EMPIRE
SOILS INVESTIGATIONS INC.

ENVIRONMENTAL INVESTIGATION
WATERFRONT SCHOOL
BUFFALO, NEW YORK

Prepared For:

City of Buffalo
Board of Education
406 City Hall
Buffalo, New York 14202

Attention: Mr. Robert Rua

BTA-90-149
August, 1990
(Ammended)

S-5167 SOUTH PARK AVENUE, P.O. BOX 0913, HAMBURG, NY 14075, 716-649-8110, TELEFAX 716-649-8051

EMPIRE
SOILS INVESTIGATIONS INC.

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APPENDICES

S-5167 SOUTH PARK AVENUE, P.O. BOX 0913, HAMBURG, NY 14075, 716-649-8110, TELEFAX 716-649-8051

EMPIRE
SOILS INVESTIGATIONS INC.

ENVIRONMENTAL INVESTIGATION
WATERFRONT SCHOOL
BUFFALO, NEW YORK

I. INTRODUCTION

A. General

Empire Soils Investigations, Inc. (ESI) was contracted by the City of Buffalo Board of Education to conduct a limited subsurface exploration and analytical testing program at the Waterfront School in Buffalo, New York. A site location plan is presented as Drawing No. 1 in Appendix A. The environmental investigation was conducted in accordance with ESI's proposal dated July 26, 1990.

B. Purpose and Scope

The purpose of the environmental investigation was to investigate the possible presence of ferric cyanide and USEPA target compound list parameters on the southern boundary of the Buffalo Waterfront School. Reportedly, ferric cyanide has been found and removed from the adjacent National Fuel Gas property relatively close to the southern boundary of the school.

In order to accomplish this purpose, ESI completed the following scope of services in agreement with the school board:

- Made a site visit to layout boring locations and observe the location of the National Fuel Gas excavation;
- Advanced six* (6) borings through the fill materials along the boundary between the Waterfront School and National Fuel Gas;
- Prepared subsurface boring logs;
- Measured organic vapor and hydrogen cyanide concentrations during the exploration phase of this project;
- Obtained subsurface soil samples for analytical testing;
- Engaged the services of a New York State Department of Health (NYSDOH) certified environmental laboratory, Huntingdon Analytical Services (HAS) to analyze the soil samples;
- Evaluated the data collected, and;
- Summarized the information in this report.

The opinions, conclusions and recommendations in this report are based solely on the above scope of services. Limitations to this environmental investigation are presented in Appendix B.

II. SUBSURFACE EXPLORATION

A. General

ESI advanced six (6) test borings (SB-1 through SB-6) along a portion of the southern border of the City of Buffalo Waterfront School on July 25, 1990. The boring locations are illustrated on Drawing No. 2 in Appendix A. The six (6) borings were spaced at generally equal distances along the southern border of the portion of the Waterfront School property adjacent to the National Fuel Gas excavation. The test borings were advanced to determine the subsurface conditions at the site and obtain soil samples for analytical testing.

B. Methods

ESI advanced the test borings using a truck mounted rotary drill rig, Model CME-45B. ESI used 2-1/4-inch hollow stem augers to advance the boreholes. Representative samples of the subsurface soils were obtained by driving a precleaned 2-inch diameter stainless steel split-spoon sampler into the undisturbed material below the auger casing, with a 140-pound hammer falling freely a distance of thirty (30)-inches (ASTM Method D-1586).

The recovered subsurface soil samples were visually classified in the field by an ESI environmental geologist using ASTM Method D-2488. Features such as relative density and consistency (obtained from the blow counts), color, grain size, moisture, etc. were recorded on the boring logs. Organic vapor measurements of

the headspace in the soil sample jars were made using a calibrated photoionization detector (PID). The PID used was a Hnu Model 101S equipped with an 11.7 eV ultraviolet light source.

C. Subsurface Conditions

ESI advanced each of the borings through the fill materials encountered into the apparent native clayey-silts or silty-clays beneath the site. Detailed descriptions of the soil conditions encountered in each borehole are presented on the subsurface logs in Appendix C. The fill thicknesses encountered at each borehole are summarized below:

Boring Number	Depth of Fill (Feet)
SB-1	8
SB-2	15
SB-3	15
SB-4	13
SB-5	14
SB-6	13.5

The fill materials consisted of a wide variety of natural and man-made materials. Silt, sand and gravel fill materials are mingled with varying amounts of bricks, cinders, slag, glass, concrete, lime-like materials, black-blue fine sand (possible ferric cyanide), and wood. Indicators of potential environmental concerns are summarized below:

Boring No.	Range of PID Measurements in Sample Jar Headspace (ppm)	Subsurface Log Notations
SB-1	BG-11	-------
SB-2	8-80	Oil sheen on water. Blue-black fine to coarse sand (possible ferric cyanide).
SB-3	BG-180	Coke/Coal tar odor.
SB-4	BG-25	-------
SB-5	BG-110	Very strong petroleum or coke odor. Oil sheen on water.
SB-6	BG-130	Very strong petroleum odor. Minute oil pockets, very distinct sheen.

Soil boring SB-2 had some blue-black material that could be ferric cyanide. Ferric cyanide is usually characterized by a distinct blue coloring.

The photoionization detector (organic vapor) measurements at various depths below grade are summarized on Table 1. Elevated photoionization measurements are an indication of potential environmental contamination. In general, measurements above 10 ppm (parts per million) merit additional investigation or chemical analysis.

TABLE 1

SUMMARY OF PID MEASUREMENTS IN SAMPLE JAR HEADSPACE AT VARIOUS DEPTHS BELOW GRADE

	PID Concentration (ppm)					
Depth	SB-1	SB-2	SB-3	SB-4	SB-5	SB-6
0-2'	11	*	BG	NS	NS	NS
2-4'	BG	*	*	5-6	BG-4.8	*
4-6'	BG-8	*	5-6	20	8	BG
6-8'	7	*	BG-6	25	70-110	*
8-10'	9.5	8	BG	22	*	70-80
10-12'	NS	9	5-6	BG	*	120-130
12-14'	NS	7	150-180	*	15-17	50-56
14-16'	NS	50-80	70-80	NS	50	NS

Note:
* =Insufficient sample available for measurement.
BG =Ambient Air Background Condition
ppm =parts per million
NS =No Sample

III. LABORATORY ANALYTICAL TESTING

A. Procedures and Methods

Huntingdon Analytical Services, a division of Empire Soils Investigation and a certified NYSDOH environmental laboratory (No. 10833) performed the analyses on the soil samples. The soil samples were cooled and transported to the laboratory using a chain-of-custody record. A copy the of the chain-of-custody is attached to the analytical results in Appendix D. This report presents the results of the analyses for ferric cyanide indicator parameters. A direct test for ferric cyanide with approved methods was not identified, however ESI tested the soil for total iron (ferric and ferrous materials), total cyanide, and releasable cyanide. The analytical test methods were as follows:

Parameter	EPA Method
Total Iron	SW846 - 6010
Total Cyanide	SW846 - 9010
Total Releasable Cyanide	SW846 - 9010 and Reactivity Test
TCL Volatiles	8240
TCL Semi-Volatiles	8270
TCL Pesticide/PCB's	8080
TAL Metals	6010, 7060, 7421, 7471, 7740, 7841,

A copy of the reactivity test (total releasable cyanide) is presented in Appendix E of this report for reference purposes.

The subsurface soil samples submitted for analyses were representative of the materials from the following depths below grade:

Boring	Soil Sample Interval for Analysis
SB-1	0 to 8'
SB-2	0 to 8'
SB-3	2 to 12'
SB-4	4 to 10'
SB-5	4 to 12'
SB-6	2 to 10'

These depths were determined by the on-site environmental geologist based on the presence of fill materials and classification of the materials.

B. Soil Test Results for Ferric Cyanide Indicator Parameters

The results of the analytical testing of the six (6) soil samples are summarized below:

	Concentration (mg/kg) (ppm) *		
Boring No.	Iron (Total)	Cyanide (Total)	Total Releasable Cyanide
SB-1	9,550	21	<50
SB-2	9,380	6.6	<50
SB-3	10,100	7.8	<50
SB-4	10,400	21	<50
SB-5	16,000	31	<50
SB-6	15,300	14	<50

* = mg/kg (milligrams per kilogram on dry weight basis)
ppm = parts per million

The iron concentrations in the six (6) samples were all well below the average natural abundance of iron in soils and crystal rock.

Cyanide was detected in each of the soil samples ranging from 6.6 to 31 ppm. This indicates that ferric cyanide or other cyanide

containing compounds are present. The USEPA and NYSDEC characterize cyanide containing waste as hazardous if the material fails the reactivity test (total releasable cyanide). A copy of this test method is presented in Appendix E. Simply stated if the waste reacts with an acid solution to produce hydrogen cyanide gas, a measurement of the total releasable cyanide is made. The amount of total releasable cyanide is compared to the current EPA action level of 250 mg HCN/kg waste. No releaseable cyanide was detected in any of the soil samples tested from the six (6) borings. Therefore these soils would not be considered a hazardous waste based on reactivity (i.e. total releasable cyanide).

C. Target Compound List Analyses Results

The soil samples from each boring were analyzed for the USEPA Target Compound List (TCL) parameters in addition to the ferric cyanide indicators. This section of the report details the results of the TCL analysis. The Target Compound List is a list of pollutants identified by the USEPA. The compounds are divided into four fractions; these fractions are the volatiles, semi-volatiles, pesticide/PCB and metals. Cyanide is also on the USEPA target compound list but was discussed in a previous section.

There were no PCB or pesticide compounds present above the analytical detection levels in the six soil samples.

Two volatile compounds and 19 semi-volatile compounds were

detected in one or more of the soil samples. These detectable compounds are summarized on Table 2. The laboratory report for TCL Analysis are presented in Appendix D.

Volatile compounds were detected in borings SB-5 and SB-6 only. The compounds detected were ethyl benzene and xylenes.

The semi-volatile compounds detected generally fall into the category known as polynuclear aromatic hydrocarbons (PAH's) which are components of coal tars. There are no known New York State acceptable standards for the coal tars compounds in soil. The New Jersey cleanup standard for known coal tar contamination of soil is that the summation of all coal tar compounds be less than 10 ppm (ug/kg). The summation of the detectable coal tar compounds based on the analyses from each of the soil samples is summarized below:

Boring Number	Summation of Coal Tars (mg/kg)(ppm)
SB-1	101.23
SB-2	35.53
SB-3	1.8
SB-4	40.36
SB-5	600.7
SB-6	39.62

If the New Jersey criteria is applied to this site, areas around SB-1, SB-2, SB-4, SB-5, and SB-6 would potentially require cleanup. Routes of potential exposure and environmental degradation should be factored into determining the clean up requirements.

TABLE 2

SUMMARY OF TCL ORGANIC COMPOUNDS
PRESENT ABOVE DETECTION LEVELS IN ONE
OR MORE OF THE SUBSURFACE SOIL SAMPLES
WATERFRONT SCHOOL, BUFFALO, NEW YORK

Parameter	SB-1	SB-2	SB-3	SB-4	SB-5	SB-6	EPA Criteria (1)
Volatiles:							
Ethyl benzene	<0.5	<0.5	<0.5	<0.5	3.1	82.0	6.0
Xylene (total)	<0.5	<0.5	<0.5	<0.5	3.8	130.0	28.0
Semi-Volatiles:							
Acenaphthene	1.9	2.8	<0.33	1.8	42.0	0.59	3.4
Acenaphthylene	<0.33	<0.33	<0.33	0.36	<1.65	<0.33	4.0
Anthracene	3.7	2.0	<0.33	3.1	38.0	1.1	4.0
Benzo(a)anthracene	8.3	1.4	<0.33	2.4	38.0	3.8	8.2
Benzo(b)fluoranthene	6.7	0.98	<0.33	1.7	29	2.6	3.4
Benzo(k)fluoranthene	6.6	1.3	<0.33	1.7	25	2.7	3.4
Benzo(a)pyrene	7.7	1.5	<0.33	1.9	33	3.2	1.5
Benzo(g,h,i)perylene	5.6	1.3	<0.33	1.7	20	2.1	8.2
Bis(2-ethylhexyl) phthalate	0.43	<0.33	<0.33	<0.33	<1.65	<0.33	28
Chrysene	7.8	1.3	<0.33	2.2	32.0	3.4	8.2
Dibenz(a,h)anthracene	1.1	<0.33	<0.33	<0.33	4.7	0.52	8.2
Dibenzofuran	1.0	3.2	<0.33	1.7	31.0	0.42	Unknown
Fluoranthene	14.0	2.4	<0.33	5.6	68.0	6.4	8.2
Fluorene	1.7	3.9	<0.33	2.6	33.0	0.59	4.0
Indeno(1,2,3-cd)pyrene	4.9	0.95	<0.33	1.7	21.0	2.0	8.2
2-Methyl Naphthalene	0.73	1.6	<0.33	<0.33	3.0	<0.33	Unknown
Naphthalene	1.5	3.8	1.8	1.9	23.0	1.7	3.1
Phenanthrene	12.0	5.1	<0.33	4.2	110.0	3.5	3.1
Pyrene	16.0	2.0	<0.33	5.8	50.0	5.0	8.2

(1) - Final treatment standards for multi-source leachates (F039 Wastes)

The EPA issued regulations on June 1, 1990 (FR 22520-22720) that included treatment standards for multisource leachates (F039 wastes). While these regulations are not specifically directed at contaminated soils from unknown sources they do provide a basis for determining the significance of the contamination. The EPA criteria is presented on Table 2. One or more compounds are present in borings SB-1, SB-2, SB-4, SB-5 and SB-6 which exceed the EPA criteria. Therefore, it is possible that cleanup will be required by the NYSDEC.

