SUPERFUND CONTRACT SUPPORT TEAM

SAMPLING REPORT

for the

UNION SHIP CANAL SITE

A.K.A. HANNA FURNACE CORPORATION SITE

in BUFFALO, ERIE COUNTY, NEW YORK

June 7, 2001

Participating Personnel: United States Environmental Protection Agency
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Date Prepared: September 7, 2001

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UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION II

DATE: SEP 2 0 2001

SUBJECT: Sampling Report for Union Ship Canal

FROM: Diane Salkie, Environmental Scientist
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TO: Kevin Matheis, On-Scene Coordinator
Emergency and Remedial Response Division

Attached please find the June, 2001 waste pile sampling report for the Union Ship Canal site in Buffalo, New York. If you have any questions, please contact me at (732) 321-4423.

Attachment

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APPENDIX H:	N.Y.D.E.C. (New York Department of Environmental Conservation). Division Technical and Administrative Guidance Memorandum on Determination of Soil Cleanup Objectives and Cleanup Levels. January 1994. *Tables 1 - 4 Recommended Soil Cleanup Objectives*.
APPENDIX I:	U.S. Environmental Protection Agency, Region III. Hazardous Site Cleanup Division. October, 2000. *Risk-Based Concentrations Table.*
APPENDIX J:	Union Ship Canal Trip Report

1.0 BACKGROUND

The approximately 131-acre Hanna Furnace site is located in the southern-most part of the City of Buffalo, Erie County, New York. Union Ship Canal traverses the property approximately in the middle, in a west-east direction. The canal extends from the eastern boundary of the site to the Buffalo Harbor in the west. A 50-foot easement and right-of-way granted to Shenango Furnace are adjacent to the northern edge of the property. To the northeast of the site is a foundry building owned by Marlen Steel Corporation and to the east is Conrail Corporation property. The south of the site is bordered by the South Buffalo Railroad Company property and directly to the west of the site is Fuhrman Boulevard and the Hamburg Turnpike. The Father Baker Bridge forms an elevated portion of the Hamburg Turnpike which formerly allowed access of canal barges to the site via the Union Ship Canal. A site map, Figure 1-1 and a schematic drawing of the Union Ship Canal, Figure 1-2, can be found in Appendix A.

Prior to cessation of activities in 1982, the site was used for pig iron manufacturing. Approximately ten acres along the eastern boundary of the site and 20 acres to the north of the Union Ship Canal were utilized for land filling generated wastes and raw material storage during the period of 1960 - 1982. The mounds of waste material rise to a maximum of 30 feet above grade. A small pond is located to the northwest of this area. Approximately 30 acres to the southeast of the canal were utilized for pig iron storage. Forty acres south of the canal were utilized for the production of pig iron and ancillary activities. In 1900, the southern portion of the property was purchased and incorporated by Buffalo Union Steel. To service the facility, the Union Ship Canal was constructed in 1910. Manufacturing of pig irons commenced with the construction of blast furnaces during the period of 1900 to 1915. In 1920, the Hanna Furnace Company acquired the site from Union Steel. In 1929, the site was purchased by National Steel Company and became known as Hanna Furnace Corporation, a part of National Steel's conglomerate.

In 1960, Hanna Furnace purchased 25 acres of swamp land north of the canal from the Pennsylvania Railroad. In 1962, approximately 18 acres of the newly-acquired property was sold to Shenango Furnace Company. Due to foreign competition and closure of Shenango Furnace Company, a primary recipient of Hanna's metal, in 1982, Hanna Furnace ceased all operations at this site. In 1983, the Jordan Foster Scrap Corporation, the current owner, purchased the site from National Steel. Jordan Foster dismantled the blast furnaces, the casting mill and several other buildings. The Jordan Foster Scrap Corporation has since filed for bankruptcy.

In 1996, the City of Buffalo acquired the property through the In Rem process after the trustees in bankruptcy sought to have it abandoned. The site is in proposal with the City of Buffalo as a Brownfields site. However, they are still concerned with large piles of material in the northern one fourth of the property that in total have been estimated to contain approximately 350,000 cubic yards of material. The Division of Environmental Science and Assessment (DESA), Hazardous Waste Support Branch (HWSB), Superfund Contract Support Team (SCST) conducted a waste pile sampling event at the Union Ship Canal site to delineate what contaminants exists in the aforementioned waste piles.

2.0 SAMPLING PROCEDURES

The sampling procedures were in accordance with the guidelines set forth in the Quality Assurance Project Plan (QAPP) which is located in Appendix B.

3.0 DESCRIPTION OF EVENTS

On June 07, 2001, two members from the U.S. EPA, Division of Environmental Science and Assessment (DESA), Superfund Contract Support Team (SCST) met with the U.S. EPA On-Scene Coordinator (OSC), Kevin Matheis and the Removal Support Team (RST) representative, Mike Mahnkopf. The OSC led the others to the site where a city-hired backhoe was waiting. Initially the OSC took the EPA personnel and the RST representative on a walking tour throughout the site. He identified the three waste piles as: flu ash pile, iron ore pile and the mountain landfill pile. See Figure A of Appendix A for a map of the site. The backhoe will dig approximately 3 to 6 feet, or until homogenized soil is encountered. A representative from the New York State Department of Environmental Conservation (NYSDEC) arrived on site prior to sampling.

