ERM-Northeast

5500 Main Street
Williamsville, NY 14221
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May 26, 1994

Mr. Dixon Rollins, P.E.
NYSDEC
6274 East Avon-Lima Road
Avon, New York 14414

ERM

RE: Remedial Action Plan for the Gleason Works Former Waste Storage Area

Dear Mr. Rollins:

Enclosed are two copies of the above-referenced Remedial Action Plan (RAP) for your review and comment. As discussed with you on May 25, 1994, due to unanticipated PCB and VOC concentrations detected in the soil samples from beneath the former waste storage area, it was necessary to prepare a RAP that provided a more detailed remedial approach than that outlined in the October 1993 Closure Plan. This RAP includes a discussion of the sampling and testing program completed in accordance with the Closure Plan, our proposed supplemental sampling and testing program and our proposed remedial approach.

As discussed with you, the RAP includes a revised implementation schedule for remediation of the former storage area. This revised schedule extends the completion of remediation beyond the completion date contemplated in the Closure Plan. However, it is Gleason's desire to implement the RAP as soon as we receive your comments. Thus, we would appreciate an expeditious review of this RAP.

If you have any questions regarding the RAP, please do not hesitate to contact me at (716) 633-5920.

Very truly yours,

Jeffrey A. Wittlinger, P.E, DEE
Group Manager, Engineering

REMEDIAL ACTION PLAN FOR THE GLEASON WORKS FORMER WASTE STORAGE AREA

Prepared For:

The Gleason Works
1000 University Avenue
P.O. Box 22970
Rochester, New York 14692

May, 1994

ERM-NORTHEAST, INC.
5500 Main Street
Williamsville, New York 14221

687.003

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REMEDIAL ACTION PLAN FOR THE GLEASON WORKS
FORMER WASTE STORAGE AREA

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1.0 INTRODUCTION

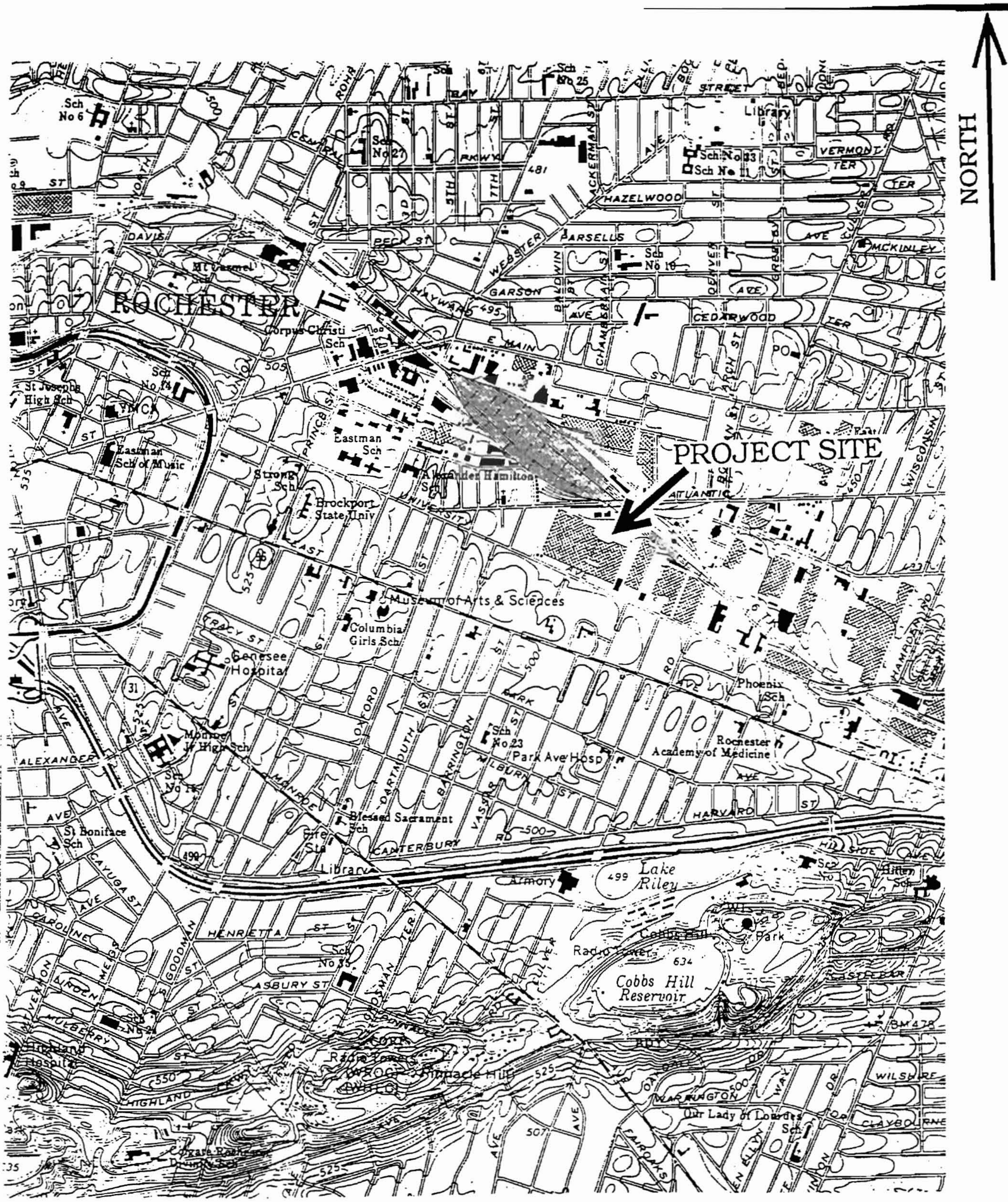
This Remedial Action Plan (RAP) was prepared by ERM-Northeast, Inc. (ERM) for The Gleason Works (Gleason) to summarize the results of the recently completed sampling and analysis program and to guide the remediation of the former waste storage area at Gleason's 1000 University Avenue, Rochester, New York facility. This RAP was prepared subsequent to completion of the field investigation program and, thus, provides a more complete description of the remedial approach discussed in the NYSDEC-approved October, 1993 Closure Plan.

1.1 Site Description

The Gleason facility at 1000 University Avenue (hereafter referred to as "the site") is located within the eastern portion of the City of Rochester, Monroe County, New York (Figure 1-1). The 20.4 acre site is bordered to the north by the New York Central Railroad and Atlantic Avenue, to the east by Buckingham Properties, to the west by Russell Street and to the south by University Avenue (Figure 1-2). The perimeter of the site is fenced, and guards are present at the entrance gates during working and non-working hours. The Gleason facility manufactures machinery that is used world-wide by the automotive and aerospace industries.

1.2 Regulatory Issues

Gleason applied for a Treatment, Storage and Disposal Facility (TSDF) permit in 1981 in order to allow accumulation of hazardous wastes in its waste storage area (see Figure 1-2) for greater than 90 days. In 1984, Gleason submitted a written request to the United States Environmental Protection Agency (USEPA) for a Part B denial/Part A withdrawal. Based upon



NOTES:

1) FIGURE ADAPTED FROM USGS ROCHESTER EAST QUADRANGLE MAP, 1978.

2) APPROXIMATE SCALE: 1 CM. = 240 METERS

TITLE

FIGURE 1-1
SITE LOCATION PLAN

PREPARED FOR

THE GLEASON WORKS

ERM-Northeast
Environmental Resources Management

SCALE	FIGURE
DATE	

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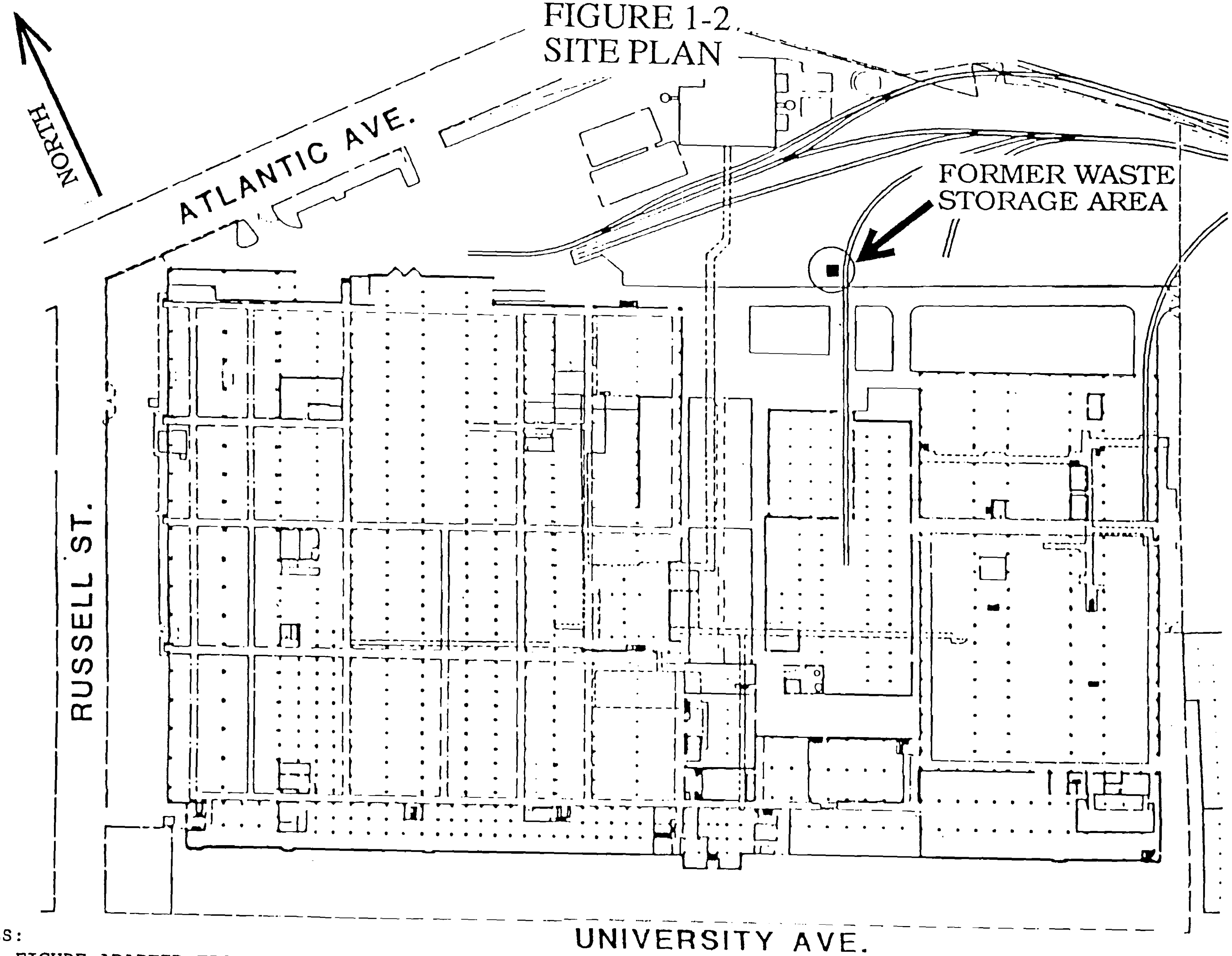
FIGURE 1-2
SITE PLAN



NOTES:
1) FIGURE ADAPTED FROM LOZIER SITE PLAN, SEPTEMBER 1989.
2) DRAWING NOT TO SCALE.

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subsequent conversations between NYSDEC and Gleason, Gleason was reclassified by NYSDEC as a hazardous waste Generator at that time.

As a Generator, Gleason accumulated drums of waste in the storage area for less than 90 days prior to off-site disposal. Additionally in 1984, Gleason submitted a preliminary Closure Plan for its storage area. This plan was approved by NYSDEC; however, an implementation schedule was not prepared at that time because the storage area was being used by Gleason for (less than) 90 day storage.

The USEPA performed a Corrective Action Prior to Loss of Interim Status (CAPTLOIS) inspection at the facility in 1989. The USEPA investigated the entire facility including the waste storage area and concluded that there were no known or suspected releases from the storage area. See March, 1989 USEPA CAPTLOIS report.

Gleason has recently taken steps to close its former storage area because the area is no longer used for accumulation of wastes. Gleason retained ERM to prepare a Closure Plan for submittal to NYSDEC. NYSDEC approved the Closure Plan in December 1993 and, following the public comment period, Gleason initiated a field sampling and testing program to delineate the area requiring remediation. This RAP addresses the findings of the sampling effort and evaluates remedial alternatives for the closure/remediation of the area.

