. When work shutdown occurs, downwind air monitoring as directed by the Site Health and Safety Coordinator will be implemented to ensure that vapor emission does not impact the nearest residential or commercial structure at levels exceeding those specified in the Major Vapor Emission section.

7.2.2.2 Major Vapor Emission

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

If, following the cessation of the work activities or as the result of an emergency, organic levels persist for more than 30 minutes above 5 ppm above background 200 feet downwind or half the distance to the nearest residential or commercial property from the work area, then the air quality will be monitored within 20 feet of the perimeter of the nearest residential or commercial structure (20-Foot Zone).

If efforts to abate the emission source are unsuccessful and if any of the following levels persist for more than 30 minutes in the 20-Foot Zone, then the Major Vapor Emission Response Plan will be placed into effect if organic vapor levels are approaching 5 ppm above background. However, the Major Vapor Emission Response Plan will be immediately placed into effect if organic vapor levels are greater than 10 ppm above background.

7.2.2.3 Major Vapor Emission Response Plan

Upon activation, the following activities will be undertaken:

1. Emergency Response Contacts as listed in the Health and Safety Plan of the Work Plan will go into effect.

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

3. 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 Site Health and Safety Coordinator.

8.0 HEAT/COLD STRESS MONITORING

Since some of the work activities at the Botanical Gardens/Holiday Park Sites will be scheduled for both the summer and winter months, measures will be taken to minimize heat/cold stress to Malcolm Pirnie employees. Malcolm Pirnie's Site Health and Safety Technician or designee will be responsible for monitoring Malcolm Pirnie employees' for symptoms of heat/cold stress.

8.1 HEAT STRESS MONITORING

Personal protective equipment may place an employee at risk of developing heat stress, probably one of the most common (and potentially serious) illnesses encountered at hazardous waste disposal sites. The potential for heat stress is dependent on a number of factors, including environmental conditions, clothing, workload, physical conditioning and age. Personal protective equipment may severely reduce the body's normal ability to maintain equilibrium (via evaporation, convection and radiation), and by its bulk and weight increases energy expenditure.

Proper training and preventive measures will aid in averting loss of worker productivity and serious illness. Heat Stress prevention is particularly important because once a person suffers from heat stroke or heat exhaustion, that person may be predisposed to additional heat related illness. To avoid heat stress, the following steps should be taken:

- Adjust work schedules.
- Modify work/rest schedules according to monitoring requirements.
- Mandate work shutdowns as needed.
- Perform work during cooler hours of the day, if possible, or at night if adequate lighting can be provided.
- Provide shelter (air-conditioned, if possible) or shaded areas to protect personnel during rest periods.

- Maintain worker's body fluids at normal levels. This is necessary to ensure that the cardiovascular system functions adequately. Daily fluid intake must approximately equal the amount of water lost in sweat, i.e., eight fluid ounces (0.23 liters) of water must be ingested for approximately ever eight ounces (0.23kg) of weight lost. The normal thirst mechanism is not sensitive enough to ensure that enough water will be drunk to replace lost sweat. When heavy sweating occurs, encourage the worker to drink more. The following strategies may be useful:

  - Maintain water temperature to 59 to 60 degrees Fahrenheit.
  - Provide disposable cups that hold about 4 ounces (0.1 liter).
  - Have workers drink 16 ounces (0.5 liters) of fluid (preferably water or diluted drinks) before beginning work.
  - Urge workers to drink a cup or two every 15 to 20 minutes, or at each monitoring break a total of 1 to 1.6 gallons (4 to 6 liters) of fluid per day are recommended, but more may be necessary to maintain body weight.

Train workers to recognize symptoms of heat related illness. The signs and symptoms of heat stress are as follows:

- Heat rash may result from continuous exposure to heat or humid air.
- Heat cramps are caused by heavy sweating with inadequate electrolyte replacement. Signs and symptoms include:
  - muscle spasms
  - pain in the hands, feet and abdomen
- Heat exhaustion occurs from increased stress on various body organs including inadequate blood circulation due to cardiovascular insufficiency or dehydration. Signs and symptoms include:
  - pale, cool, moist skin
  - heavy sweating
  - dizziness
  - nausea
  - fainting
- Heat stroke is the most serious form of heat stress. Temperature regulation fails and the body temperature rises to critical levels. Immediate action must be taken to cool the body before serious injury and death occur. Competent medical help must be obtained. Signs and symptoms are:

- red, hot, usually dry skin
- lack of or reduced perspiration
- nausea
- dizziness and confusion
- strong, rapid pulse
- coma

The monitoring of personnel wearing protective clothing should commence when the ambient temperature is 70 degrees Fahrenheit or above. For monitoring the body's recuperative ability to excess heat, one or more of the following techniques should be used as a screening mechanism.