The EPA employees began sampling from the flu ash (FA) pile. The first sample collected was called, US-FA-01, which is located to at the northwestern end of the flu ash pile. Large pieces of scrap metal were found in the waste pile in the areas exposed by the backhoe. The soil which was sampled from 2.0 - 2.5 feet deep at 0940, was dark brown with minimal rocks. They then moved onto US-FA-02 which is located on the southern, narrow area of the flu ash pile. They collected this sample at 1005 from 3.5 to 4.0 feet deep. The sample consisted of a soft, fine, dark brown soil with a shiny material throughout the sample. There was a slight petroleum odor associated with the sample. The next sample location, US-FA-03, was chosen at the southeastern end of the flu ash pile, on the lower gradient. This sample was collected from 3.0 - 3.5 feet at 1020 and consisted of a brown soil with rocks. The NYSDEC representative informed the OSC that many test pits had been conducted on the mountain landfill pile. Therefore, a sample was cut from the mountain landfill and added to the flu ash pile. The next sampling location was US-FA-04 which is located at the eastern end of the flu ash pile, before the elevation begins. This sample was collected from 3.5 - 4.0 feet deep at 1035 and consisted of brown soil with some black spots and small rocks.

The next pile sampled was the iron ore (IO) pile. The backhoe began digging on the southwest side of the pile which is closest to the canal. At 1055 the EPA sampled US-IO-01 and duplicate US-IO-4 at 3.5 - 4.0 feet deep. The sample consisted of a light brown clay with numerous round stones. In the meantime the backhoe dug a hole on the southeast side of the pile. The OSC determined that the sample is homogenous throughout the entire pile. Therefore, no other samples will be collected from the iron ore pile. See picture : Figure 10 on page 9.

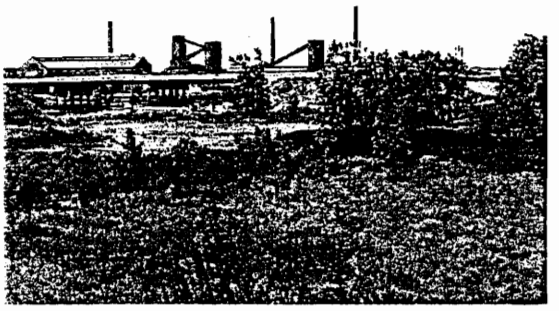
The EPA employees then moved on to the mountain landfill (ML) pile. They began with US-ML-01 at the southwestern side of the pile. They collected this sample at 1140 from 3.5 - 4.0 feet deep with a matrix spike/matrix spike duplicate (MS/MSD). The sample consisted of a dark brown soil with few rocks and some bricks. The next sample, US-ML-02 was once again collected from the side of the pile, this time from the western side. The location was sampled at 1155 from 2.5 - 3.0 feet and consisted of brown soil with a white/grey mass of clay in the sample. The back hoe then moved to the top of the mountain landfill pile. After three rejections, the backhoe was able to dig at sample location, US-ML-03, which ended up at the northeastern side of the pile. The sample was collected at 1215 from 3.0 - 3.5 feet and consisted of brown, soft soil with rocks. The final location was chosen after again, hitting rejection three times, at the top southwestern side of the mountain landfill. The sample was collected at 1225 from 4.0 - 4.5 feet deep and consisted of brown, soft soil with rocks and bricks.

The EPA personnel collected a rinsate blank at 1245 by pouring analyte-free water over a decontaminated stainless steel bowl, scoop and auger. The RST representative labeled the sample bottles, filled out the chain of custodies and shipped the samples on June 07, 2001 to a subcontracted laboratory via Federal Express at 1500. The sampling event was then complete and the Trip Report can be found as Appendix J. A map of the sampling locations can be found as Figure A in Appendix A.

The following seven (7) pages consist of photographs of the sampling locations.

SITE PHOTOGRAPHS

Figure 1: This photograph of the Union Ship Canal site was taken from Furhman Boulevard looking east at the property.

These are four panoramic pictures of the site from standing on the mountain landfill. The pictures are from west to east, while standing in the south portion of the site.

FLU ASH PILE

Figure 3: This is a picture of the southwestern side of the flu ash waste pile. See Figure A of Appendix A for a map of the following sample locations.

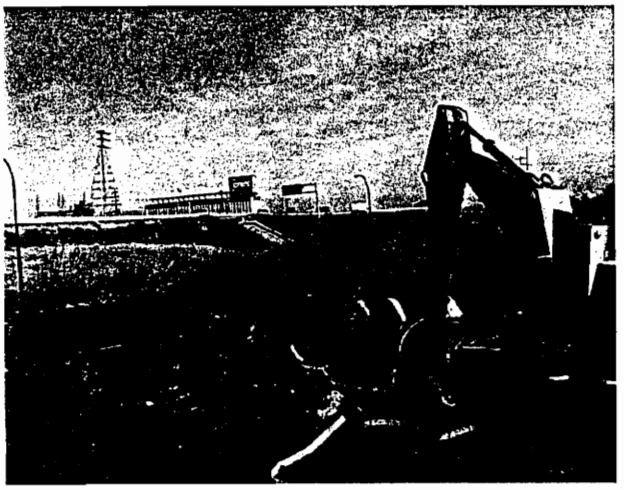


Figure 4: This is a picture of sample, US-FA-01 which was the first sample collected from the flu ash pile. Notice the scraps of metal.

Figure 5: This is sample, US-FA-02 which is located on the canal side of the flu ash pile.

Figure 6: This is a picture of sample location, US-FA-03 which is located on the northeast tip of the flu ash pile.

Figure 7: This is the last sampling location from the flu ash pile. It was not collected from the elevated area of the pile as the other samples were, but from the entrance to the flu ash pile.

IRON ORE PILE

Figure 8: This is a picture of the iron ore pile, which was taken while standing on the northwest side of the pile. A map of the following sample locations can be found as Figure A in Appendix A.