1.3 *Remedial Action Plan Overview*

This RAP is presented for use by project personnel and will supplement the October 1993 Closure Plan to guide the project through closure of the former storage area. Overall, the RAP includes a description of the following:

- Background Information;
- Field Sampling and Analytical Testing Program;
- Delineation of the Area Requiring Remediation;
- Evaluation of Closure Alternatives;
- Closure of the Storage Area; and
- Implementation Schedule.

A Health and Safety Plan (HASP) will also be prepared and submitted to NYSDEC following selection of the remedial contractor and will be based upon the results of the sampling and testing program included herein. The HASP will be implemented by on-site personnel (i.e., in the vicinity of the work area) during implementation of the Closure Plan. Based upon the known materials previously stored in the storage area, it is currently anticipated that potential volatile organic concentrations will be monitored using a Photoionization Detector (PID) and that dust will be monitored using a mini-RAM particulate meter. Additionally, oxygen and explosivity will be monitored during remediation activities as a precautionary measure.

2.0 BACKGROUND INFORMATION

2.1 *Former Storage Area Description*

Gleason formerly used an area approximately 25 foot by 27 foot (675 sq.-ft.) for the accumulation and storage of drummed hazardous waste prior to off-site disposal. This area was located on a concrete pad, approximately 41 foot by 42 foot (1,722 sq.-ft.). During operation, the storage area was bermed and covered with a layer of flyash which was a byproduct of the coal burning process at the on-site Power House. This flyash layer was subsequently removed and is currently staged on plastic sheeting in an area adjacent to the former storage area. During the period when the area was used for waste accumulation (1981 through 1990), a chain barrier surrounded the area and "Hazardous Waste" and "No Smoking" warning signs were placed there.

2.2 *Former Waste Handling Activities*

Hazardous wastes were generated on-site by manufacturing processes. Satellite accumulation drums were filled at the point of waste generation and moved to the storage area using a Hyster forklift. See Table 2-1 for a list of hazardous wastes typically generated/stored. These wastes were consolidated in 55-gallon drums at the storage area.

During operation, storage containers included New York State Department of Transportation (NYSDOT) - approved 55-gallon steel closed-top drums (17E, 17H, 37M and 6D type drums). Corrosives were stored in polyethylene-lined steel drums. Drums not suitable for transportation were overpacked inside 85-gallon drums. Most of the drums were obtained from Kaplan Container Corporation of East Rochester; however, some reclaimed drums were also used. These reclaimed drums were inspected prior to use. The drums were stored on pallets which were placed on the flyash that covered the concrete pad. The maximum accumulation in the waste storage area was 60 drums.

Table 2-1 includes a summary of the wastes formerly accumulated at the storage area. A more comprehensive summary is included in Appendix A. These wastes were shipped to the following facilities for treatment or disposal: Voelker Analysis (NYD 991291782), Frontier Chemical (NYD 043815703), Emergency Technical Services Corp. (NJD 000692053), CECOS International, Corp. (NYD 080336241) Detrex Corp. (MID 091605972, OHD 080158702), CyanoKem (MID 098011992), General Electric (NYD 067539940), Thermal KEM (SCD 044442333), ENSCO (ARD 069748192), Solvents and Petroleum Services, Inc. (NYD 013277454), Michigan Disposal (MID 000724831), Envirotek Ltd. (NYD 038641601), Environmental International Electric Services, Inc. (MOD 980973556), Transformer Service, Inc. (NHD 018902874) and Chemtron Corp. (OHD 066060609).

2.3 *Current Waste Handling Activities*

Hazardous wastes are currently stored for less than 90 days in a storage area located in the Annex Building. These wastes are manifested, transported and disposed in accordance with Federal and State regulations at approved off-site TSDFs. The NYSDEC inspects the present storage area periodically.

TABLE 2 - 1

Summary of Chemicals Stored in Former Waste Storage Area

Hazardous Waste	Content	EPA/NYSDEC Waste Code
Liquid	Copper, sodium, and nickel cyanides in basic solutions. Some common bases include sodium hydroxide and potassium hydroxide (Poison B)	D003
Liquid	Cadmium and copper cyanide in neutral solutions (Poison B)	D003
Liquid	Chromic acid and sulfuric acid (corrosive)	D002
Liquid	Spent halogenated solvents, trichloroethylene and trichloroethane, and methylene chloride with some contaminants amounting to less than 30% including phenol, formic acid, and dissolved rubber	F002
Liquid	Spent non-halogenated solvents, commonly found in paint, lacquer, and toner. Common constituents include alcohol, ketones, xylene, toluene, and naphtha. Small amounts of phthalate and carbon black (flammable and combustible liquids)	F005 D001
Liquid	Polychlorinated biphenyls (ORM-E)	B006
Solid	Chrome, copper, cyanide, lead, and barium sulfate and Speedi-dry (Poison B and ORM-E)	D005 D007
Miscellaneous	a. Copper plating solution filters (dry) (Poison B) b. Waste parcolene solution, manganese phosphate and tetrasodium pryosphosphate c. Wax contaminated with 1-2% chromium, copper and trichloroethylene (ORM-E)	

3.0 FIELD SAMPLING AND ANALYTICAL TESTING PROGRAM

Sampling activities were conducted on March 1 and 2, 1994 in accordance with the October, 1993 Closure Plan. The purpose of these activities was to delineate the extent of the analytes of concern in the flyash pile and in the storage area. Additionally, two background soil samples were collected for comparison purposes.

3.1 Test Borings

Eight test borings (see Figure 3-1) were drilled by Nothnagle Drilling of Scottsville, New York in and around the former storage area. The borings were installed using a CME truck-mounted drilling rig outfitted with a 3-7/8" rollerbit and advanced to a depth of six feet. Borings B-1 through B-4 were advanced near the corners of the former storage area and borings B-5 through B-8 were drilled through the concrete pad in the central portion of the storage area.

Split-spoon samples were collected from the borings with a 2 foot by 2 inch outside diameter (O.D.) split-spoon sampler using the Standard Penetration Test (SPT) in accordance with ASTM D1586. The four interior borings (B-5 through B-8) required rollerbit drilling through the concrete (approximately 6 inches thick) followed by split-spoon advancement. The concrete cuttings from B-5 through B-8 were collected and composited into a single sample. Drilling was unnecessary at borings B-1 through B-4 because the boreholes created by advancing the split-spoon sampler remained open to 6 feet during sample collection.

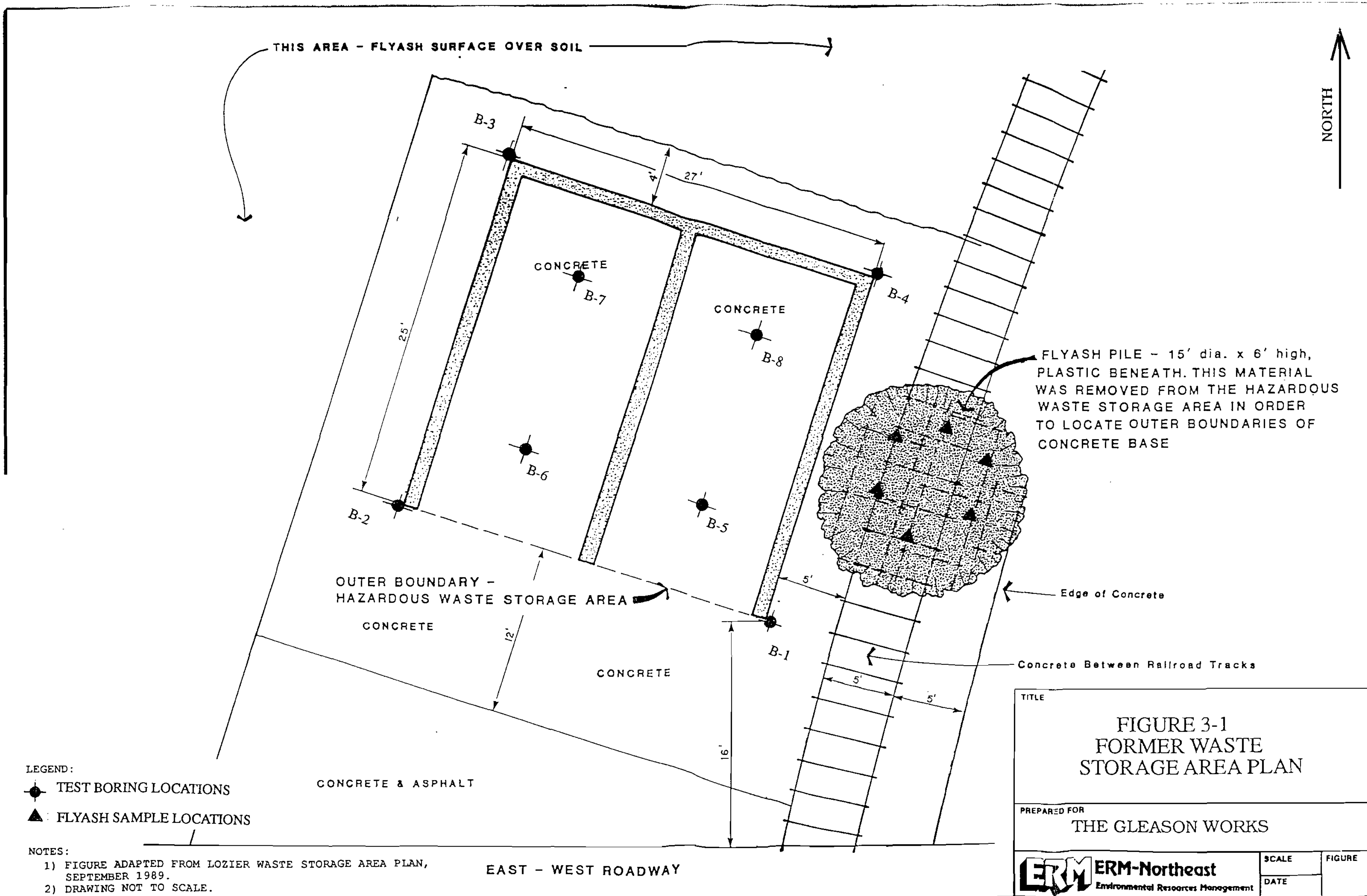


FIGURE 3-1
FORMER WASTE STORAGE AREA PLAN

A total of 24 soil samples were collected from the eight boring locations (i.e., 3 samples per boring) underneath or adjacent to the storage area. One split-spoon sample was collected from either the surface or from below the concrete(i.e., ground surface to 2 feet), a second sample was collected from 2 to 4 feet below the ground surface and a third sample from 4 to 6 feet. The samples were logged in the field by a geologist and boring logs are provided in Appendix B. The split-spoon samplers were decontaminated between samples using the following method:

1) Wash with Alconox detergent;
2) Rinse with clean potable water;
3) Rinse with methanol;
4) Rinse with deionized water; and
5) Air dry.

Each split-spoon soil sample was screened for volatile organic compounds (VOCs) using a Photovac Microtip MP-100 and was then deposited into pre-cleaned sample jars. PID readings ranged from no detection to approximately 30 parts per million (ppm). Samples for VOC analysis were collected first and the jars were filled to limit headspace in the sample. Following collection of the samples for VOC analysis, additional soil was collected for the other analytical tests. Occasionally there was not enough sample volume in a single split spoon to fill all the sample jars for a specific depth interval. In these cases additional sample volume was obtained by resampling the interval at a location immediately adjacent to the first location.

In accordance with the Closure Plan, samples from 0 to 2 feet were initially analyzed for TCL-volatiles (method 8240), polychlorinated biphenyls (method 8080), chromium, copper, lead, mercury, barium, cadmium, manganese and cyanide. Samples collected from greater depths were designated for laboratory extraction and holding. Based upon the results from the initial eight 0 to 2 foot samples, the samples from the 2 to 4 foot and 4 to 6 foot zones were also analyzed to complete the delineation of the soil.

3.2 *Flyash Pile Sampling*

Six (6) samples were collected from the flyash pile to provide sufficient sample distribution across the pile. At each location the existing plastic cover was cut with a knife, a sample was collected through the cover with a precleaned stainless steel spoon, and the hole was then resealed. The six samples were composited into 2 samples using dedicated aluminum pans (see Figure 3-1). The samples from the eastern side of the pile were composited into sample FP-1 and the samples from the western side were composited into sample FP-2. Both samples underwent Toxicity Characteristic Leaching Procedure (TCLP) analysis in accordance with the Closure Plan.