- Heart rate may be measured by the radial pulse for 30 seconds as early as possible in the resting period. The rate at the beginning of the rest period should not exceed 110 beats per minute. If the rate is higher, the next work period should be shortened by 10 minutes (or 33%), while the length of the rest period stays the same. If the pulse rate is 100 beats per minute at the beginning of the next rest period, the following work cycle should be further shortened by 33%.

- Body temperature may be measured orally with a clinical thermometer as early as possible in the resting period. Oral temperature at the beginning of the rest period should not exceed 99.6 degrees Fahrenheit. If it does, the next work period should be shortened by 10 minutes (or 33%), while the length of the rest period stays the same. However, if the oral temperature exceeds 99.6 degrees Fahrenheit at the beginning of the next period, the following work cycle may be further shortened by 33%. Oral temperature should be measured again at the end of the rest period to make sure that it has dropped below 99.6 degrees Fahrenheit. No Malcolm Pirnie employee will be permitted to continue wearing semipermeable or impermeable garments when his/her oral temperature exceeds 100.6 degrees Fahrenheit.

8.2 COLD STRESS MONITORING

Exposure to cold conditions may result in frostbite or hypothermia, each of which progresses in stages as shown below.

- **Frostbite** occurs when body tissue (usually on the extremities) begins to freeze. The three states of frostbite are:

1) **Frostnip** - This is the first stage of the freezing process. It is characterized by a whitened area of skin, along with a slight burning or painful sensation. Treatment consists of removing the victim from the cold conditions, removal of boots and gloves, soaking the injured part in warm water (102 to 108 degrees Fahrenheit) and drinking a warm beverage.

2) **Superficial Frostbite** - This is the second stage of the freezing process. It is characterized by a whitish-grey area of tissue which will be firm to the touch but will yield little pain. Treatment is identical to that for Frostnip.

3) **Deep Frostbite** - In this final stage of the freezing process the affected tissue will be cold, numb and hard, and will yield little to no pain. Treatment is identical to that for Frostnip.

- **Hypothermia** occurs when the body loses heat faster than it can produce it. The stages of hypothermia (which may not be clearly defined or visible at first) are the following:

1) Shivering
2) Apathy (a change to a disagreeable mood)
3) Unconsciousness
4) Bodily freezing
5) Death (if untreated)

Treatment of hypothermia is given below:

- Remove the victim from the cold environment and remove wet or frozen clothing. (Do this carefully as frostbite may have started.)

- Perform active re-warming with hot liquids for drinking (Note: do **not** give the victim any liquid containing alcohol or caffeine in this case) and a warm water bath (102 to 108 degrees Fahrenheit)

- Perform passive re-warming with a blanket or jacket wrapped around the victim.

In any potential cold stress situation, it is the responsibility of the Site Health and Safety Officer to encourage the following:

- Education of workers to recognize the symptoms of frostbite and hypothermia.
- Workers should dress warmly, with more layers of thin clothing as opposed to one thick layer.
- Personnel should remain active and keep moving.
- Personnel should be allowed to take shelter in a heated area, as necessary.
- Personnel should drink warm liquids (no caffeine or alcohol if frostbite has set in).

For monitoring the body's recuperation from excess cold, oral temperature readings should occur:

- At the Site Safety Technician's discretion when suspicion is based on changes in worker's performance or mental status.
- At workers request.
- As a screening measure, two times per shift, under unusually hazardous conditions (e.g., wind chill less that 20 degrees Fahrenheit or wind chill less than 30 degrees Fahrenheit with precipitation).
- As a screening measure whenever any one worker on site develops hypothermia.

Any person developing moderate hypothermia (a core body temperature of 92 degrees Fahrenheit) cannot return to work for 40 hours.