Figure 9: This is a picture of the only sampling location in the iron ore pile, US-IO-01 and a duplicate, US-IO-04. The sample was collected from the southern (canal side) of the pile.

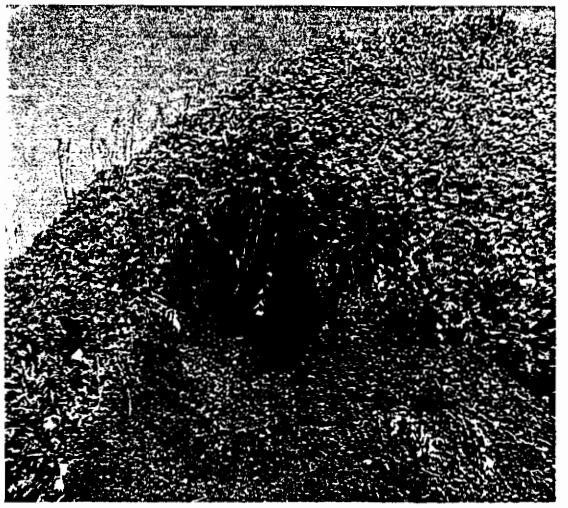


Figure 10: This is a picture of a proposed sampling location further to the east in the iron ore pile. It was decided in the field that this matrix is the same as US-IO-01 and therefore was not sampled.

MOUNTAIN LANDFILL PILE

Figure 11: This is a picture of the mountain landfill pile and was taken from the west side of the pile. The following sample locations can be found on a map, called Figure A in Appendix A.

Figure 12: This is a picture of the first sampling location from the mountain landfill, US-ML-01. It is located on the southwest corner of the pile and was collected from the side of the pile.

Figure 13: This is sampling location, US-ML-02 which was collected from the western side of the mountain landfill.

Figure 14: This is a picture of sampling location, US-ML-03 which is located on the top north side of the mountain landfill.

Figure 15: The final sampling location, US-ML-04 was collected from the southwestern portion of the top of the mountain landfill.

4.0 RESULTS

The rinsate blank was taken for Quality Control and to determine if any outside contamination was introduced to the samples. There were no organic contaminants found in the rinsate blank. The inorganic contaminants found in the rinsate blank are: antimony, barium, cadmium, calcium, chromium, cobalt, copper, iron, magnesium, manganese, nickel, potassium, sodium, vanadium and zinc. The compounds in the blanks could have been introduced during decontamination of the sampling equipment or the laboratory equipment or they may be from the analyte-free distilled water that was used. Chromium in sample US-IO-01 was rejected due to the level in the rinsate blank. The Quality Assurance/Quality Control sample data can be found in Table 1 on page 14

All toxicity characteristic leaching procedure (TCLP) and Resource Conservation and Recovery Act (RCRA) charcteristic samples were compared to the U.S. Code of Federal Regulations *Title 40: Protection of Environment, Volume 18, Part 261.21: Characteristic of Ignitability, 261.22: Characteristic of Reactivity, 261.23: Characteristic of Corrosivity* and *261.24: Toxicity Characteristic, revised 7/1/00* which can be found as Appendices F and G and in Table 2 on page 15. The only inorganic contaminant that was found to exceed this applicable or relevant and appropriate requirement (ARAR) was lead in sample, US-FA-03, in the flu ash pile. The only organic contaminant that exceeded this ARAR was the pesticide, silvex, in sample, US-ML-01, in the mountain landfill pile. None of the samples analyzed for RCRA characteristics proved to be positive for either ignitability, corrosivity or reactivity. This can be seen from Table 2 on page 15 and from the raw data in Appendix C. The RCRA characteristics raw data can be found in Appendix D.

Table 3 on page 20, is a summary of the target analyte list (TAL) - total metal analysis and polychlorinated biphenol (PCB) analysis sample results. These samples were compared to the following ARARs: New York State Department of Environmental Conservation (NYSDEC) *Technical and Administrative Guidance Memorandum (TAGM): Determination of Soil Cleanup Objectives and Cleanup Levels, Appendix A: Recommended Soil Cleanup Objectives* and the U.S. EPA Region III *Risk-Based Concentration (RBC) Table,* which can be found as Appendix H and I, respectively. The TAGM cleanup levels are a conservative, remedial approach to sites and are mostly based on soil background which was not collected at this site. However, for a number of the analytes, the TAGM list has a choice of a level or the soil background. For this particular site, that level will be used as a conservative cleanup level. The samples with results that exceed the TAGM levels are as follows: US-FA-01: arsenic, beryllium, cadmium, chromium, copper, iron, nickel, selenium and zinc; US-IO-01 and duplicate, US-IO-04: arsenic, beryllium, cadmium, chromium, copper, iron, nickel, and zinc; and US-ML-01 and US-ML-03: arsenic, beryllium, cadmium, chromium, copper, iron, mercury, nickel, selenium and zinc. These results can also be found in Table 3 on page 20 and in the raw data in Appendix D. None of the TAL - total metal samples exceeded the RBC levels. Also, none of the PCB sample results exceeded either ARAR. The PCB raw data can be found in Appendix C.

In the sample summaries, Tables 2 and 3, there are a variety of qualifiers along with the data. The footnotes at the bottom of each page explain each qualifier. A "J" qualifier is an estimated value and is generally because the value recorded is less than the contract required detection limit. However, there are a variety of other reasons for the "J" qualifier is used in an analytical report. One reason that is found throughout this data package, is because the spike recoveries were outside of specified quality control limits. Another reason is because there was a difference between the duplicate samples. These reasons for the "J" qualifier and others can be found in the footnotes in Tables 2 and 3. The "B" qualifier means that the reported value was obtained from a reading that was less than the contract required detection limit (CRDL), but greater than or equal to the instrument detection limit (IDL). The "E" qualifier was given to an analyte because the serial dilution results are not within 10%. The "N" qualifier means that when the sample was spiked for the MS/MSD, the result was not within control limits. Due to high concentrations, two of the sample compounds had to be diluted: iron in US-ML-01 and US-ML-03.