3.3 *Background Soil Sampling*

Two background surface soil samples were collected at the site. Sample BK-1 was located near the northeast corner of the site and was collected from 0 to 6 inches using a precleaned stainless steel spoon. BK-2 was located in a grassy area near the northeast corner of the Gate 4 guard station on Atlantic Avenue and was collected in the same manner. Both samples were analyzed for TCL volatiles, PCBs, chromium, copper, lead, mercury, barium, cadmium, manganese and cyanide.

3.4 *Sample Preparation and Delivery*

All samples were placed in appropriate sample jars and were stored in refrigerated coolers. Each sample was properly recorded on the chain of custody for tracking purposes. At the end of each day the coolers were hand-delivered to General Testing Corporation (GTC) laboratories in Rochester, New York.

3.5 *Analytical Testing*

The analytical testing program generally followed the Closure Plan. A summary of this program is provided below.

Sample Type	Analytical Test Method
Flyash Pile Samples	TCLP for Parameters on Table 3-1
Concrete Sample	TCLP for Parameters on Table 3-1
Storage Area Samples	TCL Volatiles, PCBs, chromium, copper, lead, mercury, barium, cadmium, manganese and cyanide. TCLP was only performed on samples B-5 and B-8, 0 to 2 feet, because these samples contained the highest total VOC concentrations.
Background Soil Samples	TCL Volatiles, PCBs, chromium, copper, lead, mercury, barium, cadmium, manganese and cyanide.

TABLE 3-1

TOXICITY CHARACTERISTIC CONSTITUENTS

Constituent	Regulatory Level (mg/l)
Arsenic	5.0
Barium	100.0
Benzene	0.5
Cadmium	1.0
Carbon Tetrachloride	0.5
Chlordane	0.03
Chlorobenzene	100.0
Chloroform	6.0
Chromium	5.0
o-Cresol	200.0
m-Cresol	200.0
p-Cresol	200.0
Cresol	200.0
2,4-D	10.0
1,4-Dichlorobenzene	7.5
1,2-Dichloroethane	0.5
1,1-Dichloroethylene	0.7
2,4-Dinitrotoluene	0.13
Endrin	0.02
Heptachlor	0.008
Hexachlorobenzene	0.13
Hexachloro-1,3-butadiene	0.5
Hexachloroethane	3.0
Lead	5.0
Lindane	0.4
Mercury	0.2
Methoxychlor	10.0
Methyl ethyl ketone	200.0
Nitrobenzene	2.0
Pentachlorophenol	100.0
Pyridine	5.0
Selenium	1.0
Silver	5.0
Tetrachloroethylene	0.7
Toxaphene	0.5
Trichloroethylene	0.5
2,4,5-Trichlorophenol	400.0
2,4,6-Trichlorophenol	2.0
2,4,5-TP (Silver)	1.0
Vinyl Chloride	0.2

The analytical testing was performed by GTC, a NYSDOH-approved laboratory. The laboratory Quality Assurance/Quality Control program consisted of a chronological summary and the laboratory blank analysis for the analysis date. Data validation was completed through a comparison of the analytical results from the soil samples with the trip blanks and method blanks, and by reviewing surrogate recovery data. Based on this comparison, the data appear to be valid.

4.0 DELINEATION OF AREA REQUIRING REMEDIATION

Tables 4-1 through 4-4 include a summary of the analytes detected in the samples collected during the sampling and testing program. The complete analytical data report was sent to NYSDEC in an April 21, 1994 transmittal.

4.1 Comparison of Data with Cleanup Levels

Table 4-1 provides a summary of the analytical testing results for the background samples (BK-1 and BK-2), the concrete composite sample (C-1) and the 0 to 2 foot soil samples from borings B-1 through B-8. Tables 4-2 and 4-3 provide summaries of the analytical testing results for the 2 to 4 foot soil samples and the 4 to 6 foot soil samples, respectively. Table 4-4 includes the analytical testing results for the TCLP analyses performed on the flyash pile composite samples (FP-1 and FP-2) and the two soil samples with the highest total VOC concentrations (i.e., B-5 and B-8, 0 to 2 feet)

Cleanup levels were developed based on the Recommended Soil Cleanup Objectives presented in the January 24, 1994 NYSDEC Technical and Administrative Guidance Memorandum (TAGM) HWR-94-4046: Determination of Soil Cleanup Levels. These cleanup levels are shown on Tables 4-1 through 4-3 and the analytes detected at levels exceeding these guidance values are identified on the tables. Cleanup levels for the metals were developed based upon the higher of the background soil sample results or the NYSDEC cleanup objective.

The vertical and lateral extent of the soil with analyte concentrations above the cleanup levels has not been completely delineated on all sides of the former storage area. Within the 0 to 2 foot zone, samples from B-1, B-2, B-3 and B-4 contained metals concentrations in excess of the metals cleanup levels

TABLE 4-1

ANALYTICAL TESTING DATA FROM 0 TO 2 FOOT SAMPLES
GLEASON WORKS RCRA PAD CLOSURE

PARAMETERS DETECTED	SAMPLE IDENTIFICATION NUMBER CONCENTRATION IN PPM											NYSDEC CLASS GA GW STD. (PPB)	NYSDEC REC. SOIL CLEANUP OBJECTIVE (PPM)
	BK-1	BK-2	C-1	B-1	B-2	B-3	B-4	B-5	B-6	B-7	B-8		
Barium	64.9	57	47.8	121	89.3	60.3	114	58	32.9	24.7	426	1000	300
Cadmium	ND	ND	ND	0.968	ND	ND	0.687	ND	ND	ND	ND	10	1
Chromium	15.2	18.3	15.4	43	21.9	31.9	737	14.7	8.58	7.51	689	50	18.3
Copper	34.9	30.5	22.1	117	19.3	439	297	187	15	11	113	200	34.9
Manganese	406	608	437	398	4700	352	220	294	404	293	381	300	608
Mercury	0.217	0.225	ND	0.648	0.192	0.132	0.076	0.296	0.184	0.103	0.251	2	0.225
Lead	42.9	46	ND	172	14.1	90.6	86.3	77.7	23.5	ND	165	25	46
Cyanide	ND	ND	ND	ND	ND	ND	ND	5.46	ND	ND	ND	0.1	Not Avail.
	CONCENTRATION IN PPB											(PPB)	(PPB)
Xylene	ND	ND	ND	9.5	ND	110	ND	ND	ND	ND	ND	5	1,200
Vinyl Chloride	ND	ND	ND	ND	180	91	ND	ND	95	ND	ND	2	200
Acetone	ND	ND	ND	ND	740	60	23	ND	ND	500	ND	Not Avail.	200
Methylene chloride	ND	10	22	ND	40	ND	ND	ND	35	ND	ND	5	100
1,1-Dichloroethane	ND	ND	ND	ND	160	140	ND	ND	290	180	ND	5	400
cis-1,2-Dichloroethene	ND	ND	ND	ND	180	99	ND	130,000	ND	ND	480,000	Not. Avail.	300
Trichloroethene	ND	ND	38	ND	ND	54	9	540,000	ND	ND	910,000	5	700
Toluene	ND	ND	ND	ND	ND	53	ND	ND	ND	ND	ND	5	1,500
1,1,1-Trichloroethane	ND	ND	ND	ND	ND	ND	ND	ND	32	ND	ND	5	800
4-Methyl-2-Pentanone	ND	ND	ND	ND	ND	ND	ND	ND	59	ND	ND	Not Avail.	Not Avail.
PCB 1254	ND	ND	4,700	ND	28,000	4,500	800	120,000	36,000	260,000	140,000	Not Avail.	10,000

NOTES:

[shaded box] = DETECTED ABOVE NYSDEC RECOMMENDED SOIL CLEANUP OBJECTIVE.

ND = Not Detected
NA = Not Analyzed

TABLE 4-2

ANALYTICAL TESTING DATA FROM 2 TO 4 FOOT SAMPLES
GLEASON WORKS RCRA PAD CLOSURE

PARAMETERS DETECTED	SAMPLE IDENTIFICATION NUMBER CONCENTRATION IN PPM								NYSDEC CLASS GA GW STANDARD (PPB)	NYSDEC REC. SOIL CLEANUP OBJECTIVE (PPM)
	B-1	B-2	B-3	B-4	B-5	B-6	B-7	B-8		
Barium	51.2	80.7	72.1	50.2	54.7	53.3	56.6	59.4	1000	300
Cadmium	0.605	0.636	ND	ND	ND	ND	ND	ND	10	1
Chromium	14.6	618	16.1	663	9.27	15	12.3	11.6	50	18.3
Copper	87	180	47.4	173	26.5	29.3	18.1	16.6	200	34.9
Manganese	261	414	267	740	318	509	373	383	300	608
Mercury	0.0585	ND	0.167	ND	ND	ND	ND	0.11	2	0.225
Lead	286	405	49.8	19.4	28.4	83.6	6.54	28.7	25	46
Cyanide	NA	NA	NA	NA	ND	NA	NA	NA	0.1	Not Avail.
	CONCENTRATION IN PPB								(PPB)	(PPB)
Xylene	ND	ND	33	ND	150	ND	ND	ND	5	1,200
Vinyl Chloride	ND	ND	ND	2800	38	ND	ND	ND	2	200
Acetone	ND	120	65	ND	ND	46	ND	ND	Not Avail.	200
1,1-Dichloroethane	ND	75	ND	ND	100	ND	ND	ND	5	400
cis-1,2-Dichloroethene	100	610	200	55000	170	ND	760	52,000	Not. Avail.	300
Trichloroethene	15	64	35	25000	220	ND	ND	3,700	5	700
Trans-1,2-Dichloroethene	ND	43	ND	ND	ND	ND	ND	1600		300
PCB 1254	ND	55,000	14,000	ND	22,000	19,000	7,800	18,000	Not Avail.	10,000

NOTES:

[shaded box] = DETECTED ABOVE NYSDEC RECOMMENDED SOIL CLEANUP OBJECTIVE.

ND = Not Detected
NA = Not Analyzed

TABLE 4-3

ANALYTICAL TESTING DATA FROM 4 TO 6 FOOT SAMPLES
GLEASON WORKS RCRA PAD CLOSURE

PARAMETERS DETECTED	SAMPLE IDENTIFICATION NUMBER CONCENTRATION IN PPM								NYSDEC CLASS GA GW STANDARD (PPB)	NYSDEC REC. SOIL CLEANUP OBJECTIVE (PPM)
	B-1	B-2	B-3	B-4	B-5	B-6	B-7	B-8		
Barium	35.6	47.3	57.1	35.1	125	59.4	49.8	261	1000	300
Cadmium	ND	ND	ND	ND	ND	ND	ND	ND	10	1
Chromium	21.7	12.2	16.1	13.9	48.4	12.6	104	11.4	50	18.3
Copper	19.2	11.8	12.6	17.3	38.9	15.9	108	69.9	200	34.9
Manganese	994	504	369	418	579	214	256	278	300	608
Mercury	ND	ND	0.145	ND	ND	ND	ND	ND	2	0.225
Lead	6.46	14.6	13.1	9.72	11.4	23.3	13.9	5920	25	46
Cyanide	NA	NA	NA	NA	ND	NA	NA	NA	0.1	Not Avail.
			CONCENTRATION IN PPB						(PPB)	(PPB)
Vinyl Chloride	ND	ND	ND	ND	ND	ND	ND	5000	2	200
Acetone	ND	ND	ND	ND	ND	49	ND	ND	Not Avail.	200
1,1-Dichloroethane	ND	59	ND	ND	ND	ND	ND	ND	5	400
cis-1,2-Dichloroethene	4400	620	110	47000	4,400	ND	290	280,000	Not. Avail.	300
Trichloroethene	ND	110	ND	27000	870	ND	43	ND	5	700
Trans-1,2-Dichloroethene	ND	ND	ND	ND	ND	ND	ND	1700		300
PCB 1254	ND	6,000	ND	1,000	4,000	5,700	3,900	16,000	Not Avail.	10,000

NOTES:

[shaded box] = DETECTED ABOVE NYSDEC RECOMMENDED SOIL CLEANUP OBJECTIVE.

ND = Not Detected
NA = Not Analyzed

TABLE 4-4

TCLP ANALYTICAL TESTING DATA
GLEASON WORKS RCRA PAD CLOSURE

PARAMETERS DETECTED	SAMPLE IDENTIFICATION NUMBER CONCENTRATION IN PPM				NYSDEC CLASS GA GW STANDARD (PPM)	TCLP LIMIT (PPM)
	FP-1	FP-2	B-5	B-8		
Barium	ND	ND	1.22	ND	1	100
Chromium	ND	ND	ND	0.139	0.05	5
Lead	ND	ND	0.136	ND	0.025	5
Trichloroethene (PPB)	70	ND	2,100	7,600	5	500

NOTES:

(shading) = DETECTED ABOVE NYSDEC GROUND WATER STANDARD.