9.0 WORK ZONES AND SITE CONTROL

Work zones around the areas designated for drilling and sample collection will be established by the Subcontractor on a daily basis and communicated to all employees and other site users by the Subcontractor's Site Health and Safety Officer. It shall be the Subcontractor's Site Health and Safety Officer's responsibility to ensure that all site workers are aware of the work zone boundaries and to enforce proper procedures in each area. The zones will include:

- **Exclusion Zone ("Hot Zone")** - the area where contaminated materials may be exposed, excavated or handled and all areas where contaminated equipment or personnel may travel. The zone will be delineated by snow-type fencing. All personnel entering the Exclusion Zone must wear the prescribed level of personal protective equipment identified in Section 7.0;

- **Contamination Reduction Zone** - the zone where decontamination of personnel and equipment takes place. Any potentially contaminated clothing, equipment and samples must remain in the Contamination Reduction Zone until decontaminated;

- **Support Zone** - the part of the site which is considered non-contaminated or "clean". Support equipment will be located in this zone, and personnel may wear normal work clothes within this zone.

Access of non-essential personnel to the Exclusion and Contamination Reduction Zones will be strictly controlled by the Subcontractor. Only personnel who are essential to the completion of the task will be allowed access to these areas and only if they are wearing the prescribed level of protection. Entrance of all personnel must be approved by the Subcontractor's Site Health and Safety Officer. Local persons and/or regulatory personnel who have been denied access will be directed to the public information officer.

During drilling operations, the exclusion zone will include the area immediately upwind of the borehole. Site workers will bring split-spoons into this zone. Sample collection and logging of soil-core samples will be completed in this zone.

A log containing the names of workers and their level of protection will be maintained by the Subcontractor(s).

The zone boundaries may be changed by Malcolm Pirnie's Site Health and Safety Officer as environmental conditions warrant, and to respond to the necessary changes in work locations on-site.

10.0 DECONTAMINATION PROCEDURES

10.1 PERSONAL DECONTAMINATION FOR MPI EMPLOYEES

The degree of decontamination required is a function of both a particular task and the physical environment within which it takes place. The following decontamination procedure, although somewhat specific to the tasks described herein, will remain flexible, thereby allowing the decontamination crew to respond appropriately to the changing environmental conditions which may arise at the site. The procedure shall be followed by all Malcolm Pirnie personnel who are on the site.

Station 1: Equipment Drop-	1. Deposit Equipment used on-site (tools, containers, monitoring instruments, radios, clipboards, etc.) on plastic drop cloths. Segregation at the drop reduces the probability of cross contamination.
Station 2: Boots and Gloves Wash and Rinse	2. Scrub outer boots and outer gloves with decon solution or detergent water. Rinse off using copious amounts of water.
Station 3: Tape, Outer Boot and Glove Removal	3. Remove tape, outer boots and gloves. Deposit tape and gloves in container provided by Subcontractor.
Station 4: Canister or Mask Change	4. If worker leaves exclusive zone to change canister (or mask), this is the last step in the decontamination procedure. Worker's canister is exchanged, new outer gloves and boot covers donned, and worker returns to duty.
Station 5: Outer Garment Removal	5. Protective suit removed and deposited in separate container provided by Subcontractor(s).

Station 6: Face Piece, Hard Hat, Safety Goggles Removal	6. Face piece or safety glasses removed (if used). Avoid touching face with fingers. Facepiece and/or safety glasses deposited on plastic sheet. Hard hat removed and placed on plastic sheet.
Station 7: Inner Glove Removal	7. Inner gloves are the last personal protective equipment to be removed. Avoid touching the outside of the gloves with bare fingers. Dispose of these gloves in container provided by Subcontractor.

10.2 DECONTAMINATION FOR MEDICAL EMERGENCIES

In the event of a minor, non-life threatening injury, personnel should follow the decontamination procedures as defined, and then administer first-aid.

In the event of a major injury or other serious medical concern (i.e., heat stroke), immediate first-aid is to be administered and the victim transported to the hospital in lieu of further decontamination efforts unless exposure to a site contaminant would be considered "Immediately Dangerous to Life or Health."

10.3 DECONTAMINATION OF FIELD EQUIPMENT

Decontamination of heavy equipment will be conducted by the Subcontractor(s) at an off-site location to be determined, within a 2-mile radius of the project site in accordance with his approved Health and Safety Plan. Heavy equipment and tools used during drilling/ excavating and monitoring well installation activities including spoons and augers will be wrapped in plastic prior to transportation to the off-site decontamination pad. Decontamination water will be prevented from moving outside the decontamination pad and will be transferred to a holding tank. The Subcontractor(s) Health and Safety Officer will make daily inspections to determine that this procedure is being followed.