The potential impact of dibenzofuran detected in the soil is unknown. Dibenzofuran have been associated with dioxin contamination on other site.

The target analyte metals results are summarized on Table 3. The concentrations of aluminum, calcium, copper, lead, magnesium, mercury nickel and zinc exceeded the typical background concentrations in soils in one or more samples. This is probably related to the presence of man-made fill materials in the subsurface. Determination of the environmental and health impact if any of these metals is beyond the requested scope of services.

TABLE 3

SUMMARY OF TAL* METALS IN SUBSURFACE SOIL SAMPLES WATERFRONT SCHOOL, BUFFALO, NEW YORK

	Concentration (mg/kg)						
Analyte	SB-1	SB-2	SB-3	SB-4	SB-5	SB-6	Range of Background in New York State**
Aluminum	4,150	5,780	5,840	3,700	2,980	8,510	1,000-2,500
Antimony	<39.1	<4.27	<3.82	<35.0	<3.88	<4.81	Unknown
Arsenic	6.27	2.67	2.58	1.36	5.04	3.57	0.1-12
Barium	71.6	41.9	24.2	24.1	150	63.2	15-600
Beryllium	<7.81	<0.85	<0.76	<6.99	<0.78	<0.96	0-1.75
Cadmium	<19.5	<2.14	<1.91	<17.5	<1.94	<2.40	0.01-2
Calcium	51,100	27,800	32,200	89,000	30,600	20,300	130-35,000
Chromium	<15.6	7.85	6.47	<14.0	8.69	11.8	1.5-25
Cobalt	<15.6	4.90	3.49	<14.0	2.91	7.34	2.5-60
Copper	39.4	14.1	14.0	148	61.5	33.7	<1-15
Iron	9,550	9,380	10,100	10,400	16,000	15,300	17,500-25,000
Lead	93.8	41.0	34.1	4,090	165	421	1-12.5
Magnesium	7,050	7,050	18,200	45,000	7,850	6,170	1,700-6,000
Manganese	244	153	266	281	166	283	50-5,000
Mercury	0.22	0.16	0.54	<0.13	<0.14	0.59	0.042-0.2
Nickel	31.4	20.5	21.8	41.2	19.0	29.1	0.5-25
Potassium	<2,340	390	623	<2,100	496	1,060	8,500-43,000
Selenium	<0.39	<0.43	<0.38	<0.35	<0.39	<0.48	<0.1-0.125
Silver	<7.81	<0.85	<0.76	<6.99	<0.78	<0.96	Unknown
Sodium	<39.1	163	131	<35.0	178	110	6000-8000
Thallium	<0.78	<0.85	<0.76	<0.70	<0.78	<0.96	Unknown
Vanadium	<15.6	12.2	10.7	<14.0	10.7	15.5	25-60
Zinc	133	58.5	59.2	108	180	607	37-60

*TAL - Target Analyte List

** Source - NYSDEC, "Background Concentrations of 20 Elements in Soils with Special Regard for New York State.

IV. SUMMARY AND CONCLUSIONS

The conclusions and opinions presented in this report are based on the information obtained during this environmental investigation and are subject to the limitations presented in Appendix B. The relevant findings are summarized below:

- Thickness of fill materials ranged from approximately 8 to 15 feet;
- The fill materials observed contain natural and manmade materials consisting of silt, sand and gravel commingled with bricks, cinders, slag, glass, concrete, lime-like materials, traces of blue-black material, and wood;
- The traces of blue-black material may be possible ferric cyanide;
- Relatively high organic vapor (PID) readings were noted from one or more of the soil samples from each borings;
- Oily sheens were noted on water recovered in the split spoons from SB-3 and SB-5;
- Coke/coal tar odor was note in boring SB-3;
- A very strong petroleum or coke odor was noted in borings SB-5 and SB-6;
- Cyanide was detected in the soil samples from each of the borings. The cyanide concentrations ranged from 6.6 to 31 ppm;
- No releasable cyanide was detected and the soil would not be classified as a hazardous waste based on the amount of total releasable cyanide;
- Iron concentrations were relatively low compared to typical background concentrations;
- No pesticides or PCB's were detected in the soil samples;

- o Ethyl benzene and xylenes were detected in borings SB-5 and SB-6;
- o Coal tar related compounds were present in each of the borings. The summation of the coal tar compounds exceeded 10 ppm in borings SB-1, SB-2, SB-4, SB-5, and SB-6; and,
- o Concentrations of aluminum, calcium, copper lead, magnesium, mercury, nickel and zinc in one or more of the soil samples exceeded background concentrations.

In summary, there appears to be some cyanide contamination at relatively low levels such that the soil would not be considered a hazardous waste based on total releasable cyanide content. However, there are indicators of other types of environmental contamination based on the relatively high organic vapor readings, the presence of coke, coal tar and/or petroleum odors, the presence of significant quantities of fill (8 to 15 feet), the presence of elevated concentrations of volatile and semi-volatile compounds, and the presence of some metals above background levels. Volatile and/or semi-volatile compounds exceeded the EPA cleanup criteria in five of the six borings therefore it is possible the cleanup may be required by the NYSDEC.

The assessment of risk at this site would be based on potential routes of exposure and degradation of the environment. A detailed risk assessment is beyond the present scope of this investigation. The New York State Department of Environmental Conservation and New York State Department of Health should be contacted to determine the significance of the compounds detected.

Respectfully Submitted,
EMPIRE SOILS INVESTIGATIONS, INC.

Lori A. Zimmerman

Lori A. Zimmerman
Environmental Geologist

David M. Harty

David M. Harty, P.E.
Senior Environmental Engineer

cab

NATIONAL FUEL.

LEGEND:

SOIL BORING LOCATIONS.

NOTES:

THIS DRAWING IS FOR ILLUSTRATIVE PURPOSES ONLY.

TAPED MEASUREMENTS TAKEN ALONG THE FENCE LINE ARE APPROXIMATE.

FERRIC CN EXCAVATION PIT.

9'

27'

27'

27'

SB-1

SB-2

SB-3

SB-4

SB-5

SB-6

35'

27'

ASPHALT PAVED PARKING.

BUFFALO WATERFRONT SCHOOL.

CONCRETE SIDE WALK

ENTRANCE TO WATERFRONT SCHOOL FROM 4TH STREET.

EMPIRE SOILS INVESTIGATIONS INC

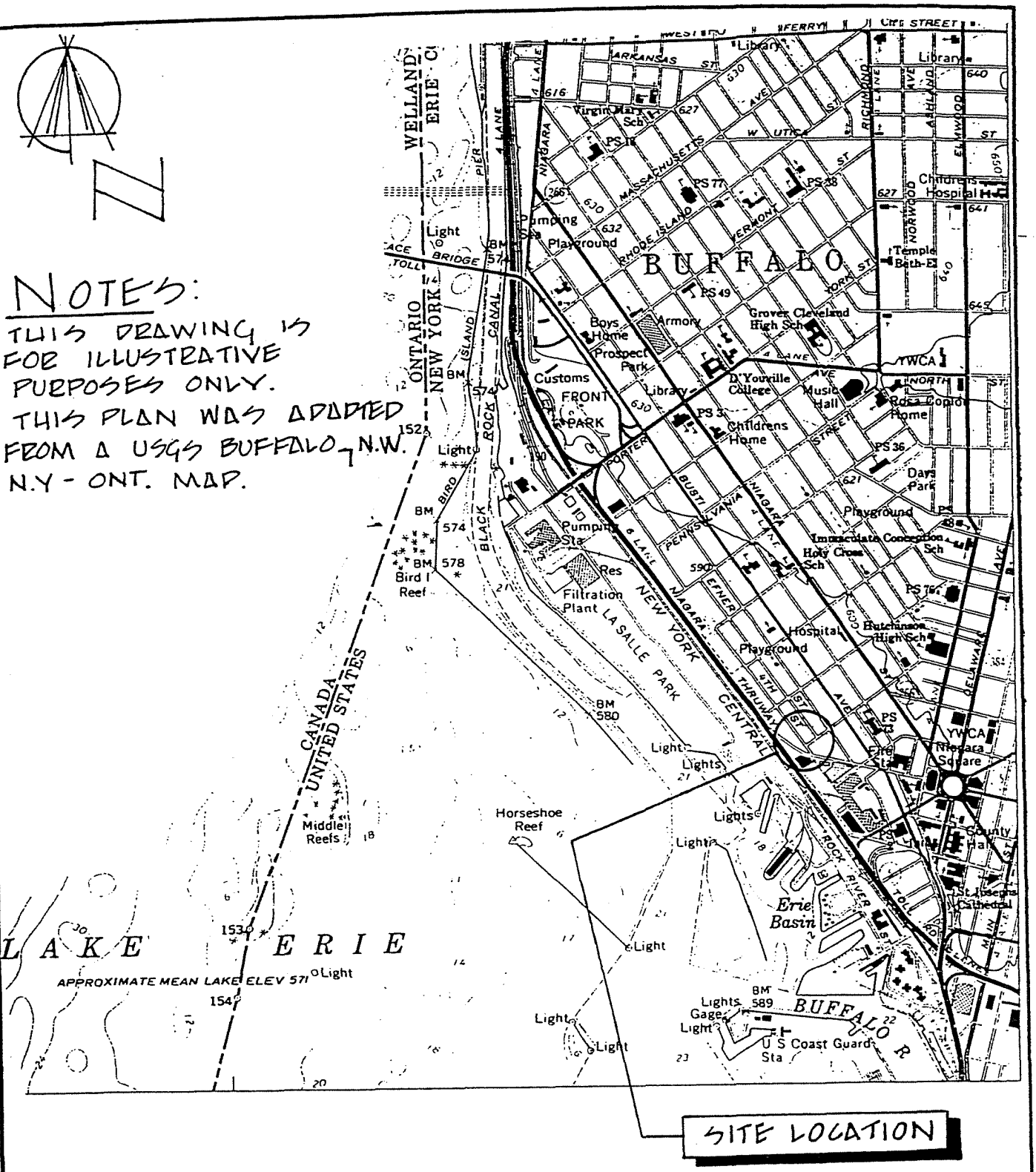
SUBSURFACE INVESTIGATION PLAN

BUFFALO WATERFRONT SCHOOL
4TH STREET BUFFALO, N.Y.

DR.BY: D.W. LABELLE	SCALE: 1" = 20'	PROJ. NO. BTA	
CK'D.BY: L.Z.	DATE: JULY '90	DRWG.NO: 2	

EMPIRE SOILS INVESTIGATIONS, INC.
S-5167 SOUTH PARK AVENUE
HAMBURG, NEW YORK 14075

APPENDIX A



QUADRANGLE LOCATION

EMPIRE SOILS INVESTIGATIONS INC

SITE LOCATION PLAN.

ENVIRONMENTAL INVESTIGATION
WATERFRONT SCHOOL
BUFFALO, NEW YORK

DR.BY: D.W. LABELLE	SCALE: 1" = 2000'	PROJ. NO. BTA 90 149
CK'D.BY: D.H.	DATE: AUG. 1990	DRWG.NO. 1

R/T FORM R-1

EMPIRE SOILS INVESTIGATIONS, INC.
S-5167 SOUTH PARK AVENUE
HAMBURG, NEW YORK 14075

APPENDIX B

APPENDIX B

LIMITATIONS

1. Empire Soils Investigations, Inc. (ESI's), Environmental Investigation was completed in accordance with generally accepted current practices of other consultants undertaking similar studies. ESI observed that degree of care and skill generally exercised by other consultants under similar circumstances and conditions. ESI's findings and conclusions must be considered not as scientific certainties but as probabilities based on our professional judgement concerning the significance of the limited data gathered during the course of the investigation. Specifically, ESI does not and cannot represent that the site contains no hazardous material, petroleum products, or other latent conditions beyond that observed by ESI during this Environmental Investigation.