(boxed shading) = DETECTED ABOVE TCLP STANDARD (HAZARDOUS WASTE).

FP-1 AND FP-2 ARE FLYASH PILE SAMPLES
B-5 AND B-8 ARE 0 TO 2' SOIL SAMPLES FROM UNDER THE CONCRETE.

and sample B-2 contained acetone and PCB concentrations in excess of those cleanup levels. However, in light of the fact that the cleanup levels for PCBs, acetone, and various metals were slightly exceeded, it appears that the perimeter borings in the 0 to 2 foot zone are near the lateral limits of the area requiring remediation.

Within the 2 to 4 foot zone, samples from B-1, B-2, B-3 and B-4 contained metals concentrations in excess of the cleanup levels and samples B-2 and B-3 contained PCB concentrations exceeding that cleanup level. The 2 to 4 foot sample from B-4 also contained vinyl chloride, trichloroethene (TCE) and cis-1,2-dichloroethene concentrations over those cleanup levels. In light of the fact that the cleanup levels for PCBs, cis-1,2-dichloroethene and various metals were only slightly exceeded for the samples from B-1 and B-3, it appears that these perimeter borings in the 2 to 4 foot zone are near the lateral limits of the area requiring remediation. However, the samples from borings B-2 and B-4 indicate that the lateral limits of the area requiring remediation near these borings may extend beyond them.

Within the 4 to 6 foot zone, samples from B-1, B-5, B-6, B-7 and B-8 contained metals concentrations in excess of the metals cleanup levels, and sample B-8 contained PCB concentrations in excess of the PCB cleanup level. The 4 to 6 foot samples from B-1, B-2, B-4, B-5 and B-8 contained cis-1,2-dichloroethene concentrations in excess of that cleanup level. Additionally, the 4 to 6 foot samples from B-4 and B-5 contained TCE concentrations in excess of that cleanup level. No analytes in excess of the cleanup levels were detected in the 4 to 6 foot samples from B-3 and B-6, indicating that the extent of contamination has been delineated at these locations. Because the samples from B-2, B-5 and B-7 only slightly exceeded cleanup levels, it appears that these borings in the 4 to 6 foot zone are near the limits of the area requiring remediation. However, the samples from borings B-4 and B-8 indicate that the extent of the area requiring remediation near these borings may extend beyond them.

4.2 *Estimation of the Limits of Soil Remediation*

The lateral and vertical limits of the area of soil requiring remediation at the perimeter and below the storage area were estimated to allow computation of soil volumes. The lateral extent of the soil requiring remediation at the perimeter boring locations, where analytes were detected above the cleanup levels, was estimated to extend approximately 7 feet beyond the borings. This approximation is based on the spacing of the previous sampling locations (i.e., approximately 7 feet apart) and the general trend of decreasing metal and PCB concentrations towards the perimeter of the storage area. The vertical limit of the impacted soil was estimated to be two feet below the current sampling program limits (i.e., maximum depth of 8 feet). This estimate appears to be reasonable based upon the decreasing PCB concentration patterns with depth; however, the VOC concentrations in the northeast portion of the storage area (i.e., B-8 and B-4) indicate that the limits of the area requiring remediation may extend beyond the storage area perimeter (i.e., currently estimated to be 7 feet) and deeper than 8 feet northeast of the storage area.

5.0 EVALUATION OF CLOSURE ALTERNATIVES

Potential remedial technologies were evaluated for the soil in the area of the former storage pad. Based upon a review of the concentrations of the parameters detected and the estimated volume of soil requiring remediation, numerous technologies (i.e., solidification/stabilization, on-site incineration and containment) were screened-out because they were either unreliable for addressing the mixture of contaminants (i.e., metals, PCBs and VOCs) at the site or because they were not cost-effective in addressing the relatively small volume of soil (i.e., presently estimated to be less than 500 cubic yards) requiring remediation. Thus, following the initial technology screening process, the potential remedial alternatives that were considered included:

Alternative 1 - Excavation and off-site disposal; and
Alternative 2 - Soil Vapor Extraction followed by off-site disposal.

5.1 Alternative 1 - Excavation and Off-site Disposal

This alternative includes excavating all soil in the vicinity of the pad that contains analytes in excess of the cleanup levels. This soil would be segregated into the following three waste streams based upon the previous sampling program and upon future verification sampling at the time of excavation:

Non-hazardous Material - this material would include the flyash pile, the concrete and the soil with VOC and metals concentrations in excess of the cleanup levels but not exceeding the following regulatory levels:

- PCB concentration of 10 parts per million (ppm). Because some of the soil samples analyzed during this program had PCB concentrations over 50 ppm, it can be concluded that all PCBs detected below the storage area were derived from a PCB waste that contained a PCB concentration in excess of 50 ppm. Thus, under 40 CFR 761.120-135, soil containing PCBs that is excavated would be classified as a Toxic Substance Control Act (TSCA)-regulated material.

- TCE concentration of 5.6 ppm. Under 40 CFR 268.43, soil that was derived from an "F" listed waste has a TCE Land Disposal Restriction (LDR) of 5.6 ppm.

The volume of this soil is estimated to be approximately 194 cubic yards.

PCB Soil - soil with PCB concentrations above 10 ppm and TCE concentrations below 5.6 ppm. The volume of this soil is estimated to be approximately 154 cubic yards.

TCE Soil - soil with TCE concentrations above the 5.6 ppm LDR for TCE. Once this material is excavated, it must be incinerated. The volume of this soil is estimated to be approximately 70 cubic yards.

Under Alternative 1, the three waste streams would be segregated at the time of excavation and transported to the appropriate off-site disposal facilities. The excavation would then be backfilled and the area restored to the pre-excavation topography.

5.2 *Alternative 2 - Soil Vapor Extraction and Off-site Disposal*

This alternative initially involves the use of Soil Vapor Extraction (SVE) to reduce the TCE concentrations in the soil to levels at or below 5.6 ppm. The details of this technology including a preliminary cost estimate are included in Appendix C. Following the SVE program, the soil in the vicinity of the pad that still contains analytes at concentrations that exceed the cleanup levels would be excavated and divided into two waste streams: Non-hazardous Material and PCB Soil. This approach would eliminate the TCE Soil waste stream and reduce the disposal costs for the treated TCE Soil by approximately $1,100 per ton. The excavation would be backfilled and the area restored to the pre-excavation topography.

5.3 *Closure Alternative Cost Comparison*

The October 1993 Closure Plan proposed that the recommended remedial alternative would be identified through a cost-effectiveness analysis similar to that proposed in the October 1991 NYSDEC Draft Cleanup Policy. However, since only two alternatives appear to be feasible for this site and since the total volume of TCE Soil is uncertain, a cost comparison was conducted to identify the volume of TCE Soil that would cause the SVE alternative to be more economical than the excavation and disposal alternative.

Table 5-1 provides a cost estimate for the excavation and off-site disposal for the three waste streams and a summary of the SVE cost estimate (see Appendix C). Based upon these estimates, SVE becomes more economical than off-site incineration once the TCE Soil mass exceeds 140 tons. At present, the TCE Soil mass is estimated to be 105 tons; however, the amount of TCE Soil northeast and below boring B-4 is unknown and, if significant, would make Alternative 2 more economical.

TABLE 5-1

GLEASON FORMER STORAGE PAD CLOSURE
REMEDIAL COST ESTIMATES

SOIL CATEGORY	LIMITING CRITERIA	REMEDIAL METHOD	DEPTH (FEET)	VOLUME (CUBIC YARDS)	WEIGHT (TONS) [1]	EXCAVATION COSTS [2]	BACKFILL COSTS [3]	TRANS. COSTS [4]	DISPOSAL COST [4]	TOTAL COSTS
NON-HAZ. MATERIAL	SOIL CONC. ABOVE CLEANUP LEVELS	OFF-SITE LANDFILL AT	CONCRETE	12.5	18.75	$250	$125	$94	$1,125	$1,594
			FLYASH PILE	13	19.5	$260	$130	$98	$1,170	$1,658
	PCBs < 10 PPM TCE < 5.6 PPM	CID LANDFILL CHAFEE, NY	0 TO 2	42	63	$840	$420	$315	$3,780	$5,355
			2 TO 4	14	21	$280	$140	$105	$1,260	$1,785
			4 TO 8	112	168	$2,240	$1,120	$840	$10,080	$14,280
PCB SOIL	PCBs > 10 PPM TCE< 5.6 PPM	OFF-SITE TREATMENT	0 TO 2	42	63	$840	$420	$315	$14,175	$15,750
		AND DISPOSAL MODEL CITY	2 TO 4	84	126	$1,680	$840	$630	$28,350	$31,500
		NY	4 TO 8	28	42	$560	$280	$210	$9,450	$10,500
TCE SOIL	TCE > 5.6 PPM	OFF-SITE INCINERATION	0 TO 2	28	42	$560	$280	$24,360	$42,000	$67,200
		CWM PORT ARTHUR	2 TO 4	14	21	$280	$140	$12,180	$21,000	$33,600
		TEXAS	4 TO 8	28	42	$560	$280	$24,360	$42,000	$67,200
ALL SOIL EXCEEDING VOC CLEANUP LEVELS	VOCs > CLEANUP LEVELS	ON-SITE SOIL VAPOR EXTRACTION	0 TO 10 FEET	NA	NA	NA	NA	NA	CAPITAL OPER.	$116,000 $74,000

NOTES:
[1] BASED ON 1.5 TONS/CUBIC YARD
[2] BASED ON $20/CUBIC YARD
[3] BASED ON $10/CUBIC YARD
[4] BASED ON VENDER QUOTATION
[5] ALL COSTS ARE APPROXIMATE BASED ON LIMITED DATA.
[6] SEE APPENDIX C FOR SVE COST ESTIMATE.
[7] THE SOIL VOLUMES PRESENTED ABOVE ARE BASED ON A MAXIMUM VERTICAL EXTENT OF CONTAMINATION OF 8 FT. AND A MAXIMUM LATERAL EXTENT OF CONTAMINATION 7 FEET AROUND THE PERIMTER OF THE STORAGE AREA.

TOTAL ALT. 1 COSTS BASED ON CURRENT REMEDIATION AREA = $250,000
TOTAL ALT. 2 COSTS BASED ON CURRENT REMEDIATION AREA = $300,000

Based upon the above comparison, a phased remedial approach is recommended which involves the collection of additional soil samples northeast of B-4. These samples would be tested only for TCE. Following a review of data, Alternative 1 would be implemented if the results indicate that there is less than approximately 35 tons of additional TCE Soil (the current estimated volume of TCE Soil is 105 tons and an additional 35 tons would make Alternative 2 more economical than Alternative 1). Alternative 2 would be implemented if the results indicate that there is greater than approximately 35 tons of additional TCE Soil. This phased approach is discussed in more detail in the following section.