Decontamination of all tools used for sample collection purposes will be conducted by Malcolm Pirnie personnel. Decontamination fluids will be containerized and prepared for proper off-site disposal. Decontamination of all bailers, split-spoons, spatula knives, and other tools used for multi-media environmental sampling and examination shall be as follows:

- disassemble the equipment;
- water wash to remove all visible foreign matter;
- wash with detergent;
- rinse all parts with distilled-deionized water;
- allow to air dry; and
- wrap all parts in aluminum foil or polyethylene to prevent contamination of clean equipment.

11.0 FIRE PREVENTION AND PROTECTION

11.1 GENERAL APPROACH

Recommended practices and standards of the National Fire Protection Association (NFPA) and other applicable regulations will be followed in the development and application of Project Fire Protection Programs. When required by regulatory (DEC) authorities, the project management will prepare and submit a Fire Protection Plan for the approval of the contracting officers, authorized representative or other designated official. Essential considerations for the Fire Protection Plan will include:

- Proper site preparation and safe storage of combustible and flammable materials;
- Availability of coordination with private and public fire authorities;
- Adequate job-site fire protection and inspections for fire prevention; and
- Adequate indoctrination and training of employees.

11.2 EQUIPMENT AND REQUIREMENTS

- Fire extinguishers will be provided by the Subcontractor(s);
- Fire extinguishers will be inspected, serviced, and maintained in accordance with the manufacturer's instructions. As a minimum, all extinguishers shall be checked monthly and weighed semi-annually, and recharged if necessary; and
- Immediately after each use, fire extinguishers will be either recharged or replaced.

11.3 FLAMMABLE AND COMBUSTIBLE SUBSTANCES

- All storage, handling or use of flammable and combustible substances will be under the supervision of qualified persons; and

- All tanks, containers and pumping equipment, whether portable or stationary, which are used for the storage and handling of flammable and combustible liquids, will meet the recommendations of the National Fire Protection Association.

- If the LEL exceeds 10% for any compound, fans will be used to dissipate volatile/combustible gases and to minimize the explosion hazard during drilling/excavation activities. In addition, % O_2/explosive gas monitoring will be conducted throughout the drilling/excavation operations.

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12.0 EMERGENCY INFORMATION

In accordance with OSHA 29 CFR Part 1910, an Emergency Response Plan is attached to this HASP as Attachment 2.

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ATTACHMENT 1
PROTECTION ENSEMBLES

MALCOLM PIRNIE

ATTACHMENT 1
PROTECTION ENSEMBLES

Equipment designed to protect the body against contact with known or anticipated chemical hazards have been divided into four categories according to the degree of protection afforded:

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

- Level B: Should be selected when the highest level of respiratory protection is needed, but a lesser level of skin protection is required; Level B protection is the minimum level recommended on initial site entries until the hazards have been further defined by on-site studies.

- Level C: Should be selected when the types of airborne substances are known, the concentrations have been measured and the criteria for using air-purifying respirators are met. In atmospheres where no airborne contaminants are present, Level C provides dermal protection only.

- Level D: Should not be worn on any site with respiratory or skin hazards. This is primarily a work uniform providing minimal protection.

The level of protection selected is based primarily on:

- Types and measured concentrations of the chemical substances in the ambient atmosphere and their associated toxicity; and

- Potential or measured exposure to substances in air, splashes of liquids or other indirect contact with material due to the task being performed.

In situations where the types of chemicals, concentrations, and possibilities of contact are not known, the appropriate level of protection must be selected based on professional experience and judgement until the hazards may be further characterized. The individual components of clothing and equipment must be assembled into a full protective ensemble to protect the worker from site-specific hazards, while at the same time minimizing hazards and drawbacks of the personal protective gear itself. Ensemble components based on the

widely used USEPA Levels of Protection are detailed below for levels B, C, and D protection.

Level B Protection Ensemble

Recommended

- Pressure-demand, full-face piece self-contained breathing apparatus (MSHA/NIOSH approved) or pressure-demand supplied-air respirator with escape SCBA;
- Saranex chemical-resistant clothing (overalls and long-sleeved jacket; hooded one- or two-piece chemical splash suit; disposable chemical-resistant one-piece suit); disposable chemical-resistant one-piece suit);
- Inner and outer chemical resistant gloves (silver shell);
- Chemical-resistant latex safety boots/shoes; and
- Hard hat.