5.0 CONCLUSION:

Ten waste pile samples were collected from nine locations. These sample were collected from three different waste piles: flu ash pile, iron ore pile and the mountain landfill pile. These locations can be seen on Figure A of Appendix A. In the flu ash pile, TCLP-lead exceeded the U.S. Code of Federal Regulations *Title 40: Protection of Environment, Volume 18, 261.24: Toxicity Characteristic,* ARAR, but did not detect any organics. There were some TAL analytes above the TAGM in sample, US-FA-01. There were also PCBs detected in all samples from the flu ash pile. However, they were not at levels that exceeded the ARARs. Only one sample was collected from the iron ore pile, with a duplicate. TCLP trichloroethene was detected in both those samples, but at low levels. This pile also had TAL - total metal samples that exceeded the TAGM ARARs, but no PCBs were detected. The final pile analyzed was the mountain landfill pile. One sample, US-ML-01, detected the pesticide, silvex, at a level that did exceed the U.S. Code of Federal Regulations *Title 40: Protection of Environment, Volume 18, 261.24: Toxicity Characteristic,* ARAR. The raw data packages for TCLP and PCB results and inorganics and RCRA results can be found in Appendices C and D, respectively and on Table 2 and 3 of this report.

A map of the sampling locations can be found as Figure A in Appendix A. Table 2 and 3, pages 15 and 20, respectively, provide summaries of the detected results of the TCLP VOC, BNA, pesticides, and inorganic analysis, the TAL - total metal analysis, PCB analysis, and RCRA characteristic conducted by a contracted laboratories on the waste pile samples at the Union Ship Canal site. Also in Tables 2 and 3 are a comparison of the results to the state and federal ARARs which can be found as Appendix F, G, and H.

TABLE 1
QA/QC SAMPLE DATA

TYPE OF SAMPLE	SAMPLE NUMBERS
EQUIPMENT BLANK	RB-01
BLIND DUPLICATE	US-IO-04 is a duplicate of US-IO-01
MATRIX SPIKE/ MATRIX SPIKE DUPLICATE	US-ML-01

TABLE 2
TCLP AND RCRA SAMPLE SUMMARY

Sample Location	Sample Numbers	Analysis	Compounds & Concentrations (mg/L)			40 CFR Part 261[1] (mg/L)
			Compounds	Conc.	QC	
US-FA-01	2080-1	TCLP Volatile Organic	Non-detection			
		TCLP Semi-Volatiles	Non-detection			
		TCLP Pesticides/ Herbicides	Non-detection			
		TCLP Total metals	Arsenic Barium Cadmium Chromium Lead Selenium	0.0026 0.581 0.0371 0.0018 0.209 0.0209	B B B B B B	5.0 100 1.0 5.0 5.0 1.0
		RCRA characteristics	Corrosivity (as pH) Ignitability	7.77 >140 °F		< 2 or >12.5 < 140 °F
US-FA-02	2080-2	TCLP Volatile Organic	Non-detection			
		TCLP Semi-Volatiles	Non-detection			
		TCLP Total metals	Arsenic Barium Cadmium Chromium Lead Selenium Silver	0.0022 0.836 0.107 0.0165 1.56 0.0249 0.0022	B B B B B B B	5.0 100 1.0 5.0 5.0 1.0 5.0
		RCRA characteristics	Corrosivity (as pH) Ignitability	7.11 >140 °F		< 2 or >12.5 < 140 °F
US-FA-03	2080-5	TCLP Total metals	Arsenic Barium Cadmium Chromium Lead Selenium Silver	0.0046 0.577 0.15 0.0202 14.7 0.0267 0.0025	B B B B B B	5.0 100 1.0 5.0 5.0 1.0 5.0
		RCRA chacteristics	Corrosivity (as pH) Ignitability	7.79 >140 °F		< 2 or >12.5 < 140 °F

B - The reported value was obtained from a reading that was less than the CRDL, but greater than or equal to the IDL.
* - Sample duplicate and sample results are not within control limits.
[1] - Code of Federal Regulations *Title 40: Protection of Environment*, Volume 18, Part 261.21, 261.22, 261.23 and 261.24. Revised 7/1/00.

TABLE 2
TCLP AND RCRA SAMPLE SUMMARY CONTINUED

Sample Location	Sample Numbers	Analysis	Compounds & Concentrations (mg/L)			40 CFR Part 261[1] (mg/L)
			Compounds	Conc.	QC	
US-FA-04	2080-6	TCLP Total metals	Barium	0.274	B	100
			Cadmium	0.0649	B	1.0
			Chromium	0.0068	B	5.0
			Lead	0.256	B	5.0
			Selenium	0.0282	B	1.0
			Silver	0.0027	B	1.0
		RCRA chacteristics	Corrosivity (as pH)	8.13		< 2 or >12.5
			Ignitability	>140 °F		< 140 °F
US-IO-01	2080-4	TCLP Volatile Organic	Trichloroethene	0.007	J	0.5
		TCLP Semi-Volatiles	Non-detection			
		TCLP Pesticides/ Herbicides	Non-detection			
		TCLP Total metals	Arsenic	0.0059	B	5.0
			Barium	0.0711	B	100
			Cadmium	0.0009	B	1.0
			Chromium	0.0013	B	5.0
			Lead	0.0091	B	5.0
			Selenium	0.0161	BJ^	1.0
			Silver	0.00075	B	5.0
		RCRA characteristics	Corrosivity (as pH)	7.94	J:	< 2 or >12.5
			Ignitability	>140 °F		< 140 °F

B - The reported value was obtained from a reading that was less than the CRDL, but greater than or equal to the IDL.
J - The result is estimated.
J^ - Spike recoveries were outside of specified QC control limits in the associated spike samples and because the sample results concentration is < 4X the spike added concentrations.
J: - The pH/corrosivity values of these sample pairs differ > ± 0.1 pH unit.
[1] Code of Federal Regulations *Title 40: Protection of Environment*, Volume 18, Part 261.21, 261.22, 261.23 and 261.24. Revised 7/1/00.