2. ESI can assume no responsibility for the undetected presence of either identified potential conditions or other latent conditions.

3. The observations described in this report were made under conditions stated therein. The conclusions presented in the report were based solely upon the services described therein and not tasks and procedures beyond the scope of described services or the time and budgetary constraints imposed by the client.

4. Observations were made of the subject site and on adjacent sites as indicated within the report. Due to the presence of fill materials, ESI renders no opinion as to the presence of hazardous materials or to the presence of indirect evidence relating to hazardous material in that portion of the site where there was no subsurface investigation.

5. Unless otherwise specified in the report, ESI did not perform testing or analyses to determine the presence of concentrations asbestos, radon, or petroleum products.

6. The purpose of this report was to assess the physical characteristics of the subject site with respect to the presence in the environment of ferric cyanide. No specific attempt was made to check on the compliance of present or past owners or operators of the site with Federal, State or Local laws and regulations, environmental or otherwise.

LIMITATIONS
(Continued)

7. Where laboratory analysis have been conducted by an outside laboratory, ESI has relied upon the data provided and has not conducted an independent evaluation of the reliability of these data.

8. This report has been prepared for the exclusive use of City of Buffalo Board of Education and its designated agents for the specific application to the subject properties in accordance with generally accepted engineering practice. No other warranty, expressed or implied, is made. The environmental concerns noted in this report (if any) are applicable to the current identified proposed usage of the property.

EMPIRE SOILS INVESTIGATIONS, INC.
S-5167 SOUTH PARK AVENUE
HAMBURG, NEW YORK 14075

APPENDIX C

DATE
STARTED 7/25/90
FINISHED 7/25/90
SHEET 1 OF 1

EMPIRE SOILS INVESTIGATIONS INC. SUBSURFACE LOG

HOLE NO. B-1
SURF. ELEV. —
G. W. DEPTH See Note

PROJECT Waterfront School (BTA-90-149)
LOCATION 4th Street Buffalo, New York

DEPTH-FT	SAMPLES	SAMPLE NO	BLOWS ON SAMPLER 0/6	6/12	12/18	N	BLOW ON CASING C	SOIL OR ROCK CLASSIFICATION	NOTES
0								.4' TOPSOIL	
		1	2	8		23		Brown-black Clayey SILT, some f-c Sand, tr. gravel, tr. brick, tr. cinders, tr. glass (moist, FILL)	
			15	20				Contains tr. concrete/lime (wet)	
		2	17	15		26		Contains "and" Brick	
			11	12					
5		3	22	17		27			
			10	6					
		4	6	6		16			
			10	4				Red-white BRICK, some f-c Sand, little Silt (wet, FILL)	WOH=Weight of hammer
		5	1	WOH		WOH			
10			WOH	2				Brown f-c SAND, some Clayey Silt, tr.-little f-gravel (GLACIAL TILL) (moist-wet, loose)	
								Boring complete at 10.0'	
15									
								Composite samples for analytical testing taken from S-1 to S-4 at 10:30 am.	
20									PID=Organic vapor measurements taken with a Photoionization Detector (PID). Measurements recorded in parts per million (ppm).
									BG=Background PID measurements = 0.0-1.8 ppm
25									

N = No blows to drive 2 " spoon 12 " with 140 lb. pin wt. falling 30 "per blow.
C = No blows to drive ____ " casing ____ " with ____ lb. weight falling ____ "per blow.

CLASSIFICATION Visual by Geologist

METHOD OF INVESTIGATION ASTM D-1586 USING 2-1/4" HOLLOW STEM AUGERS

DATE
STARTED 7/25/90
FINISHED 7/25/90
SHEET 1 OF 1

EMPIRE SOILS INVESTIGATIONS INC. SUBSURFACE LOG

HOLE NO. B-2
SURF. ELEV. —
G. W. DEPTH See Note

PROJECT Waterfront School (BTA-90-149)
LOCATION 4th Street Buffalo, New York

DEPTH-FT	SAMPLES	SAMPLE NO	BLOWS ON SAMPLER 0/6	6/12	12/18	N	BLOW ON CASING C	SOIL OR ROCK CLASSIFICATION	NOTES
0								.5' TOPSOIL	
		1	1	10		20		Brown f-c GRAVEL (CRUSHED STONE), some f-c Sand, little Silt, tr. brick, tr. concrete (moist, FILL)	
			10	9					
		2	5	11		33			
			22	6				Contains tr. lime, tr. slag, tr. cinders (wet)	
5		3	3	1		2		Black-blue f-c SAND, little Silt, tr. gravel (wet, FILL)	
			1	1					
		4	1	5		6			
			1	1					
		5	3	3		6		Contains some Silt	
			3	5					
10		6	2	5		8			
			3	2					
		7	2	2		5	*		
			3	3					
15		8	10	10		16			
			6	15				Olive-black Silty CLAY, little-some f-c Sand, tr. gravel (wet, stiff)	
								Boring complete at 16.0'	

*Note oily sheen on water in spoon

Composite sample for analysis taken from S-2 to S-4 at 12:20 pm.

PID Reading=13.0-15.0 ppm in borehole at completion.

PID=Organic vapor measurements taken with a Photoionization Detector (PID). Measurements recorded in parts per million (ppm).

BG=Background PID measurements 2.5-5.0 ppm

*Samples 1 to 4 have no material in the jar due to analytical samples.

N = No blows to drive 2 " spoon 12 " with 140 lb. pin wt. falling 30 "per blow. CLASSIFICATION Visual by Geologist

C = No blows to drive ____ " casing ____ " with ____ lb. weight falling ____ "per blow.

METHOD OF INVESTIGATION ASTM D-1586 USING 2-1/4" HOLLOW STEM AUGERS

DATE
STARTED 7/25/90
FINISHED 7/25/90
SHEET 1 OF 1

EMPIRE SOILS INVESTIGATIONS INC. — **SUBSURFACE LOG**

HOLE NO. B-3
SURF. ELEV. —
G. W. DEPTH See Note

PROJECT Waterfront School (BTA-90-149)
LOCATION 4th Street Buffalo, New York

DEPTH-FT	SAMPLES	SAMPLE NO	BLOWS ON SAMPLER 0/6	6/12	12/18	N	BLOW ON CASING C	SOIL OR ROCK CLASSIFICATION	NOTES
0		1	5	8		13		Brown f-c SAND, little f-m Gravel, tr. silt, tr. brick, tr. stone (moist, FILL)	
			5	8					
		2	5	2		4	*		*Poor recovery on S-2
			2	1					
5		3	2	1		3		Becomes black Contains tr. gravel (wet, FILL)	
			1	1					
		4	2	2		4			
			2	2					
		5	1	4	26/.5	REF			
10		6	50/1			REF			Samples have odor of coke/coal tar coke
		7	6	5		9		Contains some f-c Gravel, tr. lime, tr. wood (moist, FILL)	
			4	8					
15		8	15	23		44		Black Sandy SILT, tr. gravel (moist-wet, FILL)	
			21	12				Brown Silty CLAY, little f-c Sand, tr. gravel (GLACIAL TILL)(moist, HARD)	
								Boring complete at 16.0'	
								PID Reading 10.0-12.0 ppm at boring completion in augers	
								Composite sample for analysis taken from S-2 to S-6 at 1:30 pm.	

REF=split-spoon refusal
PID=Organic vapor measurements taken with a Photoionization Detector (PID). Measurements recorded in parts per million (ppm).

BG=Background measurements = 0.0-0.5 ppm

PID / Jar Head Space
BG
-
5-6
BG-6
BG
5-6
15(
18(
70-80

N = No. blows to drive 2 " spoon 12 " with 140 lb. pin wt. falling 30 " per blow.
C = No. blows to drive ____ " casing ____ " with ____ lb. weight falling ____ " per blow.

CLASSIFICATION Visual by Geologist

METHOD OF INVESTIGATION ASTM D-1586 USING 2-1/4" HOLLOW STEM AUGERS

DATE
STARTED 7/25/90
FINISHED 7/25/90
SHEET 1 OF 1

EMPIRE SOILS INVESTIGATIONS INC. **SUBSURFACE LOG**

HOLE NO. B-4
SURF. ELEV. ——
G. W. DEPTH See Note

PROJECT Waterfront School (BTA-90-149)
LOCATION 4th Street Buffalo, New York

DEPTH-FT	SAMPLES	SAMPLE NO	BLOWS ON SAMPLER 0/6	6/12	12/18	N	BLOW ON CASING C	SOIL OR ROCK CLASSIFICATION	NOTES
0								SLAG FILL SUBGRADE	
		1	2	3		7		Black f-c GRAVEL, some f-c Sand, tr. silt, tr. wood, tr. slag (moist, FILL)	
			4	2					
5		2	1	3		6		Contains little Brick, occasional brown silty clay layer	
			3	9					
		3	8	8		14		Black f-c SAND, some f. Gravel, little Silt (wet, FILL)	
			6	10					*
		4	6	8		18		Contains tr. wood, tr brick	
10			10	11					
		5	8	5		9			
			4	3					
		6	3	4		6			
			2	2				Brown Silty CLAY, little f-m Sand, tr. gravel (moist, medium)	
15								Boring complete at 14.0'	
20								Composite sample for analysis taken from S-2 - S-4 at 2:30 pm.	PID=Organic vapor measurements taken with a Photoionization Detector (PID). Measurements recorded in parts per million (ppm).
									BG=Background PID measurements =0.0-5.0 ppm.
									* No jar PID reading becuase of analytical sample.

N = No. blows to drive 2 " spoon 12 " with 140 lb. pin wt. falling 30 "per blow. CLASSIFICATION Visual by Geologist

C = No blows to drive ____ " casing ____ " with ____ lb. weight falling ____ "per blow.

METHOD OF INVESTIGATION ASTM D-1586 USING 2-1/4" HOLLOW STEM AUGERS

DATE
STARTED 7/25/90
FINISHED 7/25/90
SHEET 1 OF 1

EMPIRE SOILS INVESTIGATIONS INC. SUBSURFACE LOG

HOLE NO. B-5
SURF. ELEV. ——
G. W. DEPTH See Note

PROJECT Waterfront School (BTA-90-149)
LOCATION 4th Street Buffalo, New York

DEPTH FT	SAMPLES	SAMPLE NO	BLOWS ON SAMPLER 0/6	6/12	12/18	N	BLOW ON CASING C	SOIL OR ROCK CLASSIFICATION	NOTES	PID Jar Head spac
0								SLAG SUBBASE FILL		-
		1	9	3		5		Black-gray f-c SAND, little f-m Gravel, little Silt, tr. lime, tr. slag (moist, FILL)		BG-4.8
			2	2						
5		2	1	1		2		Contains occasional olive-green-brown Silty CLAY lenses	Very strong petroleum or coke odor.	8
			1	6						
		3	2	3		11			Oil sheen on water in spoon.	70-110
			8	8						
		4	2	2		4		Becomes black		*
10			2	2				Contains tr. gravel		
		5	WOH			WOH				*
			WOH							
		6	1	1		2				15-17
			1	4						
15		7	6	7		23		Gray f. SAND, some Silt, tr. gravel, occasional black silt partings (moist, firm)		50
			16	16						
								Boring complete at 16.0'	WOH=Weight of hammer	
20								Composite sample for analysis taken from S-2 to S-5 at 3:30 pm.	PID=Organic vapor measurements taken with a Photoionization Detector (PID). Measurements recorded in parts per million (ppm).	
									BG=Background PID measurements=0.0-5.0 ppm.	
									*No jar PID readings due to analytical samples.	

N = No. blows to drive 2 " spoon 12 " with 140 lb. pin wt. falling 30 " per blow. CLASSIFICATION Visual by Geologist

C = No. blows to drive ____ " casing ____ " with ____ lb. weight falling ____ " per blow.

METHOD OF INVESTIGATION ASTM D-1586 USING 2-1/4" HOLLOW STEM AUGERS

DATE
STARTED 7/25/90
FINISHED 7/25/90
SHEET 1 OF 1

EMPIRE SOILS INVESTIGATIONS INC. SUBSURFACE LOG

HOLE NO. B-6
SURF. ELEV. ——
G. W. DEPTH See Note

PROJECT Waterfront School (BTA-90-149)
LOCATION 4th Street Buffalo, New York

DEPTH-FT	SAMPLES	SAMPLE NO	BLOWS ON SAMPLER 0/6	6/12	12/18	N	BLOW ON CASING C	SOIL OR ROCK CLASSIFICATION	NOTES
0								TOPSOIL & SLAG SUBBASE FILL	
		1	2	1		2		Brown f-c SAND and f-c Gravel, little Silt, tr. slag (wet, FILL)	
			1	2					
5		2	1	1		2			
			1	1				Contains tr. brick, some-little f-c Gravel	
		3	2	3		5		Contains tr. wood, occasional gray silty clay layer	
			2	2					
		4	2	2		4			
10			2	2					Very strong petroleum odor, minute oil pockets, very distinct sheen
		5	2	2		3			
			1	1					
		6	2	3		7			
			4	3				Brown-gray f. SAND and Silt, tr. gravel (wet)	
15								Boring complete at 14.0'	

PID Reading=15.0-17.0 ppm with augers set at 12.0'

Composite sample for analysis taken from S-1 to S-4 at 4:30 pm

PID=Organic vapor measurements taken with a Photoionization Detector (PID). Measurements recorded in parts per million (ppm).