Optional

- Coveralls.
- Disposable boot covers.
- Face shield.
- Long cotton underwear.

Meeting any one of the following criteria warrant the use of Level B protection:

The types and atmospheric concentrations of toxic substances have been identified and require the highest level of respiratory protection, but a lower level of skin and eye protection. These would be atmospheres:

- with concentrations Immediately Dangerous to Life and Health (IDLH)
- exceeding limits of protection afforded by a full-face air-purifying mask;
- containing substances for which air-purifying canisters do not exist or have low removal efficiency;

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

- containing less than 19.5% oxygen; or

- with evidence of incompletely identified vapors or gases as indicated by direct reading organic vapor detection instrument, but those vapors and gases are not suspected of containing high levels of chemicals harmful to skin or capable of being absorbed through the intact skin.

Level B equipment provides a high level of protection to the respiratory tract, but a somewhat lower level of protection to skin. The chemical-resistant clothing required in Level B is available in a wide variety of styles, materials, construction detail and permeability. These factors all affect the degree of protection afforded. Therefore, a specialist should select the most effective, chemical-resistant clothing based on the known or anticipated hazards and task. Level B skin protection is selected by:

- Comparing the concentrations of identified substances in the air with skin toxicity data;

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

Level C Protection Ensemble

Recommended:

- Full-face piece, air-purifying respirator equipped with MSHA and NIOSH approved organic vapor/acid gas/dust/mist combination cartridges or as designated by the Health and Safety Officer;

- Chemical-resistant clothing (polycoated Tyvek overalls and long-sleeved jacket, hooded, one- or two-piece chemical splash suit or disposable chemical-resistant one-piece suit);

- Inner and outer chemical-resistant gloves (butyl/nitrile);

- Chemical-resistant latex safety boots/shoes; and

- Hardhat.

Optional:

- Coveralls;
- Disposal boot covers;
- Face shield;
- Escape mask;
- Long cotton underwear.

The use of Level C protection is permissible upon satisfaction of these criteria:

- Measured air concentrations of identified substances will be reduced by the respirator to below the substance's permissible exposure limit (PEL), threshold limit value (TLV), and/or the concentration is within the service limit of the cartridge;

- Atmospheric contaminant concentrations do not exceed IDLH levels; and

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

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 an air-purifying device. The device (when required) must be an air purifying respirator (MSHA/NIOSH approved) equipped with filter cartridges. Cartridges must be able to remove the substances encountered. Respiratory protection will be used only with proper fitting, training and the approval of a qualified individual. In addition, an air-purifying respirator can be used only if:

- Oxygen content of the atmosphere is at least 19.5% in volume;
- Substances are identified and concentrations measured;
- Substances have adequate warning properties;
- Individual passes a qualitative fit-test for the mask; and
- Appropriate cartridge/canister is used, and its service limit 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. Continual surveillance using direct-reading instruments is needed to detect any changes in air quality necessitating a higher level of respiratory protection.

Level D Protection Ensemble

Recommended:

- Protective coveralls (Tyvek);
- Safety boots/shoes;
- Safety glasses or chemical splash goggles;
- Hardhat;
- Nitrile gloves.

Optional:

- Escape mask;
- Face shield.

The use of Level D protection is permissible upon satisfaction of these criteria:

- No hazardous air pollutants have been measured; and
- Work functions preclude splashes, immersion or the potential for unexpected inhalation of any chemicals; and
- Atmospheric contains at least 19.5% oxygen.

Level D protection is primarily a work uniform. It can be worn in areas where only boots can be contaminated, or where there are no inhalable toxic substances.

MALCOLM PIRNIE

ATTACHMENT 2
EMERGENCY RESPONSE PLAN

MALCOLM PIRNIE

ATTACHMENT 2
EMERGENCY RESPONSE PLAN

Chain of Command

The following Malcolm Pirnie chain of command will be followed for any on-site emergency:

Rick Frappa, CPG
Judith Vangalio
Anne Marie McManus, P.E.
Mark McGowan

Communications

Internal emergency communication systems are used to alert workers to danger, convey safety information, and maintain site control. Any effective system can be employed. Two-way radio headsets or field telephones are often used when work teams are far from the command post. Hand signals and air-horn blasts are also commonly used. Every system must have a backup. It shall be the responsibility of the Site Health and Safety Officer to ensure that an adequate method of internal communication is understood by all personnel entering the site. Unless all personnel are otherwise informed, the following signals shall be used.