TABLE 2
TCLP AND RCRA SAMPLE SUMMARY CONTINUED

Sample Location	Sample Numbers	Analysis	Compounds & Concentrations (mg/kg)			40 CFR Part 261[1] (mg/L)
			Compounds	Conc.	QC	
US-IO-04 Duplicate of US-IO-01	2080-3	TCLP Volatile Organic	Trichloroethene	0.01	J	0.5
		TCLP Semi-Volatiles	Non-detection			
		TCLP Pesticides/Herbicides	Non-detection			
		TCLP Total metals	Arsenic Barium Cadmium Chromium Lead Selenium Silver	0.0035 0.066 0.00086 0.0008 0.0068 0.0165 0.00085	B B B B B BJ^ B	5.0 100 1.0 5.0 5.0 1.0 5.0
		RCRA characteristics	Corrosivity (as pH) Ignitability	7.15 >140 °F	J: 	< 2 or >12.5 < 140 °F
US-ML-01 MS/MSD	2080-10	TCLP Volatile Organic	Non-detection			
		TCLP Semi-Volatiles	Non-detection			
		TCLP Pesticides/ Herbicides	Silvex	2.5	J	1.0
		TCLP Total metals	Arsenic Barium Cadmium Chromium Lead Selenium Silver	0.0039 0.352 0.0122 0.0049 0.0286 0.0185 0.0009	B B B B B BJ^ B	5.0 100 1.0 5.0 5.0 1.0 5.0
		RCRA characteristics	Corrosivity (as pH) Ignitability	8.57 >140 °F	 	< 2 or >12.5 < 140 °F

B - The reported value was obtained from a reading that was less than the CRDL, but greater than or equal to the IDL.
J - The result is estimated.
J^ - Spike recoveries were outside of specified QC control limits in the associated spike samples and because the sample results concentration is < 4X the spike added concentrations.
J: - The pH/corrosivity values of these sample pairs differ > ± 0.1 pH unit.
[1] Code of Federal Regulations *Title 40: Protection of Environment*, Volume 18, Part 261.21, 261.22, 261.23 and 261.24. Revised 7/1/00.

mg/kg? If so it does not exceed TCLP

TABLE 2
TCLP AND RCRA SAMPLE SUMMARY CONTINUED

Sample Location	Sample Numbers	Analysis	Compounds & Concentrations (mg/L)			40 CFR Part 261[1] (mg/L)
			Compounds	Conc.	QC	
US-ML-02	2080-9	TCLP total metals	Barium	0.526	B	100
			Cadmium	0.0139	B	1.0
			Chromium	0.0067	B	5.0
			Lead	0.0551	BJ^	5.0
			Selenium	0.0166	B	1.0
		RCRA chacteristics	Corrosivity (as pH)	8.75		< 2 or >12.5
			Ignitability	>140 °F		< 140 °F
US-ML-03	2080-7	TCLP total metals	Barium	0.468	B	100
			Cadmium	0.0088	B	1.0
			Chromium	0.0072	B	5.0
			Lead	0.0238	B	5.0
			Selenium	0.0181	BJ^	1.0
			Silver	0.00073	B	5.0
		RCRA chacteristics	Corrosivity (as pH)	8.52		< 2 or >12.5
			Ignitability	>140 °F		< 140 °F
US-ML-04	2080-8	TCLP total metals	Arsenic	0.0034	B	5.0
			Barium	0.368	B	100
			Cadmium	0.0074	B	1.0
			Chromium	0.0105	B	5.0
			Lead	0.0224	B	5.0
			Selenium	0.0152	BJ^	1.0
			Silver	0.00094	B	5.0
		RCRA chacteristics	Corrosivity (as pH)	8.53		< 2 or >12.5
			Ignitability	>140		< 140 °F

B - The reported value was obtained from a reading that was less than the CRDL, but greater than or equal to the IDL.
J^ - Spike recoveries were outside of specified QC control limits in the associated spike samples and because the sample results concentration is < 4X the spike added concentrations.
[1] Code of Federal Regulations *Title 40: Protection of Environment*, Volume 18, Part 261.21, 261.22, 261.23 and 261.24. Revised 7/1/00.

TABLE 2
TCLP AND RCRA SAMPLE SUMMARY CONTINUED

Sample Location	Sample Numbers	Analysis	Compounds & Concentrations (mg/L)			40 CFR Part 261[1] (mg/L)
			Compounds	Conc.	QC	
RB-01	2080-1	Volatile Organics	Non-detection			
		Pesticides/ Herbicides	Non-detection			
		Semi-volatiles	Non-detection			
		PCBs	Non-detection			
		Total metals	Antimony	20.8	B	
			Barium	9.3	B	
			Cadmium	0.31	B	
			Calcium	262	B	
			Chromium	23.2		
			Cobalt	2.2	B	
			Copper	4.3	B	
			Iron	93.5	B	
			Magnesium	39.6	B	
			Manganese	3.2	BJ<	
			Nickel	11.1	B	
			Potassium	30.4	B	
			Sodium	177	B	
			Vanadium	2.0	B	
			Zinc	14.8	B	

B - The reported value was obtained from a reading that was less than the CRDL, but greater than or equal to the IDL.
J< - Contract required detection limit standard percent recoveries were outside the quality control limits and because their concentration fell within "affected ranges".
[1] Code of Federal Regulations *Title 40: Protection of Environment*, Volume 18, Part 261.21, 261.22, 261.23 and 261.24. Revised 7/1/00.