BG=Background PID measurements= 0.0-4.0 ppm

*No jar PID readings due to analytical samples.

PII Jar Head spac
-
*
BG
*
70-80
120
130
50-56

N = No. blows to drive 2 " spoon 12 " with 140 lb. pin wt. falling 30 "per blow. CLASSIFICATION Visual by Geologist

C = No. blows to drive ____ " casing ____ " with ____ lb. weight falling ____ "per blow.

METHOD OF INVESTIGATION ASTM D-1586 USING 2-1/4" HOLLOW STEM AUGERS

EMPIRE SOILS INVESTIGATIONS, INC.
S-5167 SOUTH PARK AVENUE
HAMBURG, NEW YORK 14075

APPENDIX D

HAS

HUNTINGDON ANALYTICAL SERVICES
Division of **EMPIRE SOILS INVESTIGATIONS INC.**
PO Box 250 Middleport New York 14105
Tel: (716) 735-3400 FAX (716) 735-3653

Environmental Analytical Report For:

EMPIRE SOILS INVESTIGATIONS, INC. - HAMBURG

WATERFRONT SCHOOL

HAS Ref. #90-995

August 1, 1990

HAS

HUNTINGDON ANALYTICAL SERVICES
ELAP #10833
ENVIRONMENTAL REPORT

HAS Reference Numbers: #90-995

August 1, 1990

Statement of Work Performed

I hereby declare that the work was performed under my supervision according to the procedures outlined by the following references and that this report provides a correct and faithful record of the results obtained.

- 40 CFR Part 136, "Guidelines Establishing Test Procedures for the Analysis of Pollutants Under the Clean Water Act," October 26, 1984 (Federal Register) U.S. Environmental Protection Agency.
- U.S. Environmental Protection Agency, "Test Methods of Evaluating Solid Waste - Physical/Chemical Methods," Office of Solid Waste and Emergency Response, SW-846, 2nd Edition and 3rd Edition.
- New York State Department of Health, Analytical Toxicology Laboratory Handbook, August 1982.

Katherine A. Syracuse

Katherine A. Syracuse
Lab Director, Environmental

REPORT CODE LEGEND:

<DL = Less than detection limit
ND = Not detected
NA = Not applicable
INP = Information not provided
MB = Method Blank

HUNTINGDON ANALYTICAL SERVICES

Analyte: TOTAL IRON

Date Sampled: 7/25/90

SAMPLE ID: HAS #	CLIENT	EPA METHOD	DATE PREPARED	DATE ANALYZED	DETECTION LIMIT	RESULT mg/kg	QC
995-001	SB-1	6010	7/30/90	8/01/90	15.6	9550	*95
995-002	SB-2	6010	7/30/90	8/01/90	1.71	9380	*95
995-003	SB-3	6010	7/30/90	8/01/90	1.53	10100	*95
995-004	SB-4	6010	7/30/90	8/01/90	14	10400	*95
995-005	SB-5	6010	7/30/90	8/01/90	1.55	16000	*95
995-006	SB-6	6010	7/30/90	8/01/90	1.92	15300	*95
995-MB	METHOD BLANK	6010	7/30/90	8/01/90	0.02	<DL**	*95

*THIS INDICATES A 95% CONFIDENCE LIMIT ACHIEVED WITH AN EPA QUALITY CONTROL SOLUTION ANALYZED ALONG WITH YOUR SAMPLE.

ALL SOIL/SLUDGE SAMPLE RESULTS ARE BASED UPON DRY WEIGHT

**mg/l

HUNTINGDON ANALYTICAL SERVICES
ENVIRONMENTAL

Inorganic Wet Chemical Analyses

Analyte: Total Releasable Cyanide

EPA Method No.: SW-846 Reactivity Section 7.3 9010

Sample Date	HAS Sample #90-	Client I.D.	Date Prepared	Date Analyzed	Method Detection Limit	Result	Units	QC in %
7/25/90	995-001	SB-1	7/30/90	7/30/90	50	<50	mg/kg as HCN	99*
7/25/90	995-002	SB-2	7/30/90	7/30/90	50	<50	mg/kg as HCN	99*
7/25/90	995-003	SB-3	7/30/90	7/30/90	50	<50	mg/kg as HCN	99*
7/25/90	995-004	SB-4	7/30/90	7/30/90	50	<50	mg/kg as HCN	99*
7/25/90	995-005	SB-5	7/30/90	7/30/90	50	<50	mg/kg as HCN	99*
7/25/90	995-006	SB-6	7/30/90	7/30/90	50	<50	mg/kg as HCN	99*

* A known standard of the analyte of interest was analyzed along with this sample with the percent recovery indicated above.

HUNTINGDON ANALYTICAL SERVICES
ENVIRONMENTAL

Inorganic Wet Chemical Analyses

Analyte: Total Cyanide

EPA Method No.: SW-846 9010

Sample Date	HAS Sample #90-	Client I.D.	Date Prepared	Date Analyzed	Method Detection Limit	Result	Units	QC in %
7/25/90	995-001	SB-1	7/27/90	7/31/90	1.0	21	mg/kg	99*
7/25/90	995-002	SB-2	7/27/90	7/31/90	1.0	6.6	mg/kg	99*
7/25/90	995-003	SB-3	7/27/90	7/31/90	1.0	7.8	mg/kg	99*
7/25/90	995-004	SB-4	7/27/90	7/31/90	1.0	21	mg/kg	99*
7/25/90	995-005	SB-5	7/27/90	7/31/90	1.0	31	mg/kg	99*
7/25/90	995-006	SB-6	7/27/90	7/31/90	1.0	14	mg/kg	99*

* A known standard of the analyte of interest was analyzed along with this sample with the percent recovery indicated above.

HUNTINGDON ANALYTICAL SERVICES · CHAIN-OF-CUSTODY RECORD AND ANALYTICAL REQUEST FORM

Page ___ of ___

Client Name: [illegible]

Client Contact: Dave Harl

HAS Quote #:

Address: Buffalo, N.Y.

Phone: (716) 649-8110

P.O. #:

Project No.: DM-90

Project/Site Name: Waterfront School

Samplers (Signatures): Lori A. Zimmerman

HAS Ref. No.: 90-995

Sample I.D.	Date	Time	Comp.	Grab	Sample Location	HAS Seq. #	No. of Containers	Container Size & Type: 1 Liter Amber Glass						Analysis Requested/ Remarks
SB-1	7-25-90	10:30		X	Test Boring #1	001	1	1						CN, Tot. Releasable CN, Fe
SB-2	7-25-90	12:20		X	T.B. #2	002	1	1						[ ]
SB-3	7-25-90	1:30		X	T.B. #3	003	1	1						[ ]
SB-4	7-25-90	2:30		X	T.B. #4	004	1	1						[
SB-5	7-25-90	3:30		X	T.B. #5	005	1	1						[
SB-6	7-25-90	4:30		X	T.B. #6	006	1	1						[
~~SB~~						MEB								

Relinquished by:	Date/Time:	Received by:	Relinquished by:	Date/Time:	Received by:
Lori A. Zimmerman	7-26-90 8:00	[illegible signature]	[illegible signature]	7/26/90 12:5[illegible]	[illegible signature]

Relinquished by:	Date/Time:	Received by:	Relinquished by:	Date/Time:	Received by:

Relinquished by:	Date/Time:	Received for Lab by:	Date/Time:	Remarks:
		Mary Beaudoin	7/26/90 12:55	[illegible]

HAS

HUNTINGDON ANALYTICAL SERVICES
Division of **EMPIRE SOILS INVESTIGATIONS INC.**
PO Box 250 Middleport New York 14105
Tel: (716) 735-3400 FAX (716) 735-3653

Environmental Analytical Report For:

EMPIRE SOILS INVESTIGATIONS, INC. - HAMBURG

Waterfront School Project

HAS Ref. #90-995 and #90-995B

August 16, 1990

HAS

HUNTINGDON ANALYTICAL SERVICES
ELAP #10833
ENVIRONMENTAL REPORT

HAS Reference Numbers: #90-995 and #90-995B

August 16, 1990

Statement of Work Performed

I hereby declare that the work was performed under my supervision according to the procedures outlined by the following references and that this report provides a correct and faithful record of the results obtained.

- 40 CFR Part 136, "Guidelines Establishing Test Procedures for the Analysis of Pollutants Under the Clean Water Act," October 26, 1984 (Federal Register) U.S. Environmental Protection Agency.
- U.S. Environmental Protection Agency, "Test Methods of Evaluating Solid Waste - Physical/Chemical Methods," Office of Solid Waste and Emergency Response, SW-846, 2nd Edition and 3rd Edition.
- New York State Department of Health, Analytical Toxicology Laboratory Handbook, August 1982.

Katherine A. Syracuse
Lab Director, Environmental

REPORT CODE LEGEND:

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ND = Not detected
NA = Not applicable
INP = Information not provided
MB = Method Blank

HUNTINGDON ANALYTICAL SERVICES
ENVIRONMENTAL

METHOD 8240
VOLATILE ORGANICS

SAMPLE IDENTIFICATION :	SB-1	SB-2	SB-3	SB-4	SB-5	SB-6	METHOD BLANK 8-8-90	METHOD BLANK 8-9-90	
HAS SAMPLE #90-995	001	002	003	004	005	006	-----	-----	
COMPOUND	RESULT ug/Kg	RESULT ug/Kg	RESULT ug/Kg	RESULT ug/Kg	RESULT ug/Kg	RESULT ug/Kg	RESULT ug/Kg	RESULT ug/Kg	MDL ug/Kg
CHLOROMETHANE	<1000	<1000	<1000	<1000	<1000	<10000	<1000	<1000	<1000
BROMOMETHANE	<1000	<1000	<1000	<1000	<1000	<10000	<1000	<1000	<1000
VINYL CHLORIDE	<1000	<1000	<1000	<1000	<1000	<10000	<1000	<1000	<1000
CHLOROETHANE	<1000	<1000	<1000	<1000	<1000	<10000	<1000	<1000	<1000
METHYLENE CHLORIDE	<500	<500	<500	<500	<500	<5000	<500	<500	<500
ACETONE	<1000	<1000	<1000	<1000	<1000	<10000	<1000	<1000	<1000
TRICHLOROFLUOROMETHANE	<1000	<1000	<1000	<1000	<1000	<10000	<1000	<1000	<1000
CARBON DISULFIDE	<500	<500	<500	<500	<500	<5000	<500	<500	<500
1,1-DICHLOROETHENE	<500	<500	<500	<500	<500	<5000	<500	<500	<500
1,1-DICHLOROETHANE	<500	<500	<500	<500	<500	<5000	<500	<500	<500
1,2-DICHLOROETHENE (TOTAL)	<500	<500	<500	<500	<500	<5000	<500	<500	<500
CHLOROFORM	<500	<500	<500	<500	<500	<5000	<500	<500	<500
1,2-DICHLOROETHANE	<500	<500	<500	<500	<500	<5000	<500	<500	<500
2-BUTANONE	<1000	<1000	<1000	<1000	<1000	<10000	<1000	<1000	<1000
1,1,1-TRICHLOROETHANE	<500	<500	<500	<500	<500	<5000	<500	<500	<500
CARBON TETRACHLORIDE	<500	<500	<500	<500	<500	<5000	<500	<500	<500
VINYL ACETATE	<1000	<1000	<1000	<1000	<1000	<10000	<1000	<1000	<1000
BROMODICHLOROMETHANE	<500	<500	<500	<500	<500	<5000	<500	<500	<500
1,2-DICHLOROPROPANE	<500	<500	<500	<500	<500	<5000	<500	<500	<500
cis-1,3-DICHLOROPROPENE	<500	<500	<500	<500	<500	<5000	<500	<500	<500
TRICHLOROETHENE	<500	<500	<500	<500	<500	<5000	<500	<500	<500
DIBROMOCHLOROMETHANE	<500	<500	<500	<500	<500	<5000	<500	<500	<500
1,1,2-TRICHLOROETHANE	<500	<500	<500	<500	<500	<5000	<500	<500	<500
BENZENE	<500	<500	<500	<500	<500	<5000	<500	<500	<500
trans-1,3-DICHLOROPROPENE	<500	<500	<500	<500	<500	<5000	<500	<500	<500
2-CHLOROETHYLVINYL ETHER	<2000	<2000	<2000	<2000	<2000	<20000	<2000	<2000	<2000
BROMOFORM	<500	<500	<500	<500	<500	<5000	<500	<500	<500
4-METHYL-2-PENTANONE	<1000	<1000	<1000	<1000	<1000	<10000	<1000	<1000	<1000
2-HEXANONE	<1000	<1000	<1000	<1000	<1000	<10000	<1000	<1000	<1000
TETRACHLOROETHENE	<500	<500	<500	<500	<500	<5000	<500	<500	<500
1,1,2,2-TETRACHLOROETHANE	<500	<500	<500	<500	<500	<5000	<500	<500	<500
TOLUENE	<500	<500	<500	<500	<500	<5000	<500	<500	<500
CHLOROBENZENE	<500	<500	<500	<500	<500	<5000	<500	<500	<500
ETHYL BENZENE	<500	<500	<500	<500	3100	82000	<500	<500	<500
STYRENE	<500	<500	<500	<500	<500	<5000	<500	<500	<500
XYLENE (TOTAL)	<500	<500	<500	<500	3800	130000	<500	<500	<500
1,3-DICHLOROBENZENE	<1000	<1000	<1000	<1000	<1000	<10000	<1000	<1000	<1000
1,2-DICHLOROBENZENE	<1000	<1000	<1000	<1000	<1000	<10000	<1000	<1000	<1000
1,4-DICHLOROBENZENE	<1000	<1000	<1000	<1000	<1000	<10000	<1000	<1000	<1000
DATE RECEIVED:	7-26-90	7-26-90	7-26-90	7-26-90	7-26-90	7-26-90	----	----	----
DATE SAMPLED:	7-25-90	7-25-90	7-25-90	7-25-90	7-25-90	7-25-90	----	----	----
DATE ANALYZED:	8-8-90	8-8-90	8-8-90	8-8-90	8-8-90	8-8,9-90	8-8-90	8-9-90	----