1) Emergency signals by portable air horn, siren, or whistle: two short blasts, personal injury; continuous blast, emergency requiring site excavation.

2) Visual signals: hand gripping throat, out of air/cannot breathe; hands on top of head, need assistance; thumbs up, affirmative/ everything is OK; thumbs down, no/negative; grip partner's wrist or waist, leave area immediately.

Emergency Telephone Numbers

MALCOLM PIRNIE PROJECT MANAGER:

Anne Marie McManus, P.E.	(716) 667-0900 (W) (716) 667-3018 (H)

MALCOLM PIRNIE

MALCOLM PIRNIE CORPORATE HEALTH AND SAFETY MANAGER:

Mark McGowan	Work: (914) 694-2100 After Hours: (800) 478-6870

MALCOLM PIRNIE SITE HEALTH AND SAFETY OFFICER:

Judith Vangalio	Work: (716) 667-0900 Home: (716) 662-5404

MALCOLM SITE SAFETY TECHNICIAN:

Rick Frappa	Work: (716) 667-0900 Home: (716) 662-6847

PUBLIC INFORMATION OFFICER:

Valerie Woodward	(518) 457-9538
DeGraff Memorial Hospital Emergency Room	(716) 690-2111

FIRE	911
AMBULANCE	911
POLICE	911

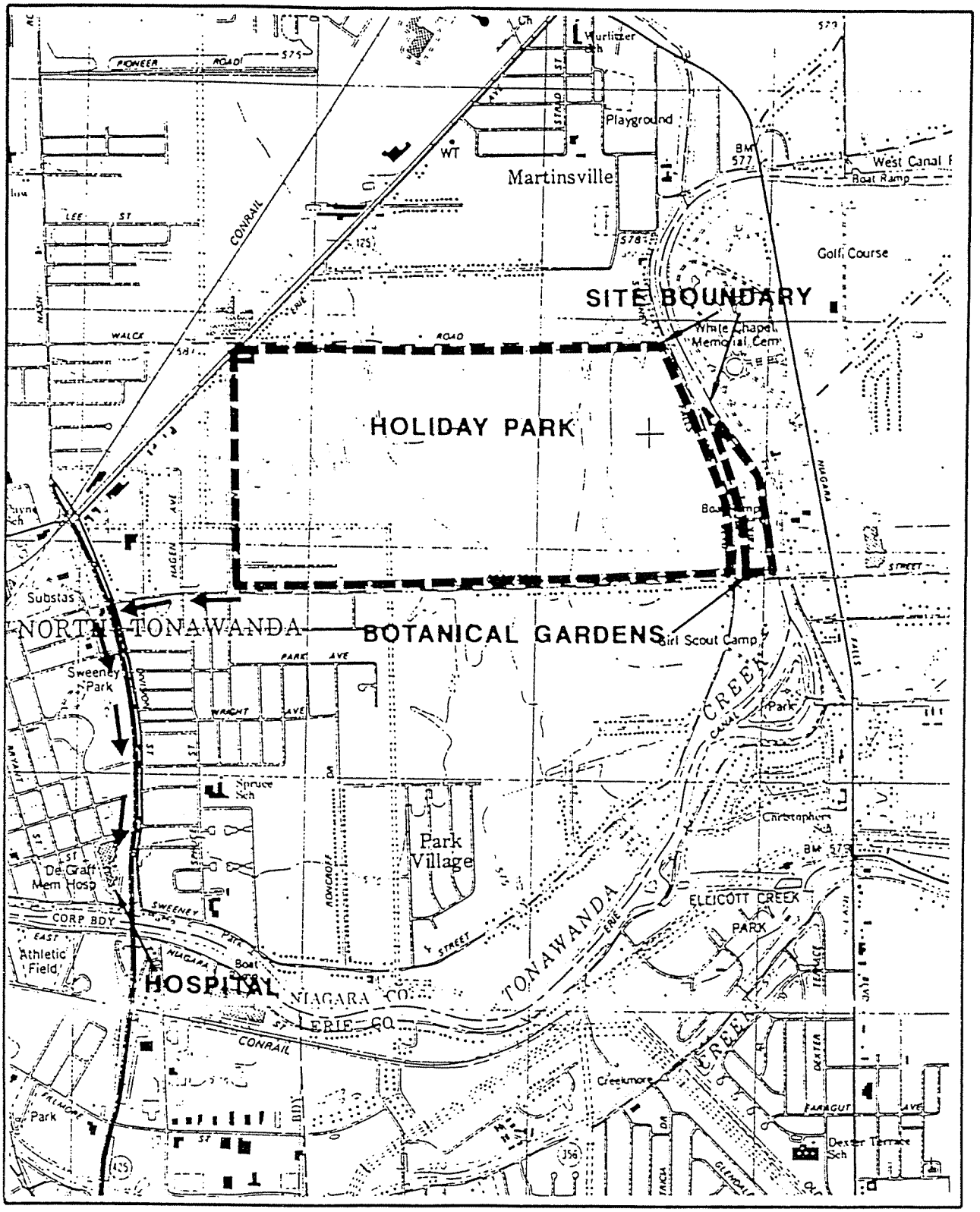
The site location is:
Holiday Park/Botanical Gardens
Old Falls Blvd. and Walck Rd.
North Tonawanda, NY