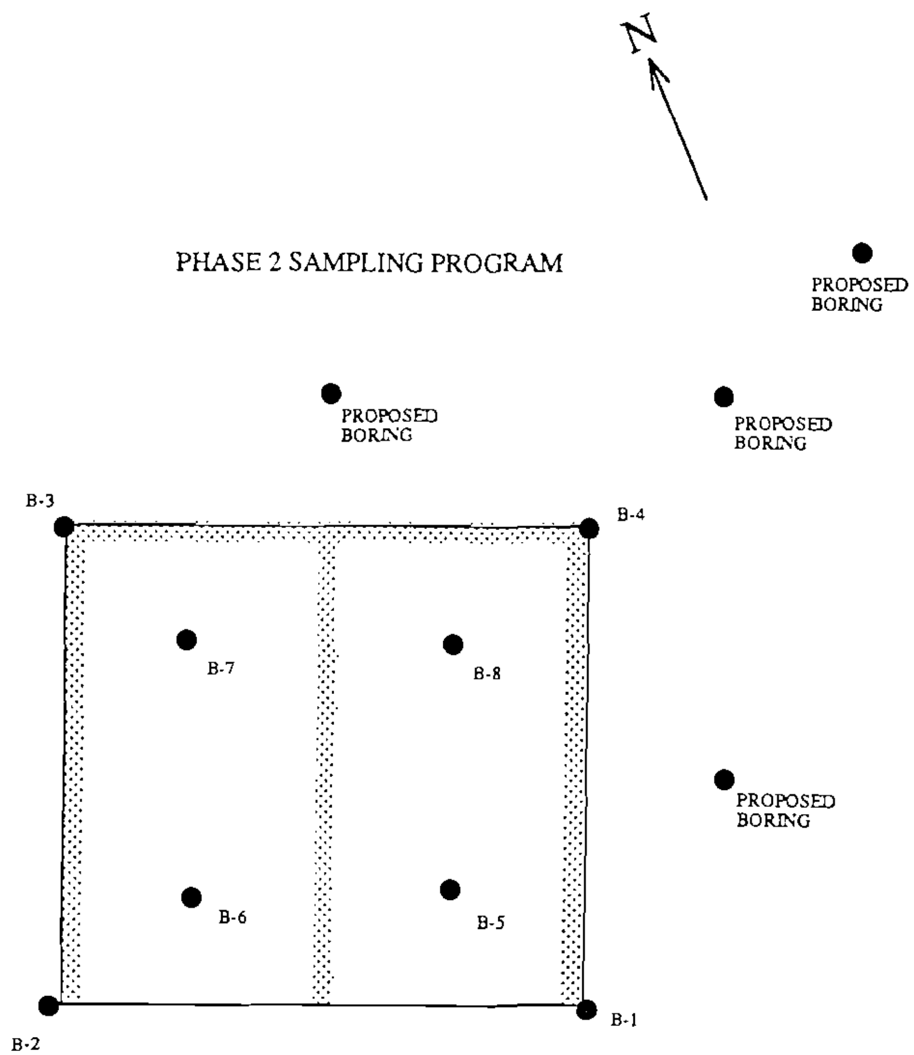
6.0 CLOSURE OF STORAGE AREA

6.1 *Phase 2 Sampling*

As stated above, in order to identify the most cost-effective alternative for the former storage pad, it is necessary to approximate the vertical and lateral extent of the TCE Soil (soil with TCE concentrations over the 5.6 ppm Land Ban limit). The extent of this soil has been identified on all sides of the pad with the exception of the area near B-4. TCE concentrations greater than 5.6 ppm were detected in the 2 to 4 and 4 to 6 foot samples from B-4, indicating that the TCE Soil may extend northeast of the pad. Thus, four soil borings will be drilled northeast of the pad at the locations shown on Figure 6-1. Soil samples will be collected in accordance with the Closure Plan to a depth of at least 10 feet. The samples will be screened in the field using a photoionization detector (PID) and the four samples showing the highest PID readings will be sent to an off-site analytical laboratory for TCE analysis. Because TCE is heavier than water and tends to migrate downward through the overburden with time, the borings will be advanced until no organics are detected with the PID.

If a significant volume of additional TCE Soil is identified through the Phase 2 sampling program, then the SVE system will be designed and installed as outlined in Appendix C. Once the SVE system has operated for a period of approximately one year, the TCE and other VOC concentrations in the soil will have been reduced to level that will allow excavation and segregation of the soil into two waste streams: PCB Soil and Non-hazardous Soil.

If no additional TCE Soil is identified by the preliminary sampling program, then the remedial program will only include the items discussed in the remainder of this section.



NOTES:
1) FIGURE ADAPTED FROM LOZIER WASTE STORAGE AREA PLAN, 9/89
2) APPROXIMATE SCALE: 1" = 10 FEET
3) LOCATIONS OF SITE FEATURES ARE APPROXIMATE.

TITLE
PHASE 2 SAMPLING PROGRAM

PREPARED FOR
THE GLEASON WORKS

ERM-Northeast
Environmental Resources Management
ERM

SCALE
FIGURE 6-1
DATE
DRAWN:
JOB NO.:
FILE NAME:

6.2 *Site Preparation*

Based on the analytical data for the soil samples and the cleanup levels, the area requiring excavation will be delineated in the field with survey stakes. The vertical and lateral limits of the excavation will be identified and discussed with the remedial contractor prior to mobilization of equipment.

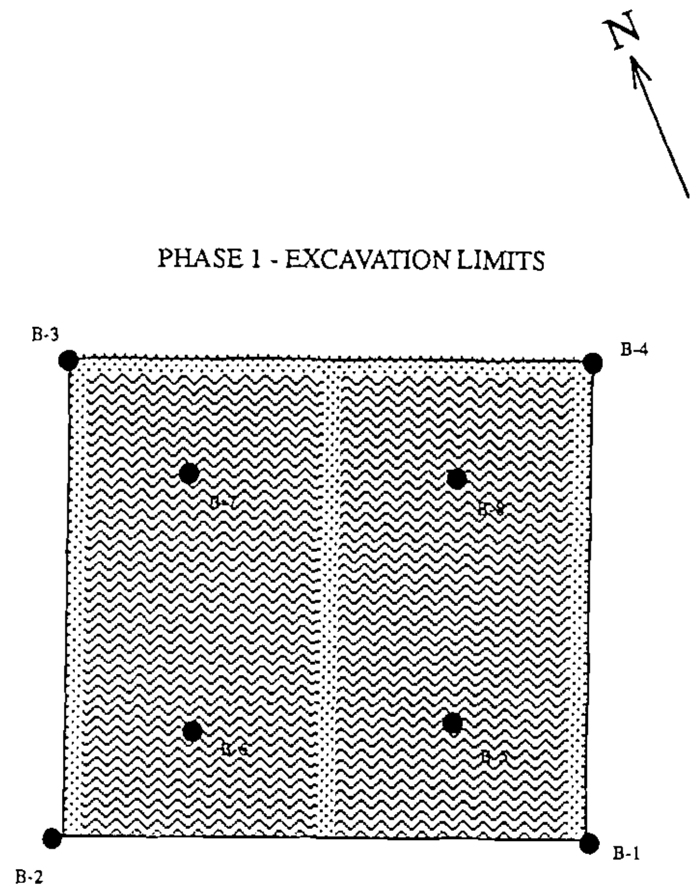
6.3 *Storage Pad Cleaning*

Cleaning of the storage area will include removal of residual material (i.e., flyash dust) on the concrete pad. This material will be staged with the flyash previously removed from the area.

6.4 *Excavation of Soil and Flyash*

A hydraulic excavator will be used to remove the material requiring remediation (i.e., soil, flyash and concrete). The Non-hazardous Soil will be loaded directly into roll-offs for subsequent off-site landfill disposal. The PCB Soil and the TCE Soil will be segregated, placed in proper containers and appropriately labeled. The segregation of the soil will follow the four phase approach outlined on Figures 6-2 through 6-5.

Following excavation of the soil to the predetermined limits, a confirmation testing program will be implemented as described below. Following review of the test results, the excavation will be backfilled with clean soil and restored to grade.



LEGEND:

- REMOVE CONRETE SLAB IN FORMER STORAGE AREA AND PLACE IN ROLL-OFF FOR OFF-SITE NON-HAZARDOUS LANDFILL DISPOSAL.
(APROXIMATE VOLUME = 12.5 CUBIC YARDS)

NOTES:
1) FIGURE ADAPTED FROM LOZIER WASTE STORAGE AREA PLAN, 9/89
2) APPROXIMATE SCALE: 1" = 10 FEET
3) LOCATIONS OF SITE FEATURES ARE APPROXIMATE.

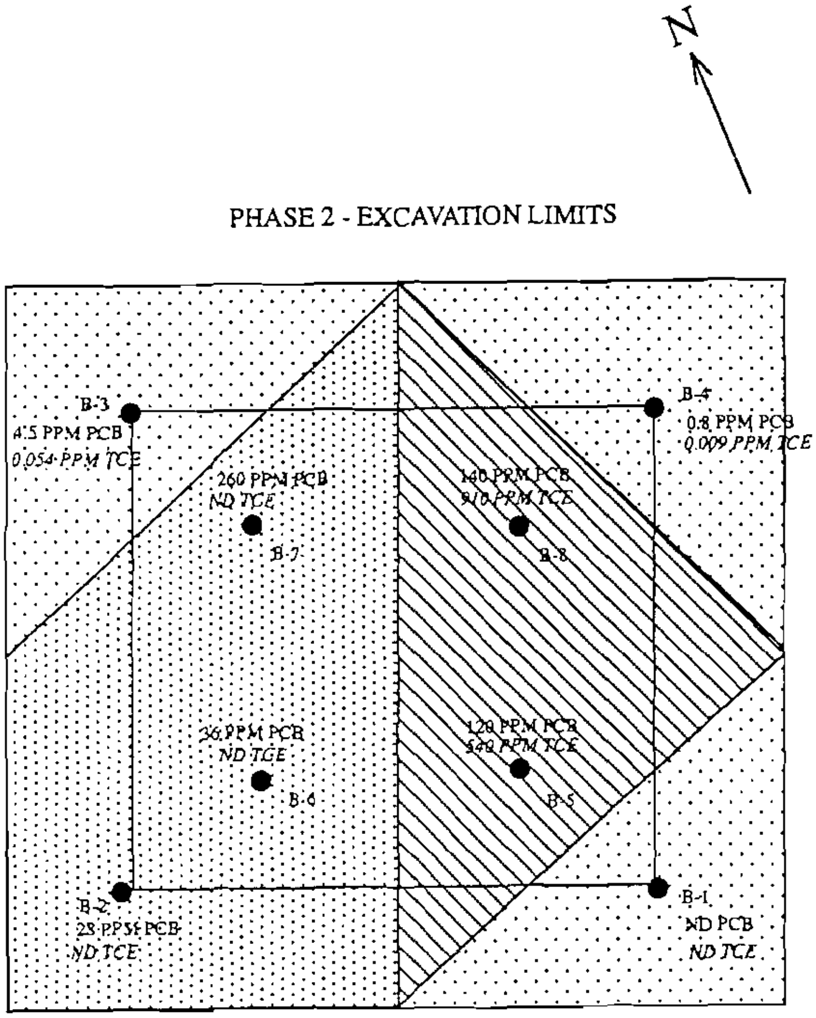
TITLE
PHASE 1 EXCAVATION LIMITS

PREPARED FOR
THE GLEASON WORKS

ERM-Northeast
Environmental Resources Management
ERM

SCALE
FIGURE 6-2
DATE
DRAWN: JOB NO.: FILE NAME:

PHASE 2 - EXCAVATION LIMITS



LEGEND:

- EXCAVATE SOIL IN THIS AREA TO DEPTH OF 2 FEET AND PLACE IN ROLL-OFF FOR OFF-SITE NON-HAZ. LANDFILL DISPOSAL (APROXIMATE VOLUME = 42 CUBIC YARDS)
- EXCAVATE SOIL IN THIS AREA TO DEPTH OF 2 FEET AND PLACE IN DRUMS OR ROLL-OF FOR OFF-SITE RCRA/TSCA LANDFILL DISPOSAL. (APROXIMATE VOLUME = 42 CUBIC YARDS)
- SOIL IN THIS AREA EXCEEDS LAND BAN LIMIT FOR TCE. INCINERATE OFF-SITE OR TREAT ON-SITE PRIOR TO OFF-SITE RCRA/TSCA LANDFILL DISPOSAL. (APROXIMATE VOLUME = 28 CUBIC YARDS)

NOTES:
1) FIGURE ADAPTED FROM LOZIER WASTE STORAGE AREA PLAN, 9/89
2) APPROXIMATE SCALE: 1" = 10 FEET
3) LOCATIONS OF SITE FEATURES ARE APPROXIMATE.