HUNTINGDON ANALYTICAL SERVICES
ENVIRONMENTAL

METHOD 8270
SEMI-VOLATILE ORGANICS

SAMPLE IDENTIFICATION :	SB-1	SB-2	SB-3	SB-4	SB-5	SB-6	METHOD BLANK	
HAS SAMPLE #90-995	001	002	003	004	005	006	-----	
BASE/NEUTRAL COMPOUNDS	RESULT ug/Kg	RESULT ug/Kg	RESULT ug/Kg	RESULT ug/Kg	RESULT ug/Kg	RESULT ug/Kg	RESULT ug/Kg	MDL ug/Kg
ACENAPHTHENE	1,900	2,800	<330	1,800	42,000	590	<330	<330
ACENAPHTHYLENE	<330	<330	<330	360	<1,650	<330	<330	<330
ANTHRACENE	3,700	2,000	<330	3,100	38,000	1,100	<330	<330
BENZIDINE	<1,600	<1,600	<1,600	<1,600	<8,000	<1,600	<1,600	<1,600
BENZO(a)ANTHRACENE	8,300	1,400	<330	2,400	38,000	3,800	<330	<330
BENZO(b)FLUORANTHENE	6,700	980	<330	1,700	29,000	2,600	<330	<330
BENZOIC ACID	<1600	<1600	<1,600	<1,600	<8,000	<1,600	<1,600	<1,600
BENZO(k)FLUORANTHENE	6,600	1,300	<330	1,700	25,000	2,700	<330	<330
BENZO(a)PYRENE	7,700	1,500	<330	1,900	33,000	3,200	<330	<330
BENZO(g,h,i)PERYLENE	5,600	1,300	<330	1,700	20,000	2,100	<330	<330
BENZYL ALCOHOL	<330	<330	<330	<330	<1,650	<330	<330	<330
BIS(2-CHLOROETHOXY)METHANE	<330	<330	<330	<330	<1,650	<330	<330	<330
BIS(2-CHLOROETHYL)ETHER	<330	<330	<330	<330	<1,650	<330	<330	<330
BIS(2-CHLOROISOPROPYL)ETHER	<330	<330	<330	<330	<1,650	<330	<330	<330
BIS(2-ETHYLHEXYL)PHTHALATE	430	<330	<330	<330	<1,650	<330	<330	<330
BUTYLBENZYL PHTHALATE	<330	<330	<330	<330	<1,650	<330	<330	<330
4-BROMOPHENYL-PHENYL ETHER	<330	<330	<330	<330	<1,650	<330	<330	<330
4-CHLOROANALINE	<330	<330	<330	<330	<1,650	<330	<330	<330
2-CHLORONAPHTHALENE	<330	<330	<330	<330	<1,650	<330	<330	<330
4-CHLOROPHENYL-PHENYL ETHER	<330	<330	<330	<330	<1,650	<330	<330	<330
CHRYSENE	7,800	1,300	<330	2,200	32,000	3,400	<330	<330
DIBENZ(a,h)ANTHRACENE	1,100	<330	<330	<330	4,700	520	<330	<330
DIBENZOFURAN	1,800	3,200	<330	1,700	31,000	420	<330	<330
DI-N-BUTYLPHTHALATE	<330	<330	<330	<330	<1,650	<330	<330	<330
1,2-DICHLOROBENZENE	<330	<330	<330	<330	<1,650	<330	<330	<330
1,3-DICHLOROBENZENE	<330	<330	<330	<330	<1,650	<330	<330	<330
1,4-DICHLOROBENZENE	<330	<330	<330	<330	<1,650	<330	<330	<330
3,3-DICHLOROBENZIDINE	<660	<660	<660	<660	<3,300	<660	<660	<660
DIETHYL PHTHALATE	<330	<330	<330	<330	<1,650	<330	<330	<330
DIMETHYL PHTHALATE	<330	<330	<330	<330	<1,650	<330	<330	<330
2,4-DINITROTOLUENE	<330	<330	<330	<330	<1,650	<330	<330	<330
2,6-DINITROTOLUENE	<330	<330	<330	<330	<1,650	<330	<330	<330
DI-N-OCTYL PHTHALATE	<330	<330	<330	<330	<1,650	<330	<330	<330
FLUORANTHENE	14,000	2,400	<330	5,600	68,000	6,400	<330	<330
FLUORENE	1,700	3,900	<330	2,600	33,000	590	<330	<330
HEXACHLOROBENZENE	<330	<330	<330	<330	<1,650	<330	<330	<330
HEXACHLOROBUTADIENE	<330	<330	<330	<330	<1,650	<330	<330	<330
HEXACHLOROCYCLOPENTADIENE	<330	<330	<330	<330	<1,650	<330	<330	<330
HEXACHLOROETHANE	<330	<330	<330	<330	<1,650	<330	<330	<330
INDENO(1,2,3-cd)PYRENE	4,900	950	<330	1,700	21,000	2,000	<330	<330
ISOPHORONE	<330	<330	<330	<330	<1,650	<330	<330	<330

HUNTINGDON ANALYTICAL SERVICES
ENVIRONMENTAL

METHOD 8270
SEMI-VOLATILE ORGANICS

SAMPLE IDENTIFICATION :	SB-1	SB-2	SB-3	SB-4	SB-5	SB-6	METHOD BLANK	
HAS SAMPLE #90-995	001	002	003	004	005	006	-----	
BASE/NEUTRAL COMPOUNDS	RESULT ug/Kg	RESULT ug/Kg	RESULT ug/Kg	RESULT ug/Kg	RESULT ug/Kg	RESULT ug/Kg	RESULT ug/Kg	MDL ug/Kg
2-METHYL NAPHTHALENE ---------	730	1,600	<330	<330	3,000	<330	<330	<330
NAPHTHALENE ----------	1,500	3,800	1,800	1,900	23,000	1,700	<330	<330
2-NITROANALINE ----------	<1,600	<1,600	<1,600	<1,600	<8,000	<1,600	<1,600	<1,600
3-NITROANALINE ----------	<1,600	<1,600	<1,600	<1,600	<8,000	<1,600	<1,600	<1,600
4-NITROANALINE ----------	<1,600	<1,600	<1,600	<1,600	<8,000	<1,600	<1,600	<1,600
NITROBENZENE ----------	<330	<330	<330	<330	<1,650	<330	<330	<330
N-NITROSODIMETHYLAMINE -------	<330	<330	<330	<330	<1,650	<330	<330	<330
N-NITROSODIPHENYLAMINE -------	<330	<330	<330	<330	<1,650	<330	<330	<330
N-NITROS-DI-N-PROPYLAMINE ----	<330	<330	<330	<330	<1,650	<330	<330	<330
PHENANTHRENE ----------	12,000	5,100	<330	4,200	110,000	3,500	<330	<330
PYRENE ----------	16,000	2,000	<330	5,800	50,000	5,000	<330	<330
1,2,4-TRICHLOROBENZENE -------	<330	<330	<330	<330	<1,650	<330	<330	<330
ACID COMPOUNDS	RESULT ug/Kg	RESULT ug/Kg	RESULT ug/Kg	RESULT ug/Kg	RESULT ug/Kg	RESULT ug/Kg	RESULT ug/Kg	MDL ug/Kg
4-CHLORO-3-METHYLPHENOL ------	<330	<330	<330	<330	<1,650	<330	<330	<330
2-CHLOROPHENOL ----------	<330	<330	<330	<330	<1,650	<330	<330	<330
2,4-DICHLOROPHENOL ----------	<330	<330	<330	<330	<1,650	<330	<330	<330
2,4-DIMETHYL PHENOL ----------	<330	<330	<330	<330	<1,650	<330	<330	<330
2,4-DINITROPHENOL ----------	<1,600	<1,600	<1,600	<1,600	<8,000	<1,600	<1,600	<1,600
4,6-DINITRO-2-METHYLPHENOL ---	<1,600	<1,600	<1,600	<1,600	<8,000	<1,600	<1,600	<1,600
2-METHYL PHENOL ----------	<330	<330	<330	<330	<1,650	<330	<330	<330
4-METHYL PHENOL ----------	<330	<330	<330	<330	<1,650	<330	<330	<330
2-NITROPHENOL ----------	<330	<330	<330	<330	<1,650	<330	<330	<330
4-NITROPHENOL ----------	<1,600	<1,600	<1,600	<1,600	<8,000	<1,600	<1,600	<1,600
PENTACHLOROPHENOL ----------	<1,600	<1,600	<1,600	<1,600	<8,000	<1,600	<1,600	<1,600
PHENOL ----------	<330	<330	<330	<330	<1,650	<330	<330	<330
2,4,5-TRICHLOROPHENOL --------	<1,600	<1,600	<1,600	<1,600	<8,000	<1,600	<1,600	<1,600
2,4,6-TRICHLOROPHENOL --------	<330	<330	<330	<330	<1,650	<330	<330	<330
DATE SAMPLED:	7-25-90	7-25-90	7-25-90	7-25-90	7-25-90	7-25-90	---	
DATE RECEIVED:	7-26-90	7-26-90	7-26-90	7-26-90	7-26-90	7-26-90	---	
DATE EXTRACTED:	7-27-90	7-27-90	7-27-90	7-27-90	7-27-90	7-27-90	7-27-90	
DATE ANALYZED:	7-27-90	7-27-90	7-27-90	7-27-90	7-27-90	7-27-90	7-27-90	