Directions to Hospital:

The following directions describe the most efficient route to DeGraff Memorial Hospital (see Figure B-1):

(1) From the Site, turn south onto Old Falls Blvd. and proceed to Robinson Road.
(2) Turn right onto Robinson Road and proceed west for approximately 1.5 miles to the Twin City Memorial Highway.
(3) Take Twin City Memorial Highway south to Tremont Road.

FIGURE 8-1



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MALCOLM PIRNIE

BOTANICAL GARDENS/ HOLIDAY PARK SITE
PRELIMINARY SITE ASSESSMENT

ROUTE TO HOSPITAL

DWG NO. 0266F0B1

NYSDEC

APRIL 1997

(4) The hospital is at the junction of Tremont Ave and Twin City Memorial Highway.

Personnel Exposure

- Skin contact: Use copious amounts of soap and water. Wash/rinse affected area for at least 15 minutes. Decontaminate and provide medical attention. Eyewash stations will be provided on site. If necessary, transport to DeGraff Memorial Hospital.

- Inhalation: Move to fresh air and, if necessary, transport to DeGraff Memorial Hospital.

- Ingestion: Decontaminate and transport to DeGraff Memorial Hospital.

Personal Injury

Minor first-aid will be applied on-site as deemed necessary. In the event of a life threatening injury, the individual should be transported to DeGraff Memorial Hospital via ambulance. The Malcolm Pirnie and contractor Health and Safety Officers will supply available chemical specific information to appropriate medical personnel as requested.

Malcolm Pirnie first aid kits will conform to Red Cross and other applicable good health standards, and shall consist of a weatherproof container with individually-sealed packages for each type of item. First aid kits will be fully equipped before being sent out on each job and will be checked weekly by the On-Site Safety Technician to ensure that the expended items are replaced.

Adverse Weather Conditions

In the event of adverse weather conditions, the Malcolm Pirnie Site Safety Technician in conjunction with the Malcolm Pirnie Health and Safety Officer will determine if engineering operations can continue without sacrificing the health and safety of Malcolm Pirnie employees. Some of the items to be considered prior to determining if work should continue are:

- Potential for heat/cold stress;
- Inclement weather - related working conditions;
- Limited visibility; and
- Potential for electrical storms.

Evacuation

In the event that an area must be evacuated due to an emergency, such as a chemical spill or a fire, workers shall exit upwind, if possible. Since work conditions and work zones within the site may be changing on daily basis, it shall be the responsibility of the Site Health and Safety Officer to review evacuation routes and procedures as necessary and to inform Malcolm Pirnie site workers of any changes.

Records and Reporting

It shall be the responsibility of each employer to establish and assure adequate records of all:

- Occupational injuries and illnesses;
- Accident investigations;
- Reports to insurance carrier or State compensation agencies;
- Reports required by client;
- Records and reports required by local, state, federal and/or international agencies;
- Property or equipment damage;
- Third party injury or damage claims;
- Environmental testing logs;
- Explosive and hazardous substances inventories and records;
- Records of inspections and citations;
- Related correspondence; and
- Safety training.