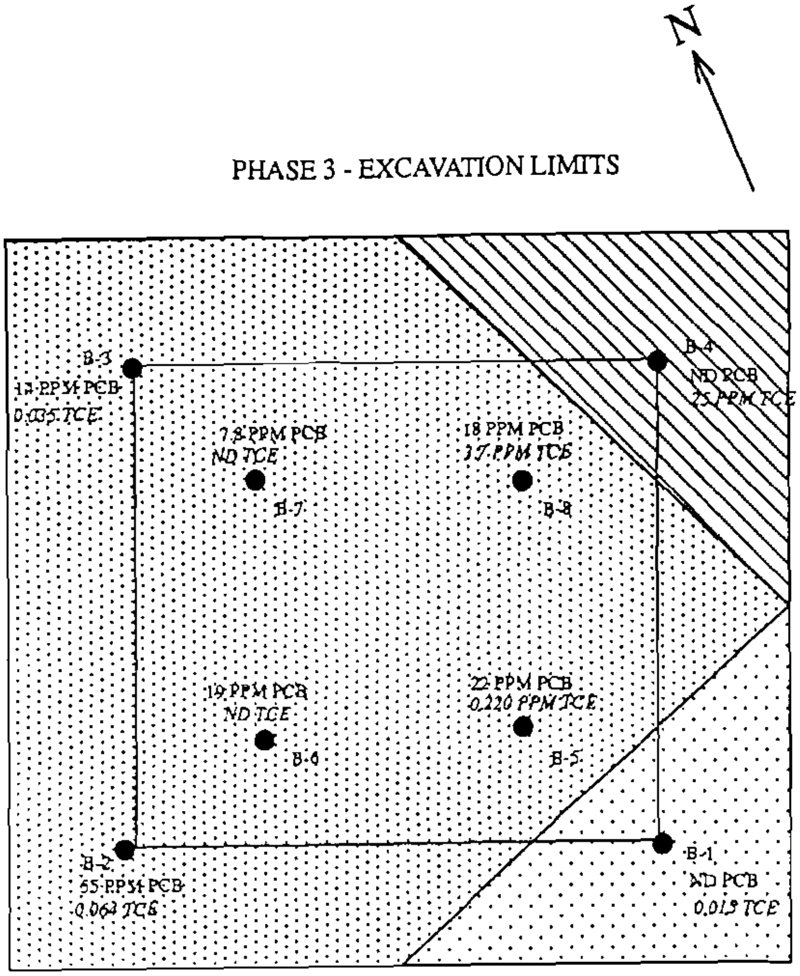
TITLE
PHASE 2 EXCAVATION LIMITS

PREPARED FOR
THE GLEASON WORKS

ERM-Northeast
Environmental Resources Management

DRAWN:	JOB NO.:	FILE NAME:	SCALE	FIGURE
			DATE	6-3

PHASE 3 - EXCAVATION LIMITS



LEGEND:

- EXCAVATE SOIL IN THIS AREA FROM 2 TO 4 FEET AND PLACE IN ROLL-OFF FOR OFF-SITE NON-HAZ. LANDFILL DISPOSAL (APROXIMATE VOLUME = 14 CUBIC YARDS)
- EXCAVATE SOIL IN THIS AREA FROM 2 TO 4 FEET AND PLACE IN DRUMS OR ROLL-OFF FOR OFF-SITE RCRA/TSCA LANDFILL DISPOSAL (APROXIMATE VOLUME = 84 CUBIC YARDS)
- SOIL IN THIS AREA EXCEEDS LAND BAN LIMIT FOR TCE. INCINERATE OFF-SITE OR TREAT ON-SITE PRIOR TO OFF-SITE RCRA/TSCA LANDFILL DISPOSAL. (APROXIMATE VOLUME = 14 CUBIC YARDS)

NOTES:
1) FIGURE ADAPTED FROM LOZIER WASTE STORAGE AREA PLAN, 9/89
2) APPROXIMATE SCALE: 1" = 10 FEET
3) LOCATIONS OF SITE FEATURES ARE APPROXIMATE.

TITLE PHASE 3 EXCAVATION LIMITS

PREPARED FOR

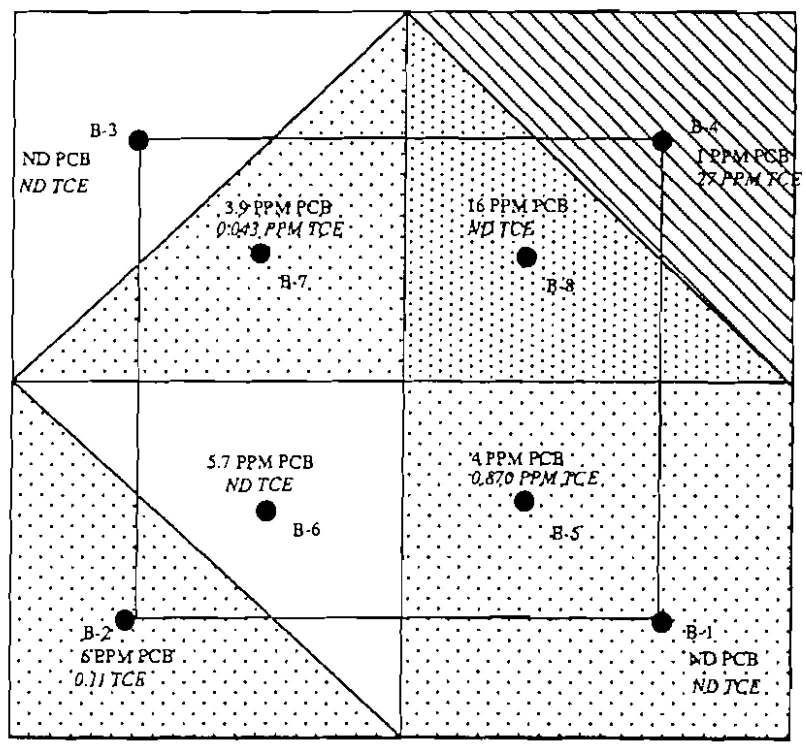
THE GLEASON WORKS

ERM ERM–Northeast
Environmental Resources Management

SCALE | FIGURE 6–4 | DATE

DRAWN: | JOB NO.: | FILE NAME:

PHASE 4 - EXCAVATION LIMITS



LEGEND:

- EXCAVATE SOIL IN THIS AREA FROM 4 TO 8 FEET AND PLACE IN ROLL-OFF FOR OFF-SITE NON-HAZ. LANDFILL DISPOSAL (APROXIMATE VOLUME = 112 CUBIC YARDS)
- EXCAVATE SOIL IN THIS AREA FROM 4 TO 8 FEET AND PLACE IN DRUMS FOR OFF-SITE RCRA/TSCA LANDFILL DISPOSAL (APROXIMATE VOLUME = 28 CUBIC YARDS)
- SOIL IN THIS AREA (4 TO 8 FOOT DEPTH) EXCEEDS LAND BAN FOR TCE. INCINERATE OFF-SITE OR TREAT ON-SITE PRIOR TO OFF-SITE RCRA/TSCA LANDFILL DISPOSAL. (APROXIMATE VOLUME = 28 CUBIC YARDS)

NOTES:
1) FIGURE ADAPTED FROM LOZIER WASTE STORAGE AREA PLAN, 9/89
2) APPROXIMATE SCALE: 1" = 10 FEET
3) LOCATIONS OF SITE FEATURES ARE APPROXIMATE.

TITLE
PHASE 4 EXCAVATION LIMITS

PREPARED FOR
THE GLEASON WORKS

ERM-Northeast
Environmental Resources Management
ERM

SCALE
FIGURE
6-5
DATE
DRAWN:
JOB NO.:
FILE NAME:

6.5 *Confirmation Testing*

The confirmation testing program will involve two field screening techniques implemented at the time of excavation followed by an analytical laboratory confirmation testing of selected soil samples. In areas where the limits of the PCB Soil have not been identified (e.g., below B-8 and some sidewall areas) a PCB test kit (Millipore Envirogard or equivalent) will be used to evaluate the PCB concentrations from the excavation limits. Once the PCB field screening confirms a PCB concentration below the cleanup level, a confirmatory soil sample will be taken from the excavation wall for off-site analytical laboratory testing.

In a similar manner, a PID will be used to identify the limits of the soil with VOC concentrations above the cleanup levels. Once the PID field screening indicates no detection of organics, a confirmatory soil sample will be taken from the excavation (i.e., sidewalls or bottom) for off-site analytical laboratory testing for the 10 VOCs detected during the previous sampling program (see table 4-1).

Due to the correlation between the elevated (i.e., above background levels) metals concentrations and the elevated VOC and PCB concentrations, no confirmatory testing for metals is proposed. It appears that if the soil containing elevated PCBs and VOCs is removed, then the elevated metals concentrations will be addressed.

6.6 *Disposal*

Based on recent discussions with the disposal facilities, the three waste streams appear to have been adequately characterized by the sampling and testing program. However, some additional testing may be requested by the disposal facilities once the waste streams are segregated. At present, it is anticipated that the following disposal facilities will be used:

Non-Hazardous Soil - CID Landfill in Chaffee, New York.
PCB Soil - Chemical Waste Management's facility in Model City, New York.
TCE Soil - Chemical Waste Management's facility in Port Arthur, Texas.

Waste manifests will be completed and signed by appropriate Gleason personnel prior to shipment of waste materials.

6.7 *Closure Documentation*

ERM project engineers will be on-site full-time during closure to monitor and document the activities of the remedial contractor. Daily field notes will be recorded summarizing the activities conducted during the remediation with will, at a minimum, contain the following:

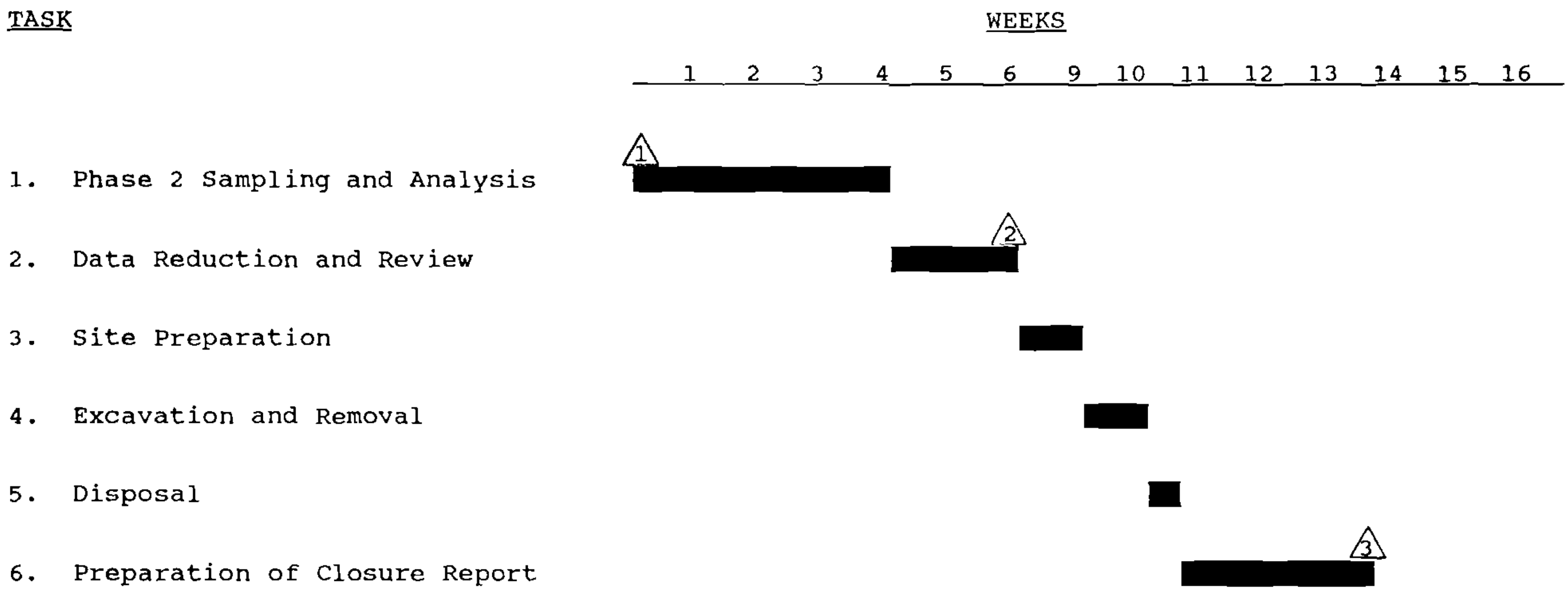
- Location;
- Date and Time;
- Weather and Temperature;
- Equipment Used;
- On-site Personnel;
- Air Quality Monitoring Levels; and
- Summary of Activities.

Following completion of the closure program, Gleason will submit a report to NYSDEC documenting sample results and closure activities. This report will document that the closure activities were conducted in compliance with this Closure Plan and will be signed by appropriate representatives from Gleason and ERM.

7.0 IMPLEMENTATION SCHEDULE

Figure 7-1 presents a revised project schedule. The implementation schedule included in the Closure Plan required revision based on the findings of the sampling program. The start date for remediation will be identified following NYSDEC-approval of the RAP. If the SVE alternative is selected, the soil excavation program will be postponed approximately 1-1/2 years to allow SVE final design, installation and implementation.