HUNTINGDON ANALYTICAL SERVICES
ENVIRONMENTAL

METHOD 8Ø8Ø
ORGANOCHLORINE PESTICIDES
POLYCHLORINATED BIPHENYLS

SAMPLE IDENTIFICATION :	SB-1	SB-2	SB-3	SB-4	SB-5	SB-6	METHOD BLANK
HAS SAMPLE #9Ø-995	ØØ1	ØØ2	ØØ3	ØØ4	ØØ5	ØØ6	----
DATE ANALYZED :	8/9/9Ø	8/9/9Ø	8/9/9Ø	8/9/9Ø	8/9/9Ø	8/9/9Ø	8/9/9Ø
COMPOUND	RESULT ug/g	RESULT ug/g	RESULT ug/g	RESULT ug/g	RESULT ug/g	RESULT ug/g	RESULT ug/g
ALDRIN	<Ø.ØlØ	<Ø.ØlØ	<Ø.ØlØ	<Ø.ØlØ	<Ø.ØlØ	<Ø.ØlØ	<Ø.ØlØ
A-BHC	<Ø.ØlØ	<Ø.ØlØ	<Ø.ØlØ	<Ø.ØlØ	<Ø.ØlØ	<Ø.ØlØ	<Ø.ØlØ
B-BHC	<Ø.ØlØ	<Ø.ØlØ	<Ø.ØlØ	<Ø.ØlØ	<Ø.ØlØ	<Ø.ØlØ	<Ø.ØlØ
D-BHC	<Ø.ØlØ	<Ø.ØlØ	<Ø.ØlØ	<Ø.ØlØ	<Ø.ØlØ	<Ø.ØlØ	<Ø.ØlØ
G-BHC	<Ø.ØlØ	<Ø.ØlØ	<Ø.ØlØ	<Ø.ØlØ	<Ø.ØlØ	<Ø.ØlØ	<Ø.ØlØ
CHLORDANE	<Ø.1Ø	<Ø.1Ø	<Ø.1Ø	<Ø.1Ø	<Ø.1Ø	<Ø.1Ø	<Ø.1Ø
4,4-DDD	<Ø.ØØØ	<Ø.ØØØ	<Ø.ØØØ	<Ø.ØØØ	<Ø.ØØØ	<Ø.ØØØ	<Ø.ØØØ
4,4-DDE	<Ø.ØØØ	<Ø.ØØØ	<Ø.ØØØ	<Ø.ØØØ	<Ø.ØØØ	<Ø.ØØØ	<Ø.ØØØ
4,4-DDT	<Ø.ØØØ	<Ø.ØØØ	<Ø.ØØØ	<Ø.ØØØ	<Ø.ØØØ	<Ø.ØØØ	<Ø.ØØØ
DIELDRIN	<Ø.ØØØ	<Ø.ØØØ	<Ø.ØØØ	<Ø.ØØØ	<Ø.ØØØ	<Ø.ØØØ	<Ø.ØØØ
ENDOSULFAN I	<Ø.ØlØ	<Ø.ØlØ	<Ø.ØlØ	<Ø.ØlØ	<Ø.ØlØ	<Ø.ØØØ	<Ø.ØlØ
ENDOSULFAN II	<Ø.ØØØ	<Ø.ØØØ	<Ø.ØØØ	<Ø.ØØØ	<Ø.ØØØ	<Ø.ØØØ	<Ø.ØØØ
ENDOSULFAN SULFATE	<Ø.ØØØ	<Ø.ØØØ	<Ø.ØØØ	<Ø.ØØØ	<Ø.ØØØ	<Ø.ØØØ	<Ø.ØØØ
ENDRIN	<Ø.ØØØ	<Ø.ØØØ	<Ø.ØØØ	<Ø.ØØØ	<Ø.ØØØ	<Ø.ØØØ	<Ø.ØØØ
ENDRIN ALDEHYDE	<Ø.ØØØ	<Ø.ØØØ	<Ø.ØØØ	<Ø.ØØØ	<Ø.ØØØ	<Ø.ØØØ	<Ø.ØØØ
HEPTACHLOR	<Ø.ØlØ	<Ø.ØlØ	<Ø.ØlØ	<Ø.ØlØ	<Ø.ØlØ	<Ø.ØlØ	<Ø.ØlØ
HEPTACHLOR EPOXIDE	<Ø.ØlØ	<Ø.ØlØ	<Ø.ØlØ	<Ø.ØlØ	<Ø.ØlØ	<Ø.ØlØ	<Ø.ØlØ
ENDRIN KETONE	<Ø.ØØØ	<Ø.ØØØ	<Ø.ØØØ	<Ø.ØØØ	<Ø.ØØØ	<Ø.ØØØ	<Ø.ØØØ
METHOXYCHLOR	<Ø.1Ø	<Ø.1Ø	<Ø.1Ø	<Ø.1Ø	<Ø.1Ø	<Ø.1Ø	<Ø.1Ø
TOXAPHENE	<Ø.2Ø	<Ø.2Ø	<Ø.2Ø	<Ø.2Ø	<Ø.2Ø	<Ø.2Ø	<Ø.2Ø
PCB-1Ø16	<Ø.2Ø	<Ø.2Ø	<Ø.2Ø	<Ø.2Ø	<Ø.2Ø	<Ø.2Ø	<Ø.2Ø
PCB-1221	<Ø.2Ø	<Ø.2Ø	<Ø.2Ø	<Ø.2Ø	<Ø.2Ø	<Ø.2Ø	<Ø.2Ø
PCB-1232	<Ø.2Ø	<Ø.2Ø	<Ø.2Ø	<Ø.2Ø	<Ø.2Ø	<Ø.2Ø	<Ø.2Ø
PCB-1242	<Ø.2Ø	<Ø.2Ø	<Ø.2Ø	<Ø.2Ø	<Ø.2Ø	<Ø.2Ø	<Ø.2Ø
PCB-1248	<Ø.2Ø	<Ø.2Ø	<Ø.2Ø	<Ø.2Ø	<Ø.2Ø	<Ø.2Ø	<Ø.2Ø
PCB-1254	<Ø.2Ø	<Ø.2Ø	<Ø.2Ø	<Ø.2Ø	<Ø.2Ø	<Ø.2Ø	<Ø.2Ø
PCB-126Ø	<Ø.2Ø	<Ø.2Ø	<Ø.2Ø	<Ø.2Ø	<Ø.2Ø	<Ø.2Ø	<Ø.2Ø

HUNTINGDON ANALYTICAL SERVICES

Sample ID: SB-1
HAS Sample #90-995-001
Date Sampled: 07/25/90

ANALYTE	EPA METHOD	DATE PREPARED	DATE ANALYZED	DETECTION LIMIT	RESULT mg/kg	MS %REC	MSD %REC	RPD
ALUMINUM	6010	07/30/90	08/01/90	35.2	4150	*95		
ANTIMONY	6010	07/30/90	08/01/90	39.1	<DL	*95		
ARSENIC	7060	07/30/90	08/14/90	1.56	6.27	111	102	7.8
BARIUM	6010	07/30/90	08/01/90	15.6	71.6	96.7	92.2	3.2
BERYLLIUM	6010	07/30/90	08/01/90	7.81	<DL	*95		
CADMIUM	6010	07/30/90	08/01/90	19.5	<DL	*95		
CALCIUM	6010	07/30/90	08/01/90	19.5	51100	*95		
CHROMIUM	6010	07/30/90	08/01/90	15.6	<DL	*95		
COBALT	6010	07/30/90	08/01/90	15.6	<DL	122	125	2.8
COPPER	6010	07/30/90	08/01/90	15.6	39.4	136	118	4.6
IRON	6010	07/30/90	08/01/90	15.6	9550	*95		
LEAD	7421	07/30/90	08/06/90	15.6	93.8	114	114	<1.0
MAGNESIUM	6010	07/30/90	08/01/90	35.2	7050	*95		
MANGANESE	6010	07/30/90	08/01/90	11.7	244	*95		
MERCURY	7471	08/10/90	08/10/90	0.12	0.22	*95		
NICKEL	6010	07/30/90	08/01/90	31.2	31.4	101	87.4	7.7
POTASSIUM	6010	07/30/90	08/01/90	2340	<DL	*95		
SELENIUM	7740	07/30/90	08/06/90	0.39	<DL	127	122	4.4
SILVER	6010	07/30/90	08/01/90	7.81	<DL	*95		
SODIUM	6010	07/30/90	08/01/90	39.1	<DL	*95		
THALLIUM	7841	07/30/90	08/02/90	0.78	<DL	109	109	<1.0
VANADIUM	6010	07/30/90	08/01/90	15.6	<DL	127	130	2.0
ZINC	6010	07/30/90	08/01/90	15.6	133	*95		

*THIS INDICATES A 95% CONFIDENCE LIMIT ACHIEVED WITH AN EPA QUALITY CONTROL SOLUTION ANALYZED ALONG WITH YOUR SAMPLE.

ALL SOIL/SLUDGE SAMPLE RESULTS ARE BASED UPON DRY WEIGHT

HUNTINGDON ANALYTICAL SERVICES

Sample ID: SB-2
HAS Sample #90-995-002
Date Sampled: 07/25/90

ANALYTE	EPA METHOD	DATE PREPARED	DATE ANALYZED	DETECTION LIMIT	RESULT mg/kg	QC
ALUMINUM	6010	07/30/90	08/01/90	3.85	5780	*95
ANTIMONY	6010	07/30/90	08/01/90	4.27	<DL	*95
ARSENIC	7060	07/30/90	08/14/90	1.71	2.67	*95
BARIUM	6010	07/30/90	08/01/90	1.71	41.9	*95
BERYLLIUM	6010	07/30/90	08/01/90	0.85	<DL	*95
CADMIUM	6010	07/30/90	08/01/90	2.14	<DL	*95
CALCIUM	6010	07/30/90	08/01/90	2.14	27800	*95
CHROMIUM	6010	07/30/90	08/01/90	1.71	7.85	*95
COBALT	6010	07/30/90	08/01/90	1.71	4.90	*95
COPPER	6010	07/30/90	08/01/90	1.71	14.1	*95
IRON	6010	07/30/90	08/01/90	1.71	9380	*95
LEAD	7421	07/30/90	08/06/90	4.27	41.0	*95
MAGNESIUM	6010	07/30/90	08/01/90	3.85	7050	*95
MANGANESE	6010	07/30/90	08/01/90	1.28	153	*95
MERCURY	7471	08/10/90	08/10/90	0.13	0.16	*95
NICKEL	6010	07/30/90	08/01/90	3.42	20.5	*95
POTASSIUM	6010	07/30/90	08/01/90	256	390	*95
SELENIUM	7740	07/30/90	08/06/90	0.43	<DL	*95
SILVER	6010	07/30/90	08/01/90	0.85	<DL	*95
SODIUM	6010	07/30/90	08/01/90	4.27	163	*95
THALLIUM	7841	07/30/90	08/02/90	0.85	<DL	*95
VANADIUM	6010	07/30/90	08/01/90	1.71	12.2	*95
ZINC	6010	07/30/90	08/01/90	1.71	58.5	*95

*THIS INDICATES A 95% CONFIDENCE LIMIT ACHIEVED WITH AN EPA QUALITY CONTROL SOLUTION ANALYZED ALONG WITH YOUR SAMPLE.

ALL SOIL/SLUDGE SAMPLE RESULTS ARE BASED UPON DRY WEIGHT

HUNTINGDON ANALYTICAL SERVICES

Sample ID: SB-3
HAS Sample #90-995-003
Date Sampled: 07/25/90

ANALYTE	EPA METHOD	DATE PREPARED	DATE ANALYZED	DETECTION LIMIT	RESULT mg/kg	QC
ALUMINUM	6010	07/30/90	08/01/90	3.44	5840	*95
ANTIMONY	6010	07/30/90	08/01/90	3.82	<DL	*95
ARSENIC	7060	07/30/90	08/14/90	1.53	2.58	*95
BARIUM	6010	07/30/90	08/01/90	1.53	24.2	*95
BERYLLIUM	6010	07/30/90	08/01/90	0.76	<DL	*95
CADMIUM	6010	07/30/90	08/01/90	1.91	<DL	*95
CALCIUM	6010	07/30/90	08/01/90	1.91	32200	*95
CHROMIUM	6010	07/30/90	08/01/90	1.53	6.47	*95
COBALT	6010	07/30/90	08/01/90	1.53	3.49	*95
COPPER	6010	07/30/90	08/01/90	1.53	14.0	*95
IRON	6010	07/30/90	08/01/90	1.53	10100	*95
LEAD	7421	07/30/90	08/06/90	3.82	34.1	*95
MAGNESIUM	6010	07/30/90	08/01/90	3.44	18200	*95
MANGANESE	6010	07/30/90	08/01/90	1.15	266	*95
MERCURY	7471	08/10/90	08/10/90	0.12	0.54	*95
NICKEL	6010	07/30/90	08/01/90	3.05	21.8	*95
POTASSIUM	6010	07/30/90	08/01/90	229	623	*95
SELENIUM	7740	07/30/90	08/06/90	0.38	<DL	*95
SILVER	6010	07/30/90	08/01/90	0.76	<DL	*95
SODIUM	6010	07/30/90	08/01/90	3.82	131	*95
THALLIUM	7841	07/30/90	08/02/90	0.76	<DL	*95
VANADIUM	6010	07/30/90	08/01/90	1.53	10.7	*95
ZINC	6010	07/30/90	08/01/90	1.53	59.2	*95

*THIS INDICATES A 95% CONFIDENCE LIMIT ACHIEVED WITH AN EPA QUALITY CONTROL SOLUTION ANALYZED ALONG WITH YOUR SAMPLE.