TABLE 3
INORGANIC AND PCB SAMPLE SUMMARY

Sample Location	Sample Numbers	Analysis	Compounds & Concentrations (mg/kg)			TAGM (mg/kg)[1]	Region 3 RBC Ind. (mg/kg))[2]
			Compounds	Conc.	QC		
US-FA-01	2080-1	TAL Total metals	Aluminum	10,200		SB	20,000,000
			Antimony	1.0	BNJ^	SB	8200
			Arsenic	12.4		7.5 or SB	380
			Barium	128		300 or SB	1,400,000
			Beryllium	1.9		0.16 or SB	41,000
			Cadmium	6.5	EJ'	1.0 or SB	10,000
			Calcium	62,400		SB	
			Chromium	51.4		10 or SB	
			Cobalt	2.9	B	30 or SB	1,200,000
			Copper	80.3	NJ^	25 or SB	820,000
			Iron	88,000		2000 or SB	6,100,000
			Lead	1420		SB	
			Magnesium	9620		SB	
			Manganese	2490		SB	410,000
			Mercury	0.10	NJ^	0.1	
			Nickel	30.6		13 or SB	410,000
			Potassium	2350	EJ'	SB	
			Selenium	3.9	NJ^	2.0 or SB	100,000
			Silver	2.8		SB	100,000
			Thallium	17.6	J'	SB	1400
			Vanadium	18.6		150 or SB	14,000
			Zinc	1790		20 or SB	6,100,000
			Cyanide	11.8	NJ^*		
		PCBs	Aroclor-1260	0.098	J/	10	290
US-FA-02	2080-2	PCBs	Aroclor-1254	0.14	J/	10	290
		TAL	Cyanide	0.0164	NJ*		
US-FA-03	2080-5	PCBs	Aroclor-1242	0.17		10	290
			Aroclor-1254	0.21	J/N	10	290
			Aroclor-1260	0.11		10	290
		TAL	Cyanide	0.0096	NJ*		
US-FA-04	2080-6	PCBs	Aroclor-1254	0.2		10	290
			Aroclor-1260	0.14	J/	10	290
		TAL	Cyanide	0.0053	NJ*		

J^ - Spike recoveries were outside of specified QC control limits in the associated spike samples and because the sample results concentration is < 4X the spike added concentrations.
B - The reported value was obtained from a reading that was less than the CRDL, but greater than or equal to the IDL.
N -The sample recovery is outside of control limits.
J' - The percent difference between the Initial Sample (I) result and the Serial Dilution Sample (S) result is either between 10-100% or > 100% when the concentration of I is > 10 X the instrument detection limit (IDL).
J/ - A percent difference between the primary and confirmation columns was > 25%.
* - Sample duplicate and sample results are not within control limits.
E - The serial dilution results are not within 10 %.
[1]- From the *Technical and Administrative Guidance Memorandum: Determination of Soil Cleanup Objectives and Cleanup Levels. Appendix A: Recommended Soil Cleanup Objectives.* Jan. 1994.
[2]-From the EPA Region III *Risk-Based Concentration Table.* October 2000.

TABLE 3
INORGANIC SAMPLE SUMMARY CONTINUED

Sample Location	Sample Numbers	Analysis	Compounds & Concentrations (mg/kg)			TAGM (mg/kg)[1]	Region 3 RBC Ind. (mg/kg))[2]
			Compounds	Conc.	QC		
US-IO-01	2080-4	TAL total metals	Aluminum	2350		SB	20,000,000
			Antimony	3.8	BNJ^	SB	8200
			Arsenic	12.4		7.5 or SB	380
			Barium	9.8	B	300 or SB	1,400,000
			Beryllium	1.0		0.16 or SB	41,000
			Cadmium	1.1	EJ'	1.0 or SB	10,000
			Calcium	26,900	J>	SB	
			Chromium	15.6	R	10 or SB	
			Cobalt	3.4	B	30 or SB	1,200,000
			Copper	38.2	NJ^	25 or SB	820,000
			Iron	48,100		2000 or SB	6,100,000
			Lead	8.0		SB	
			Magnesium	1340	*	SB	
			Manganese	3670		SB	410,000
			Mercury	0.081	BNJ^	0.1	
			Nickel	28.6	J>	13 or SB	410,000
			Potassium	270	BE	SB	
			Selenium	1.6	NJ^	2.0 or SB	100,000
			Silver	0.23	B	SB	100,000
			Sodium	203	B	SB	
			Thallium	10.1	J'	SB	1400
			Vanadium	18.8		150 or SB	14,000
			Zinc	79.3		20 or SB	6,100,000
			Cyanide	0.084	BNJ^*		
		PCBs	Non-detection				

J^ - Spike recoveries were outside of specified QC control limits in the associated spike samples and because the sample results concentration is < 4X the spike added concentrations.
B - The reported value was obtained from a reading that was less than the CRDL, but greater than or equal to the IDL.
N -The sample recovery is outside of control limits.
J' - The percent difference between the Initial Sample (I) result and the Serial Dilution Sample (S) result is either between 10-100% or > 100% when the concentration of I is > 10 X the instrument detection limit (IDL).
J> - The Relative Percent Difference (RPD) between the samples and corresponding field duplicate samples were outside the qualified QC criteria.
R - Th e rinsate blank concentration was greater than contract required detection limit and sample concentrations were above the instrument detection limit but less than 5 X field blank.
* - Sample duplicate and sample results are not within control limits.
E - The serial dilution results are not within 10 %.
[1]- From the *Technical and Administrative Guidance Memorandum: Determination of Soil Cleanup Objectives and Cleanup Levels, Appendix A: Recommended Soil Cleanup Objectives.* Jan. 1994.
[2]-From the EPA Region III *Risk-Based Concentration Table.* October 2000.