FIGURE 7-1
IMPLEMENTATION SCHEDULE



MILESTONE DESCRIPTIONS

1 Project Start-up
2 If Alternative 2 is selected, start of SVE program (1.5 Years)
3 Submit Closure Report

LEGEND

Key Task Milestones △

Note: Total implementation time, from date of NYSDEC approval of RAP, will vary between 3.5 months (Alternative 1) to 24.5 months (Alternative 2)

APPENDIX A

INVENTORY OF CHEMICALS ACCUMULATED IN THE FORMER WASTE STORAGE AREA

WASTES STORED - G.W. HAZARDOUS WASTE STORAGE AREA

WASTE NAME	USDOT SHIPPING NAME	CHEMICAL CONSTITUENTS
PCB CAPACITORS	RQ, WASTE HAZARDOUS SUBSTANCE, LIQUID, NOS. (POLYCHOLORINATED BIPHENYLS) ORM-E NA9188	POLYCHLORINATED BIPHENYLS
CHROME EXHAUST SLUDGE	HAZARDOUS WASTE SOLID, NOS ORM-E NA 9189	CHROMIUM - 30-45% LEAD - 1-5% SULFURIC ACID - 3-8%
WASTE TRICHLORETHYLENE	WASTE TRICHLORETHYLENE ORM-A UN 1710	TRICHLORETHYLENE
WASTE III TRICHLORETHANE	WASTE 1,1,1, TRICHLOROETHANE ORM-A UN 2831	1,1,1, TRICHLOROETHANE
CONTAMINATED WAX	HAZARDOUS WASTE SOLID N.O.S. ORM-E NA 9189	WAX - 90-95% CHROMIUM - 1-2% COPPER - 1-2% TRICHLORETHYLENE - 1-2%
TE PAINT	WASTE PAINT, LACQUER, COMBUSTIBLE LIQUID UN 1263	ALCOHOLS - INCLUDING 2 - PROPANOL KETONES - INCLUDING MEK TOLUENE NAPTHA XYLENE ETHANOL 2 METHYL - 1- PROPANOL 2 BUTOXYETHANOL ACETONE METHYL ISO BUTYL KETONO ISOBUTYL ACETATE BIS (2-ETHYLHEXYL) PHTHALATE
COPPER CYANIDE PRECIPITATE	WASTE CYANIDE MIXTURE POISON B UN 1588	WATER - 85-95% SODIUM CARBONATE - 3-8% CYANIDE (COPPER & SODIUM) .5-2% COPPER - .5-2%
PERIODIC REVERSE CLEANING SOLUTION	WASTE CYANIDE SOLUTION NOS POISON B UN 1935	CYANIDE - .5-1%

WASTES STORED - G.W. HAZARDOUS WASTE STORAGE AREA

WASTE NAME	USDOT SHIPPING NAME	CHEMICAL CONSTITUENTS
COPPER CYANIDE PLATING SOLUTION	WASTE CYANIDE SOLUTION NOS POISON B UN 1935	WATER - 82-90% COPPER METAL DISSOLVED - 2-4% COPPER CYANIDE - 4-6% POTASSIUM HYDROXIDE - 1-3% ULTRATARTRAL - 1-3% FREE SODIUM CYANIDE - .5-1.5%
NICKEL PENTRATE WASTE	WASTE CYANIDE SOLUTION NOS POSITION B UN 1935	WATER - 45-55% SODIUM HYDROXIDE - 35-45% SODIUM NITRATE - 2-6% SODIUM NITRITE - 2-6% NICKEL NITRATE - <.01% SODIUM CYANIDE - < 1% SODIUM CARBONATE - 1-3%
COPPER STRIP WASTE	WASTE CHROMIC ACID SOLUTION CORROSIVE UN 1755	CHROMIC ACID - 30-45% SULFURIC ACID - 30-45% WATER - 10-20% COPPER (DISSOLVED) - 3-10%
[illegible]STE TURCO - [illegible]BER STRIP	WASTE METHYLENE CHLORIDE MIXTURE - ORM-A UN 1593	METHYLENE CHLORIDE - 60-70% PHENOL - 20-30% FORMIC ACID - 5-15% DISSOLVED RUBBER - 5-10%
CHROME STRIP SOLUTION	WASTE CHROMIC ACID SOLUTION CORROSIVE UN 1755	WATER - 45-55% HYDROCHLORIC ACID - 45-55% CHROMIUM (DISSOLVED) - 3-6%
CYANIDE/SPEEDI-DRI	WASTE CYANIDE SOLID - MIXTURE, POISON B UN 1588	SPEEDI-DRY COPPER CYANIDE SODIUM CYANIDE
MERCURY BATTERIES/ MERCURY FILLED TUBES	MERCURY, COMPOUND SOLIDS, POISON B - UN 2025	SPEEDI-DRY MERCURY BATTERIES MERCURY FILLED TUBES
WASTE LACQUER THINNER	WASTE FLAMMABLE LIQUID N.O.S FLAMMABLE LIQUID UN 1993	LACQUER THINNER

WASTED STORED - G.W. HAZARDOUS WASTE STORAGE AREA

WASTE NAME	USDOT SHIPPING NAME	CHEMICAL CONSTITUENTS
WASTE PARCOLENE M SOLUTION	COMPOUND, IRON OR STEEL RUST PREVENTING OR REMOVING OTHER THAN PETROLEUM N.O.I.	MANGANESE PHOSPHATE TETRASODIUM PYROPHOSPHATE
BARIUM SULFATE SLUDGE	HAZARDOUS WASTE SOLID N.O.S. UN 1263	BARIUM SULFATE - 100%
CADMIUM PLATING SOLUTION	WASTE CYANIDE SOLUTION, N.O.S. POISON B (CADMIUM) UN 1935	CYANIDE - DISSOLVED CADMIUM - DISSOLVED
WASTE TONER	WASTE COMBUSTIBLE LIQUID N.O.S. COMBUSTIBLE LIQUID NA 1993	CARBON BLACK MINERAL SPIRITS
CYANIDE AREA RINSE DOWN SOLUTION	R.Q., WASTE CYANIDE SOLUTION, N.O.S. (CYANIDE) POISON B UN 1935	WATER - 90-95% COPPER CYANIDE - 1-2% SODIUM CYANIDE - 1-2%
COPPER PLATING SOLUTION FILTERS	RQ, WASTE CYANIDE MIXTURE, DRY, (CYANIDE) POISON B UN 1588	FILTER MATERIAL - 90-95% WATER - 1-5% COPPER CYANIDE - 1-3% SODIUM CYANIDE - 1-3%
DEBRIS FROM CYANIDE AREA, DUCTS/TANKS	RQ, POISONOUS SOLID, N.O.S. (CYANIDE, CHROME) POISON B UN 2811	DIRT - SPEEDI-DRY COPPER CYANIDE CHROMIUM
LIQUID DEBRIS FROM COPPER CYANIDE DUCT-WORK-RINSE AREA	RQ, WASTE CYANIDE SOLUTION, N.O.S. (CYANIDE) POISON B UN 1935	WATER DIRT COPPER CYANIDE (DISSOLVED)
		H. W. BOWMAN AUGUST 2, 1989 (wastes)(H)

APPENDIX B

TEST BORING LOGS

BORING LOG

Sketch Map
See Figure 2-1
Notes

Project Gleason Works
Location Rochester, NY
Boring Number B-1
Drilling Company Nothnagle
Driller K. Busch
Drilling Method split spoon
Log By K. Baker

W.O. Number 687.003
Total Depth 6 ft.
Date 3-1-94

Depth	Blows/ 6"	Sample Number	N-Value	Rec. (%)	Description/Soil Classification (Color, Texture, Structure)
		1	42	92	0' - 2': Dense, gray/Brown-dk. Brown, fine to coarse SAND, some Silt, little fine to coarse Gravel, trace Clay, contains cinders, damp. **[fine to coarse SAND; FILL]**
	14				
1	24				
	18				
2	15				
		2	8	63	2' - 4': Loose, Brown, fine to coarse SAND, some fine to coarse Gravel, damp. Grades down to Dk. Brown, fine to coarse SAND, some fine to coarse Gravel, little Silt, contains brick fragments, moist. **[fine to coarse SAND; FILL]**
	7				
3	4				
	4				
4	16				
		3	8	88	4' - 6': Loose, Brown-dk. Brown, fine to coarse SAND and SILT, some fine to coarse Gravel, contains concrete fragments, damp. **[fine to coarse SAND and SILT; FILL]**
	10				
5	4				
	4				
6	3				
					Bottom of hole at 6 feet.

BORING LOG

Sketch Map
See Figure 2-1
Notes

Project Gleason Works
Location Rochester, NY
Boring Number B-2
Drilling Company Nothnagle
Driller K. Busch
Drilling Method split spoon
Log By K. Baker

W.O. Number 687.003
Total Depth 6 ft.
Date 3-1-94

Depth	Blows/ 6"	Sample Number	N-Value	Rec. (%)	Description/Soil Classification (Color, Texture, Structure)
0–2	30, 28, 25, 12	1	53	100	0' - 2': Very Dense, Brown-Gray/Brown, fine to coarse SAND, some Silt and fine to coarse Gravel, trace Clay, contains cinders, moist-damp. **[fine to coarse SAND; FILL]**
2–4	7, 4, 4, 5	2	8	46	2' - 4': Loose, Dk. Brown-Black, SILT and fine to coarse SAND, little fine to coarse Gravel, damp. **[SILT and fine to coarse SAND]**
4–6	3, 2, 2, 4	3	4	79	4' - 6': Soft, Gray, SILTY CLAY, trace fine to coarse Gravel, plastic, damp. **[SILTY CLAY]**
6					Bottom of hole at 6 feet.

BORING LOG

Sketch Map
See Figure 2-1
Notes

Project Gleason Works
Location Rochester, NY
Boring Number B-3
Drilling Company Nothnagle
Driller K. Busch
Drilling Method split spoon
Log By K. Baker

W.O. Number 687.003
Total Depth 6 ft.
Date 3-1-94

Depth	Blows/ 6"	Sample Number	N-Value	Rec. (%)	Description/Soil Classification (Color, Texture, Structure)
0	27	1	51	75	0' - 2': Very Dense, Brown-Dk. Brown, fine to coarse SAND, some fine to coarse Gravel, dry-damp. Contains large wood fragments from 13" - 17". **[fine to coarse SAND; FILL]**
1	31				
	20				
2	12	2	26	29	2' - 4': Medium Dense, Tan, fine to coarse SAND and Dk. Brown SILT. Grades to: Gray, SILTY CLAY, trace fine to coarse Sand and Gravel, moderate plasticity, damp. **[SAND and SILT grading to SILTY CLAY]**
	12				
3	16				
	10				
4	3	3	4	50	4' - 6': Soft, Brown-Gray, SILTY CLAY, trace fine to medium Gravel and fine to coarse Sand, moderate plasticity, moist. **[SILTY CLAY]**
	3				
5	2				
	2				
6	2				Bottom of hole at 6 feet.

BORING LOG

Sketch Map
See Figure 2-1
Notes

Project Gleason Works
Location Rochester, NY
Boring Number B-4
Drilling Company Nothnagle
Driller K. Busch
Drilling Method split spoon
Log By K. Baker

W.O. Number 687.003
Total Depth 6 ft.
Date 3-1-94

Depth	Blows/ 6"	Sample Number	N-Value	Rec. (%)	Description/Soil Classification (Color, Texture, Structure)
	23	1	31	100	0' - 2': Dense, Gray-Dk. Gray, SILT and fine to coarse SAND, some fine to medium Gravel, contains cinders and concrete fragments, dry-damp. **[SILTand SAND; FILL]**
1	13				
	18				
2	12				
	11	2	29	88	2' - 4': Medium Dense, Brown-Dk. Brown, fine to coarse SAND, trace fine to coarse Gravel, moist. Grades to Black-Dk. Gray, SILT and fine to medium SAND, moist. **[SAND grading to SILT and SAND]**
3	13				
	16				
4	12				
	4	3	5	96	4' - 6': Loose, Dk. Gray-Black, SILT and fine to medium SAND, moist. Grades to Dk. Gray, fine to coarse SAND and GRAVEL, contains cinders, moist-wet. **[SILT and SAND grading to SAND and GRAVEL; FILL]**
5	3				
	2				
6	1				
					Bottom of hole at 6 feet.

BORING LOG

Sketch Map
See Figure 2-1
Notes

Project Gleason Works
Location Rochester, NY **W.O. Number** 687.003
Boring Number B-5 **Total Depth** 6 ft.
Drilling Company Nothnagle
Driller K. Busch **Date** 3-2-94
Drilling Method Rollerbit, split spoon
Log By K. Baker

Depth	Blows/ 6"	Sample Number	N-Value	Rec. (%)	Description/Soil Classification (Color, Texture, Structure)
0 - 2	concr. 16 7 5	1	23	58	6" - 2': Medium Dense, Black CINDERS, some Silt, little fine to coarse Sand, trace Gravel, damp. **[CINDERS; FILL]**
2 - 4	5 5 5 5	2	10	92	2' - 4': Medium Dense, Black, CINDERS and fine to coarse SAND, little Silt and fine to medium Gravel, moist-wet. Grades to Brown-Gray, SILT, some fine to medium Sand and Clay, trace Gravel, damp. **[CINDERS and SAND grading to SILT; FILL]**
4 - 6	2 11 9 6	3	20	71	4' - 6': Medium Dense, Brown-Gary, SILT, some Clay, little fine to medium Sand, slight plasticity, damp. Grades to Brown-Red/brown, fine to coarse SAND and GRAVEL, contains brown vesicular fragments, moist. **[SILT and CLAY grading to SAND and GRAVEL]**
6					Bottom of hole at 6 feet.