ALL SOIL/SLUDGE SAMPLE RESULTS ARE BASED UPON DRY WEIGHT

HUNTINGDON ANALYTICAL SERVICES

Sample ID: SB-4
HAS Sample #90-995-004
Date Sampled: 07/25/90

ANALYTE	EPA METHOD	DATE PREPARED	DATE ANALYZED	DETECTION LIMIT	RESULT mg/kg	QC
ALUMINUM	6010	07/30/90	08/01/90	31.5	3700	*95
ANTIMONY	6010	07/30/90	08/01/90	35.0	<DL	*95
ARSENIC	7060	07/30/90	08/13/90	0.70	1.36	*95
BARIUM	6010	07/30/90	08/01/90	14.0	24.1	*95
BERYLLIUM	6010	07/30/90	08/01/90	6.99	<DL	*95
CADMIUM	6010	07/30/90	08/01/90	17.5	<DL	*95
CALCIUM	6010	07/30/90	08/01/90	17.5	89000	*95
CHROMIUM	6010	07/30/90	08/01/90	14.0	<DL	*95
COBALT	6010	07/30/90	08/01/90	14.0	<DL	*95
COPPER	6010	07/30/90	08/01/90	14.0	148	*95
IRON	6010	07/30/90	08/01/90	14.0	10400	*95
LEAD	6010	07/30/90	08/01/90	3.50	4090	*95
MAGNESIUM	6010	07/30/90	08/01/90	31.5	45000	*95
MANGANESE	6010	07/30/90	08/01/90	10.5	281	*95
MERCURY	7471	08/10/90	08/10/90	0.13	<DL	*95
NICKEL	6010	07/30/90	08/01/90	28.0	41.2	*95
POTASSIUM	6010	07/30/90	08/01/90	2100	<DL	*95
SELENIUM	7740	07/30/90	08/06/90	0.35	<DL	*95
SILVER	6010	07/30/90	08/01/90	6.99	<DL	*95
SODIUM	6010	07/30/90	08/01/90	35.0	<DL	*95
THALLIUM	7841	07/30/90	08/02/90	0.70	<DL	*95
VANADIUM	6010	07/30/90	08/01/90	14.0	<DL	*95
ZINC	6010	07/30/90	08/01/90	14.0	108	*95

*THIS INDICATES A 95% CONFIDENCE LIMIT ACHIEVED WITH AN EPA QUALITY CONTROL SOLUTION ANALYZED ALONG WITH YOUR SAMPLE.

ALL SOIL/SLUDGE SAMPLE RESULTS ARE BASED UPON DRY WEIGHT

HUNTINGDON ANALYTICAL SERVICES

Sample ID: SB-5
HAS Sample #90-995-005
Date Sampled: 07/25/90

ANALYTE	EPA METHOD	DATE PREPARED	DATE ANALYZED	DETECTION LIMIT	RESULT mg/kg	QC
ALUMINUM	6010	07/30/90	08/01/90	3.49	2980	*95
ANTIMONY	6010	07/30/90	08/01/90	3.88	<DL	*95
ARSENIC	7060	07/30/90	08/14/90	1.55	5.04	*95
BARIUM	6010	07/30/90	08/01/90	1.55	150	*95
BERYLLIUM	6010	07/30/90	08/01/90	0.78	<DL	*95
CADMIUM	6010	07/30/90	08/01/90	1.94	<DL	*95
CALCIUM	6010	07/30/90	08/01/90	1.94	30600	*95
CHROMIUM	6010	07/30/90	08/01/90	1.55	8.69	*95
COBALT	6010	07/30/90	08/01/90	1.55	2.91	*95
COPPER	6010	07/30/90	08/01/90	1.55	61.5	*95
IRON	6010	07/30/90	08/01/90	1.55	16000	*95
LEAD	7421	07/30/90	08/06/90	38.8	165	*95
MAGNESIUM	6010	07/30/90	08/01/90	3.49	7850	*95
MANGANESE	6010	07/30/90	08/01/90	1.16	166	*95
MERCURY	7471	08/10/90	08/10/90	0.14	<DL	*95
NICKEL	6010	07/30/90	08/01/90	3.10	19.0	*95
POTASSIUM	6010	07/30/90	08/01/90	233	496	*95
SELENIUM	7740	07/30/90	08/06/90	0.39	<DL	*95
SILVER	6010	07/30/90	08/01/90	0.78	<DL	*95
SODIUM	6010	07/30/90	08/01/90	3.88	178	*95
THALLIUM	7841	07/30/90	08/02/90	0.78	<DL	*95
VANADIUM	6010	07/30/90	08/01/90	1.55	10.7	*95
ZINC	6010	07/30/90	08/01/90	1.55	180	*95

*THIS INDICATES A 95% CONFIDENCE LIMIT ACHIEVED WITH AN EPA QUALITY CONTROL SOLUTION ANALYZED ALONG WITH YOUR SAMPLE.

ALL SOIL/SLUDGE SAMPLE RESULTS ARE BASED UPON DRY WEIGHT

HUNTINGDON ANALYTICAL SERVICES

Sample ID: SB-6
HAS Sample #90-995-006
Date Sampled: 07/25/90

ANALYTE	EPA METHOD	DATE PREPARED	DATE ANALYZED	DETECTION LIMIT	RESULT mg/kg	QC
ALUMINUM	6010	07/30/90	08/01/90	4.33	8510	*95
ANTIMONY	6010	07/30/90	08/01/90	4.81	<DL	*95
ARSENIC	7060	07/30/90	08/13/90	0.96	3.57	*95
BARIUM	6010	07/30/90	08/01/90	1.92	63.2	*95
BERYLLIUM	6010	07/30/90	08/01/90	0.96	<DL	*95
CADMIUM	6010	07/30/90	08/01/90	2.40	<DL	*95
CALCIUM	6010	07/30/90	08/01/90	2.40	20300	*95
CHROMIUM	6010	07/30/90	08/01/90	1.92	11.8	*95
COBALT	6010	07/30/90	08/01/90	1.92	7.34	*95
COPPER	6010	07/30/90	08/01/90	1.92	33.7	*95
IRON	6010	07/30/90	08/01/90	1.92	15300	*95
LEAD	7421	07/30/90	08/06/90	48.1	421	*95
MAGNESIUM	6010	07/30/90	08/01/90	4.33	6170	*95
MANGANESE	6010	07/30/90	08/01/90	1.44	283	*95
MERCURY	7471	08/10/90	08/10/90	0.13	0.59	*95
NICKEL	6010	07/30/90	08/01/90	3.85	29.1	*95
POTASSIUM	6010	07/30/90	08/01/90	288	1060	*95
SELENIUM	7740	07/30/90	08/06/90	0.48	<DL	*95
SILVER	6010	07/30/90	08/01/90	0.96	<DL	*95
SODIUM	6010	07/30/90	08/01/90	4.81	110	*95
THALLIUM	7841	07/30/90	08/02/90	0.96	<DL	*95
VANADIUM	6010	07/30/90	08/01/90	1.92	15.5	*95
ZINC	6010	07/30/90	08/01/90	1.92	607	*95

*THIS INDICATES A 95% CONFIDENCE LIMIT ACHIEVED WITH AN EPA QUALITY CONTROL SOLUTION ANALYZED ALONG WITH YOUR SAMPLE.

ALL SOIL/SLUDGE SAMPLE RESULTS ARE BASED UPON DRY WEIGHT

HUNTINGDON ANALYTICAL SERVICES

Sample ID: METHOD BLANK
HAS Sample #90-995-MB
Date Sampled: N/A

ANALYTE	EPA METHOD	DATE PREPARED	DATE ANALYZED	DETECTION LIMIT	RESULT mg/l	QC
ALUMINUM	6010	07/30/90	08/01/90	0.045	<DL	*95
ANTIMONY	6010	07/30/90	08/01/90	0.05	<DL	*95
ARSENIC	7060	07/30/90	08/13/90	0.01	<DL	*95
BARIUM	6010	07/30/90	08/01/90	0.02	<DL	*95
BERYLLIUM	6010	07/30/90	08/01/90	0.01	<DL	*95
CADMIUM	6010	07/30/90	08/01/90	0.025	<DL	*95
CALCIUM	6010	07/30/90	08/01/90	0.025	<DL	*95
CHROMIUM	6010	07/30/90	08/01/90	0.02	<DL	*95
COBALT	6010	07/30/90	08/01/90	0.02	<DL	*95
COPPER	6010	07/30/90	08/01/90	0.02	<DL	*95
IRON	6010	07/30/90	08/01/90	0.02	<DL	*95
LEAD	6010	07/30/90	08/01/90	0.05	<DL	*95
LEAD	7421	07/30/90	08/06/90	0.005	<DL	*95
MAGNESIUM	6010	07/30/90	08/01/90	0.045	<DL	*95
MANGANESE	6010	07/30/90	08/01/90	0.015	<DL	*95
MERCURY	7471	08/10/90	08/10/90	0.0002	<DL	*95
NICKEL	6010	07/30/90	08/01/90	0.04	<DL	*95
POTASSIUM	6010	07/30/90	08/01/90	3.0	<DL	*95
SELENIUM	7740	07/30/90	08/06/90	0.005	<DL	*95
SILVER	6010	07/30/90	08/01/90	0.01	<DL	*95
SODIUM	6010	07/30/90	08/01/90	0.05	<DL	*95
THALLIUM	7841	07/30/90	08/02/90	0.01	<DL	*95
VANADIUM	6010	07/30/90	08/01/90	0.02	<DL	*95
ZINC	6010	07/30/90	08/01/90	0.02	<DL	*95

*THIS INDICATES A 95% CONFIDENCE LIMIT ACHIEVED WITH AN EPA QUALITY CONTROL SOLUTION ANALYZED ALONG WITH YOUR SAMPLE.

WITT

HUNTINGDON ANALYTICAL SERVICES · CHAIN-OF-CUSTODY RECORD AND ANALYTICAL REQUEST FORM — Page of

Client Name: Board of Education, 1 W. Street, Buffalo, New York — Client Contact: Dave Hasty — Phone: (716) 649-8110 — HAS Quote #: — P.O. #:

Project No.: BTA-90 — Project/Site Name: WATERFRONT School — HAS Ref. #: 90-995

Sampler (Signature): Lori A Zimmerman

Sample I.D.	Date	Time	Comp.	Grab	Sample Location	HAS Seq. #	No. of Containers	Container Size & Type: 1 Liter Amber Glass	40 ml Glass	Analysis Requested / Remarks
SB-1	7-25-90	10:30		X	Test Boring #1	001	3	1	2	TCL Analysis
SB-2	7-25-90	12:20		X	T.B. #2	002	3	1	2	[ ]
SB-3	7-25-90	1:30		X	T.B. #3	003	3	1	2	[ ]
SB-4	7-25-90	2:30		X	T.B. #4	004	3	1	2	[ ]
SB-5	7-25-90	3:30		X	T.B. #5	005	3	1	2	[ ]
SB-6	7-25-90	4:30		X	T.B. #6	006	3	1	2	[ ]

MEB

Relinquished by:	Date/Time:	Received by:	Relinquished by:	Date/Time:	Received by:
Lori A. Zimmerman	7-26-90 8:00				
				Mailed 12:55	Mary Beaudoin
Relinquished by:	Date/Time:	Received by:	Relinquished by:	Date/Time:	Received by:
Relinquished by:	Date/Time:	Received for Lab by:	Date/Time:	Remarks:	

DATE ON VIAL TIL MDTA

HUNTINGDON ANALYTICAL SERVICES · CHAIN-OF-CUSTODY RECORD AND ANALYTICAL REQUEST FORM

Client Name: [illegible] Education
Client Contact: Dave Hardy
HAS Quote #:
Address: Buffalo, N.Y.
Phone: (716) 649-8110
P.O. #:

Project No.: OM-90-
Project/Site Name: Waterfront School
Samplers (Signature): Lori L. Zimmerman
HAS Ref. No.: 90-995B

Container Size & Type: 1 Liter Amber Glass

Sample I.D.	Date	Time	Comp.	Grab	Sample Location	HAS Seq. #	No. of Containers	1 Liter Amber Glass						Analysis Requested/ Remarks
SB-1	7-25-90	10:30		X	Test Boring #1	001	1	1						CN, Tot. Releasable CN, Fe
SB-2	7-25-90	12:20		X	T.B. #2	002	1	1						[ ]
SB-3	7-25-90	1:30		X	T.B. #3	003	1	1						[ ]
SB-4	7-25-90	2:30		X	T.B. #4	004	1	1						[ ]
SB-5	7-25-90	3:30		X	T.B. #5	005	1	1						[ ]
SB-6	7-25-90	4:30		X	T.B. #6	006	1	1						[ ]
						MEB								

Relinquished by:	Date/Time:	Received by:	Relinquished by:	Date/Time:	Received by:
Lori A. Zimmerman	7-26-90 8:00	[signature]	[signature]	7/26/90 12:55	Mary Beaudoin
Relinquished by:	Date/Time:	Received by:	Relinquished by:	Date/Time:	Received by:
Relinquished by:	Date/Time:	Received for Lab by:	Date/Time:	Remarks:	
		Mary Rosenblum	7/26/90 12:55	OW DA, TC, PM, SM, JW, MP, TB	

EMPIRE SOILS INVESTIGATIONS, INC.
S-5167 SOUTH PARK AVENUE
HAMBURG, NEW YORK 14075

APPENDIX E

7.3 REACTIVITY

7.3.1 Introduction

The regulation in 40 CFR 261.23 defines reactive wastes to include wastes that have any of the following properties: (1) readily undergo violent chemical change; (2) react violently or form potentially explosive mixtures with water; (3) generate toxic fumes when mixed with water or, in the case of cyanide- or sulfide-bearing wastes, when exposed to mild acidic or basic conditions; (4) explode when subjected to a strong initiating force; (5) explode at normal temperatures and pressures; or (6) fit within the Department of Transportation's forbidden explosives,, Class A explosives, or Class B explosives classifications.