TABLE 3
INORGANIC SAMPLE SUMMARY CONTINUED

Sample Location	Sample Numbers	Analysis	Compounds & Concentrations (mg/kg)			TAGM (mg/kg)[1]	Region 3 RBC Ind. (mg/kg))[2]
			Compounds	Conc.	QC		
US-IO-04	2080-3	TAL total metals	Aluminum	3830		SB	20,000,000
			Antimony	4.1	BNJ^	SB	8200
Duplicate of US-IO-01			Arsenic	9.7		7.5 or SB	380
			Barium	10	B	300 or SB	1,400,000
			Beryllium	1.6		0.16 or SB	41,000
			Cadmium	1.4	EJ'	1.0 or SB	10,000
			Calcium	8690	J>	SB	
			Chromium	25		10 or SB	
			Cobalt	6.2	B	30 or SB	1,200,000
			Copper	37.8	NJ^	25 or SB	820,000
			Iron	64,800		2000 or SB	6,100,000
			Lead	8.4		SB	
			Magnesium	2640	*	SB	
			Manganese	2220		SB	410,000
			Mercury	0.063	BNJ	0.1	
			Nickel	49.5	J>	13 or SB	410,000
			Potassium	160	BE	SB	
			Selenium	0.76	BNJ^	2.0 or SB	100,000
			Silver	0.28	B	SB	100,000
			Sodium	141	B	SB	
			Thallium	17.5	J'	SB	1400
			Vanadium	21.6		150 or SB	14,000
			Zinc	120		20 or SB	6,100,000
			Cyanide	0.059	BNJ^*		
		PCBs	Non-detection				

J^ - Spike recoveries were outside of specified QC control limits in the associated spike samples and because the sample results concentration is < 4X the spike added concentrations.
B - The reported value was obtained from a reading that was less than the CRDL, but greater than or equal to the IDL.
N -The sample recovery is outside of control limits.
J - The result is estimated.
J' - The percent difference between the Initial Sample (I) result and the Serial Dilution Sample (S) result is either between 10-100% or > 100% when the concentration of I is > 10 X the instrument detection limit (IDL).
J> - The Relative Percent Difference (RPD) between the samples and corresponding field duplicate samples were outside the qualified QC criteria.
E - The serial dilution results are not within 10 %.
* - Sample duplicate and sample results are not within control limits.
[1]- From the *Technical and Administrative Guidance Memorandum: Determination of Soil Cleanup Objectives and Cleanup Levels, Appendix A: Recommended Soil Cleanup Objectives*. Jan. 1994.
[2]-From the EPA Region III *Risk-Based Concentration Table*. October 2000.

TABLE 3
INORGANIC SAMPLE SUMMARY CONTINUED

Sample Location	Sample Numbers	Analysis	Compounds & Concentrations (mg/kg)			TAGM (mg/kg)[1]	Region 3 RBC Ind. (mg/kg))[2]
			Compounds	Conc.	QC		
US-ML-01	2080-10	TAL Total metals	Aluminum	6760		SB	20,000,000
			Antimony	0.64	BNJ^	SB	8200
MS/MSD			Arsenic	15.3		7.5 or SB	380
			Barium	106		300 or SB	1,400,000
			Beryllium	1.2		0.16 or SB	41,000
			Cadmium	4.9	EJ'	1.0 or SB	10,000
			Calcium	45,000		SB	
			Chromium	66.5		10 or SB	
			Cobalt	5.1	B	30 or SB	1,200,000
			Copper	173	NJ^	25 or SB	820,000
			Iron	139,000	dl	2000 or SB	6,100,000
			Lead	399		SB	
			Magnesium	10,700	*	SB	
			Manganese	3360		SB	410,000
			Mercury	0.15	NJ^	0.1	
			Nickel	53.2		13 or SB	410,000
			Potassium	2380	EJ'	SB	
			Selenium	3.1	NJ^	2.0 or SB	100,000
			Silver	0.92	B	SB	100,000
			Thallium	25	J'	SB	1400
			Vanadium	21.4		150 or SB	14,000
			Zinc	1050		20 or SB	6,100,000
			Cyanide	11.8	NJ^*		
		PCBs	Non-detection				

J^ - Spike recoveries were outside of specified QC control limits in the associated spike samples and because the sample results concentration is < 4X the spike added concentrations.
B - The reported value was obtained from a reading that was less than the CRDL, but greater than or equal to the IDL.
N -The sample recovery is outside of control limits.
E - The serial dilution results are not within 10 %.
dl - The sample concentration was high and therefore had to be diluted.
J' - The percent difference between the Initial Sample (I) result and the Serial Dilution Sample (S) result is either between 10-100% or > 100% when the concentration of I is > 10 X the instrument detection limit (IDL).
* - Sample duplicate and sample results are not within control limits.
[1]- From the *Technical and Administrative Guidance Memorandum: Determination of Soil Cleanup Objectives and Cleanup Levels, Appendix A: Recommended Soil Cleanup Objectives*. Jan. 1994.
[2]-From the EPA Region III *Risk-Based Concentration Table*. October 2000.