BORING LOG

Sketch Map
See Figure 2-1

Project Gleason Works
Location Rochester, NY **W.O. Number** 687.003
Boring Number B-6 **Total Depth** 6 ft.
Drilling Company Nothnagle
Driller K. Busch **Date** 3-2-94
Drilling Method Rollerbit, split spoon
Log By K. Baker

Notes

Depth	Blows/ 6"	Sample Number	N-Value	Rec. (%)	Description/Soil Classification (Color, Texture, Structure)
0–2 (1)	concr. 13 11 9	1	24	58	6" - 2': Medium Dense, Black, SILT, some Cinders and fine to medium Sand, little Clay, trace fine to medium Gravel, slightly compacted in spots, dry-moist. **[SILT; FILL]**
2–4 (3)	7 8 3 4	2	11	67	2' - 4': Medium Dense, Black, SILT and CINDERS, some fine to medium Sand, moist. Grades to Brown-Gray, SILT, some fine to coarse Sand, little clay, trace fine to coarse Gravel, damp. **[SILT/CINDERS grading to SILT; FILL]**
4–6 (5)	2 4 3 4	3	7	79	4' - 6': Loose, Brown-Gray, SILT, increasing Clay with depth, little fine to medium Sand, moderate plasticity, damp. Grades to Dk. Gray-Black, SILT, some fine to medium Sand, little Clay and fine to coarse gravel, damp. **[SILT]**
6					Bottom of hole at 6 feet.

BORING LOG

Sketch Map
See Figure 2-1
Notes

Project Gleason Works
Location Rochester, NY **W.O. Number** 687.003
Boring Number B-7 **Total Depth** 6 ft.
Drilling Company Nothnagle
Driller K. Busch **Date** 3-2-94
Drilling Method Rollerbit, split spoon
Log By K. Baker

Depth	Blows/ 6"	Sample Number	N-Value	Rec. (%)	Description/Soil Classification (Color, Texture, Structure)
	concr.	1	26	67	6" - 2': Medium Dense, Dk. Gray-Black, SILT, some fine to medium Sand and Cinders, little Clay, trace fine to coarse Gravel, damp-moist. **[SILT; FILL]**
1	13				
	13				
2	12				
	5	2	8	83	2' - 4': Loose, Black, fine to coarse SAND and SILT, some fine to coarse Gravel, trace Clay, moist. Grades to Brown-Gray, SILT, some Clay and fine to medium Sand, trace fine to medium gravel, slight plasticity, damp. **[SAND and SILT grading to SILT]**
3	5				
	3				
4	8				
	11	3	18	42	4' - 6': Medium Dense, Brown-Gray, SILT and fine to medium SAND, some Clay, trace fine to medium Gravel, slight plasticity, damp. Grades to Brown, fine to coarse SAND and GRAVEL, little silt and Clay, moist. **[SILT and SAND grading to SAND and GRAVEL]**
5	3				
	15				
6	14				
					Bottom of hole at 6 feet.

BORING LOG

Sketch Map
See Figure 2-1
Notes

Project Gleason Works
Location Rochester, NY
W.O. Number 687.003
Boring Number B-8
Total Depth 6 ft.
Drilling Company Nothnagle
Driller K. Busch
Date 3-2-94
Drilling Method Rollerbit, split spoon
Log By K. Baker

Depth	Blows/ 6"	Sample Number	N-Value	Rec. (%)	Description/Soil Classification (Color, Texture, Structure)
0–2	concr., 13, 8, 6	1	21	92	6" - 2': Medium Dense, Black, SILT, some Cinders, little fine to fine to medium Sand, trace Gravel, damp. **[SILT; FILL]**
2–4	4, 4, 7, 3	2	11	83	2' - 4': Medium Dense, Black, SILT, some fine to medium Sand and Cinders, trace Gravel, damp. Grades to Brown-Gray, some Clay, damp-moist. **[SILT; FILL]**
4–6	9, 11, 6, 3	3	17	96	4' - 6': Medium Dense, Brown-Gray, SILT, some fine to medium Sand and Clay, trace Gravel, slight plasticity, damp-moist. Grades to Tan-Brown, fine to coarse SAND, trace Silt, damp. Grades to Dk. Gray-Black, fine to coarse SAND and GRAVEL, little Silt, moist.
					[SILT grading to SAND grading to SAND and GRAVEL]
					Bottom of hole at 6 feet.

APPENDIX C

CONCEPTUAL DESIGN OF SOIL VAPOR EXTRACTION SYSTEM

CONCEPTUAL DESIGN OF SOIL VAPOR EXTRACTION SYSTEM

1.0 Location of Vacuum Extraction and Inlet Wells

Remediation of the unsaturated contaminated soils requires well spacing such that the effective radius of influence (EROI) of the extraction wells completely encompasses the contaminated area. As a conservative assumption, a 20 foot EROI will be applied for this analysis. The EROI of the three extraction wells should completely encompass the contaminated area and provide greater air flow through the more highly contaminated soils near the center. To prevent a dead zone, one passive inlet well is recommended. An inlet well is especially important for this application because a concrete surface seal is present over the contaminated area.

2.0 Soil Vapor Extraction Equipment

A process schematic of the proposed soil vapor extraction (SVE) system is included. For each of the three extraction wells, piping, controls and instrumentation would be provided to allow for: 1) monitoring the vacuum applied to the well and the resulting flow rate of extracted soil vapor; 2) controlling the applied vacuum and resulting flow rate by the use of a flow control valve; and, 3) sampling the extracted soil vapor.

The piping from the three extraction wells, along with a dilution air inlet would be manifolded together. The dilution air is required for system start-up and to allow the system to operate at extraction flow rates lower than the design condition. The dilution air inlet piping should include provisions to monitor the dilution air inlet flow rate and to control the flow rate with a flow control valve.

The combined vapor stream would then pass through a moisture separator and an air filter. The moisture separator would be used to collect liquid which is extracted from the wells or condenses within the system. The system should be operated to prevent or minimize the extraction of liquid. The volume of liquid collected in the moisture separator is expected to be minimal so it is not necessary to install a system to remove the liquid while the SVE system is on-line. Instead, a manual drain valve is proposed which can be used to drain the moisture separator once the SVE system is temporarily shut-down. Collected liquid would be characterized and disposed of.

In order to determine the site-specific pneumatic characteristics of the soil, pilot testing is required. Pilot testing would provide information regarding the vapor extraction flow rate and vacuum requirements. For cost estimation purposes, it has been assumed that the vapor extraction flow rate per well would be 80 scfm and that the vacuum required to generate a 20-foot EROI would be 50 inches. The SVE vacuum blower must be capable of extracting a minimum of 240 scfm at an applied vacuum of 50 inches at the extraction well plus pressure drops through the piping system and the emission control system. It has been assumed that a regenerative blower would be suitable for this application, with a 10 hp motor.

3.0 Emission Controls Evaluation

For emission controls, a vapor phase carbon system is proposed. The major constituents requiring controls (trichloroethene and cis-1,2-dichloroethene) are amenable to treatment via vapor phase activated carbon. The VOC extraction rate is not known at this time. To estimate the carbon usage, the total contaminant mass to be removed from the contaminated area has been estimated, based on soil boring data. The results are presented in Table 1 which show the estimated mass of VOCs to be removed is 190 pounds. Three carbon canisters are proposed with a flow capacity of 100 scfm each and a carbon capacity of 200 pounds each. These canisters would be manifolded together to act as a single adsorber with a 300 scfm flow capacity and a 600 pound carbon capacity. Two of these adsorbers would be connected in-series and when breakthrough of the first adsorber occurred, the second adsorber would be used as the first in-series and a fresh set of canisters would be used as the second adsorber in-series. It is therefore estimated that a total of 15 canisters will be required for the remediation of the area.

4.0 Budgetary Cost Estimate

The cost estimate is based on the estimates discussed above, and on the assumption that the TCE concentration in the soil can be reduced to 5.6 ppm within one year of operation. The capital cost estimate for installing the SVE system has been estimated to be $116,000, as shown in Table 2. The annual operating cost has been estimated to be $74,000 per year, as shown in Table 3. For a one year operation, the estimated total cost is approximately $190,000.

TABLE 1
SOIL VAPOR EXTRACTION
ESTIMATE OF CARBON USAGE
RCRA PAD CLOSURE
GLEASON WORKS

Contaminant	Average Concentration in Soil (ppm)	Total Volume of Soil (cuyd.)	Total Mass of Soil (Tons)	Total Mass of Contaminant (Lbs.)
Vinyl chloride	0.345	590	885	0.61
Methylene chloride	0.041	590	885	0.07
1,1 dichloroethane	0.042	590	885	0.07
cis-1,2 dichloroethene	44.3	590	885	78.4
Trichloroethene	62.8	590	885	111
Acetone	0.067	590	885	0.12
Total	107.6	590	685	190
Carbon loading				8%
Carbon usage				2381
Number of 200-lb canisters used				12
Extra canisters for break-through prevention				3
Total number of canisters				15

TABLE 2
SOIL VAPOR EXTRACTION COST ESTIMATE
RCRA PAD CLOSURE
GLEASON WORKS

EQUIP. NAME:	INSTALLED COST:
SVE UNIT	$30,000
CARBON VESSELS -- (6)	$9,000
ELECTRICAL AND INSTRUMENTATION (12%)	$4,500
SVE WELLS (3)	$13,200
PASSIVE INJECTION WELL	$3,200
OBSERVATION WELLS	$4,500
PIPING SYSTEM	$3,000
SUBTOTAL:	$67,400
ENGINEERING (15%)	$10,110
PERMITTING	$3,000
CONSTRUCTION SUPERVISION (10%)	$6,740
START UP	$7,000
CARBON CHARACTERIZATION	$4,000
REPORTS/MEETINGS	$7,500
CONTINGENCY (15%)	$10,110
SUBTOTAL SVE CAPITAL COST:	$115,860
SUBTOTAL ANNUAL OPERATING COST (SEE TABLE 3):	$73,787
RANGE OF TOTAL SVE COSTS (ASSUME 1 YEAR OF OPERATION):	$189,647

TABLE 3
O & M COST ESTIMATE
SOIL VAPOR EXTRACTION SYSTEM
RCRA PAD CLOSURE
GLEASON WORKS

OPERATIONS:	HOURS/WEEK:	RATE/HOUR:	COST/WEEK	COST/YEAR:
OPERATOR	8	$60	$480	$24,960
ENGINEERING OVERSIGHT	2	$80	$160	$8,320
PROJECT MANAGEMENT	1	$100	$100	$5,200
PERMIT FEES	*	*	$19	$1,000
MISC. ADMINISTRATION	*	*	$38	$2,000
SUB TOTAL:			$798	$41,480

SUPPLIES:	USAGE	RATE:	COST/WEEK	COST/YEAR:
ELECTRICITY	8 KW	$0.12 $/KW-HR	$161	$8,367
CONDESATE DISPOSAL (HAZ.)	0.5 GAL./DAY	$10.00 $/GAL.	$35	$1,820
CARBON USAGE	9 DRUMS/YR.	$1,000 DRUM	$173	$9,000
INSTUMENT RENTALS	1 DAY/WK	$100 $/DAY	$100	$5,200
MISC. SUPPLIES	1 DAY/WK	$25 $/DAY	$25	$1,300
SUB TOTAL:			$494	$25,707

MAINTENANCE:	USAGE	RATE:	COST/MONTH:	COST/YEAR:
MECHANICS/ELECTRICIANS	4 HRS./MO.	50 $/HR.	$200	$2,400
SUB TOTAL:			$200	$2,400

PERFORMANCE MONITORING:	SAMPLES/MONTH.	RATE:	COST/MONTH.	COST/YEAR:
CONDENSATE SAMPLING	0.25	$200	$50	$600
AIR SAMPLING	1	$300	$300	$3,600
SUB TOTAL:			$350	$4,200

TOTAL ANNUAL OPERATING COSTS:	$73,787

NOTE:

* ELECTRICITY INCLUDES POWER FOR SVE BLOWER AND CONTROLS