This definition is intended to identify wastes that, because of their extreme instability and tendency to react violently or explode, pose a problem at all stages of the waste management process. The definition is to a large extent a paraphrase of the narrative definition employed by the National Fire Protection Association. The Agency chose to rely on a descriptive, prose definition of reactivity because the available tests for measuring the variegated class of effects embraced by the reactivity definition suffer from a number of deficiencies.

7.3.2 Regulatory Definition

7.3.2.1 Characteristic Of Reactivity Regulation

A solid waste exhibits the characteristic of reactivity if a representative sample of the waste has any of the following properties:

1. It is normally unstable and readily undergoes violent change without detonating.

2. It reacts violently with water.

3. It forms potentially explosive mixtures with water.

4. When mixed with water, it generates toxic gases, vapors, or fumes in a quantity sufficient to present a danger to human health or to the environment.

5. It is a cyanide- or sulfide-bearing waste that, when exposed to pH conditions between 2 and 12.5, can generate toxic gases, vapors, or fumes in a quantity sufficient to present a danger to human health or to the environment. (Interim Guidance for Reactive Cyanide and Reactive Sulfide, Sections 7.3.3 and 7.3.4 below, can be used to detect the presence of cyanide and sulfide in wastes.)

6. It is capable of detonation or explosive reaction if it is subjected to a strong initiating source or if heated under confinement.

7. It is readily capable of detonation or explosive decomposition or reaction at standard temperature and pressure.

8. It is a forbidden explosive, as defined in 49 CFR 173.51, or a Class A explosive, as defined in 49 CFR 173.53, or a Class B explosive, as defined in 49 CFR 173.88.

9. A solid waste that exhibits the characteristic of reactivity, but is not listed as a hazardous waste in Subpart D, has the EPA Hazardous Waste Number of D003.

7.3.3 Interim Guidance For Reactive Cyanide

7.3.3.1 The current EPA action level is:

Total releasable cyanide: 250 mg HCN/kg waste.

7.3.3.2 Test Method to Determine Hydrogen Cyanide Released from Wastes

1.0 SCOPE AND APPLICATION

1.1 This method is applicable to all wastes, with the condition that wastes that are combined with acids do not form explosive mixtures.

1.2 This method provides a way to determine the specific rate of release of hydrocyanic acid upon contact with an aqueous acid.

1.3 This test measures only the hydrocyanic acid evolved at the test conditions. It is not intended to measure forms of cyanide other than those that are evolvable under the test conditions.

2.0 SUMMARY OF METHOD

2.1 An aliquot of the waste is acidified to pH 2 in a closed system. The gas generated is swept into a scrubber. The analyte is quantified. The procedure for quantifying the cyanide is Method 9010, Chapter Five, starting with Step 7.3.5 of that method.

3.0 SAMPLE HANDLING AND PRESERVATION

3.1 Samples containing, or suspected of containing, sulfide or a combination of sulfide and cyanide wastes should be collected with a minimum of aeration. The sample bottle should be filled completely, excluding all head space, and stoppered. Analysis should commence as soon as possible, and samples should be kept in a cool, dark place until analysis begins.

3.2 It is suggested that samples of cyanide wastes be tested as quickly as possible. Although they can be preserved by adjusting the sample pH to 12 with strong base, this will cause dilution of the sample, increase the ionic strength, and, possibly, change other physical or chemical characteristics of the waste which may affect the rate of release of the hydrocyanic acid. Storage of samples should be under refrigeration and in the dark.

3.3 Testing should be performed in a ventilated hood.

4.0 APPARATUS AND MATERIALS (See Figure 1)

4.1 Round-bottom flask: 500-mL, three-neck, with 24/40 ground-glass joints.

4.2 Stirring apparatus: To achieve approximately 30 rpm. This may be either a rotating magnet and stirring bar combination or an overhead motor-driven propellor stirrer.

4.3 Separatory funnel: With pressure-equalizing tube and 24/40 ground-glass joint and Teflon sleeve.

4.4 Flexible tubing: For connection from nitrogen supply to apparatus.

4.5 Water-pumped or oil-pumped nitrogen gas: With two-stage regulator.

4.6 Rotometer: For monitoring nitrogen gas flow rate.

5.0 REAGENTS

5.1 Sulfuric acid, 0.005 M: Add 2.8 mL concentrated H_2SO_4 to Type II water and dilute to 1 L. Withdraw 100 mL of this solution and dilute to 1 L to make the 0.005 M H_2SO_4.

5.2 Cyanide reference solution: Dissolve approximately 2.5 g of KOH and 2.51 g of KCN in 1 liter of distilled water. Cyanide concentration in this solution is 1 mg/mL.

5.3 NaOH solution, 1.25 N: Dissolve 50 g of NaOH in distilled water and dilute to 1 liter with distilled water.

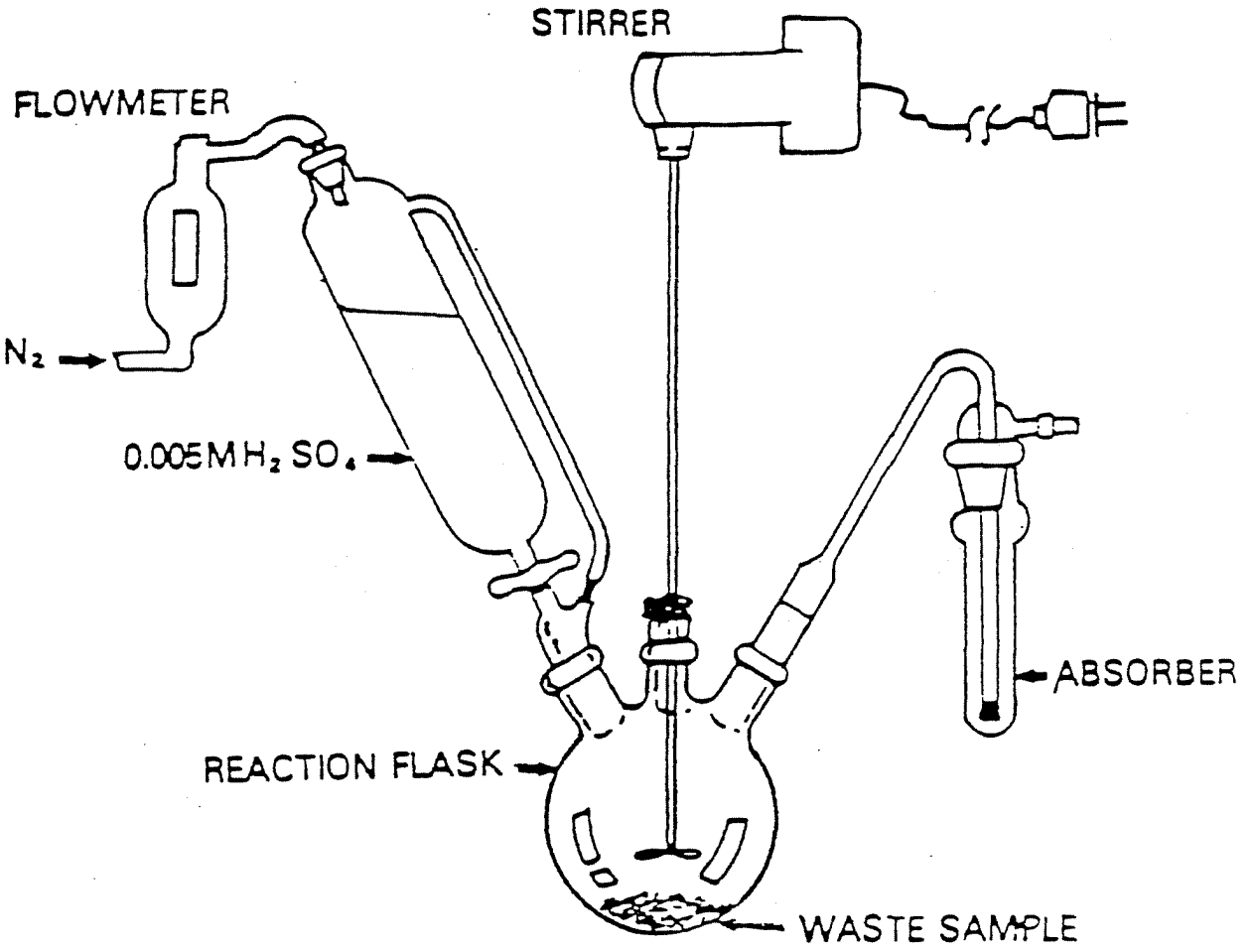

Figure 1. Apparatus to Determine Hydrogen Cyanide Released from Wastes

5.4 NaOH solution, 0.25 N: Dilute 200 mL of sodium hydroxide solution (5.3) to 1 liter with distilled water.

5.5 Stock cyanide solution, 1 mg/mL: Dissolve 2.51 g of KCN and 2 g of KOH in 1 liter of distilled water. Standardize with 0.0192 N $AgNO_3$. Dilute to appropriate concentration so that 1 mL = 1 mg CN.

5.6 Intermediate cyanide solution: Dilute 50 mL of stock solution to 1 liter with distilled water.

5.7 Standard cyanide solution, 5 mg/L: Prepare fresh daily by diluting 100 mL of intermediate solution to 1 liter with distilled water, and store in a glass-stoppered bottle.

5.8 Silver nitrate solution: Prepare by crushing approximately 5 g of $AgNO_3$ crystals and drying to constant weight at 40°C. Weigh 3.3 g of dried $AgNO_3$, dissolve in distilled water, and dilute to 1 liter.

5.9 Rhodanine indicator: Dissolve 20 mg of p-dimethylaminobenzal-rhodanine in 100 mL of acetone.

5.10 Methyl red indicator: Prepare by dissolving 0.02 g methyl red in 60 mL of distilled water and 40 mL of acetic acid.

6.0 SYSTEM CHECK

6.1 The operation of the system can be checked and verified using the cyanide reference solution (Paragraph 5.2). Perform the procedure using the reference solution as a sample and determine the percent recovery. A recovery of 50% is adequate to demonstrate proper system operation.

7.0 PROCEDURE

7.1 Add 500 mL of 0.25 N NaOH solution to a calibrated scrubber and dilute with distilled water to obtain an adequate depth of liquid.

7.2 Close the system and adjust the flow rate of nitrogen, using the rotometer. Flow should be 60 mL/min.

7.3 Add to the system 10 g of the waste to be tested.

7.4 With the nitrogen flowing, add enough acid to fill the system half full. While starting the 30-min test period.

7.5 Begin stirring while the acid is entering the round-bottom flask.

7.6 After 30 min, close off the nitrogen and disconnect the scrubber. Determine the amount of cyanide in the scrubber by Method 9010, Chapter Five, starting with Paragraph 7.3.5. of the method.

8.1 Determine the specific rate of release of HCN, using the fol parameters:

A = Concentration of HCN in scrubber (mg/L)
(This is obtained from Method 9010.)

L = Volume of solution in scrubber (L)

W = Weight of waste used (kg)

S = Time of measurement = Time N_2 stopped - Time N_2 started (sec)

$$R = \text{specific rate of release} = \frac{A \cdot L}{W \cdot S}$$

Total available HCN (mg/kg) = R x 1,800.

7.3.4 Interim Guidance For Reactive Sulfide

7.3.4.1 The current EPA action level is:

Total releasable sulfide: 500 mg H_2S/kg waste.

7.3.4.2 Test Method to Determine Hydrogen Sulfide Released from Wastes

1.0 SCOPE AND APPLICATION

1.1 This method is applicable to all wastes, with the condition that waste that are combined with acids do not form explosive mixtures.

1.2 This method provides a way to determine the specific rate of release of hydrogen sulfide upon contact with an aqueous acid.

1.3 This procedure releases only the evolved hydrogen sulfide at the test conditions. It is not intended to measure forms of sulfide other then those that are evolvable under the test conditions.

2.0 SUMMARY OF METHOD

2.1 An aliquot of the waste is acidified to pH 2 in a closed system. The gas generated is swept into a scrubber. The analyte is quantified. The procedure for quantifying the sulfide is given in Method 9030, Chapter Five.