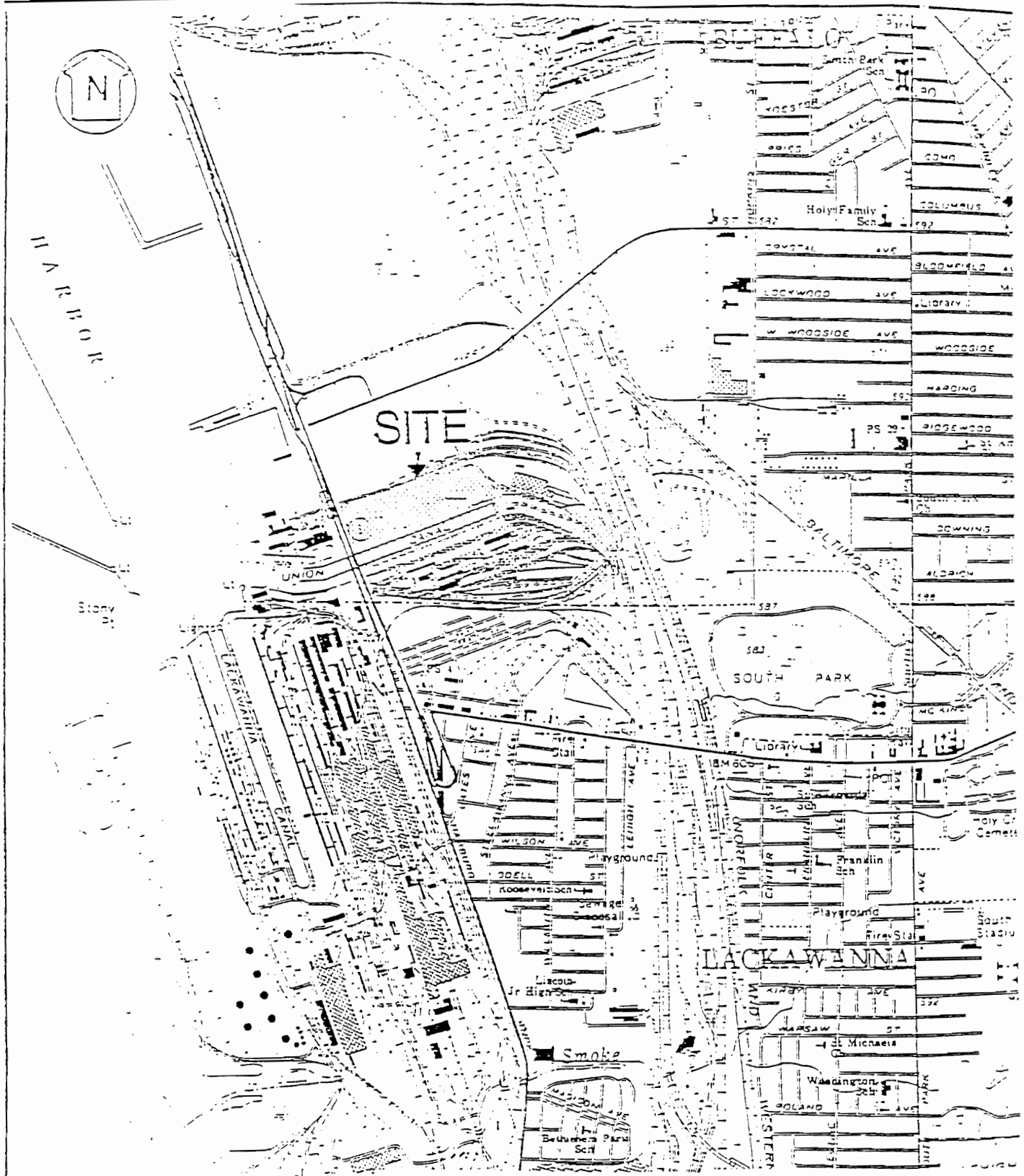
TABLE 3
INORGANIC SAMPLE SUMMARY CONTINUED

Sample Location	Sample Numbers	Analysis	Compounds & Concentrations (mg/kg)			TAGM (mg/kg)[1]	Region 3 RBC Ind. (mg/kg))[2]
			Compounds	Conc.	QC		
US-ML-02	2080-9	PCBs	Non-detection				
		TAL	Cyanide	0.0056	NJ*		
US-ML-03	2080-7	TAL total metals	Aluminum	7850		SB	20,000,000
			Antimony	1.0	BNJ^	SB	8200
			Arsenic	13.8		7.5 or SB	380
			Barium	118		300 or SB	1,400,000
			Beryllium	1.4		0.16 or SB	41,000
			Cadmium	4.6	EJ'	1.0 or SB	10,000
			Calcium	45,600		SB	
			Chromium	104		10 or SB	
			Cobalt	4.7	B	30 or SB	1,200,000
			Copper	169	NJ^	25 or SB	820,000
			Iron	132,000	dl	2000 or SB	6,100,000
			Lead	396		SB	
			Magnesium	9380	*	SB	
			Manganese	3660		SB	410,000
			Mercury	0.14	NJ^	0.1	
			Nickel	56.9		13 or SB	410,000
			Potassium	1710	EJ'	SB	
			Selenium	2.6	NJ^	2.0 or SB	100,000
			Silver	0.72	B	SB	100,000
			Sodium	56.5	B	SB	
			Thallium	25.8	J'	SB	1400
			Vanadium	21.9		150 or SB	14,000
			Zinc	926		20 or SB	6,100,000
			Cyanide	8.7	NJ^*		
		PCBs	Non-detection				
US-ML-04	2080-8	PCBs	Non-detection				
		TAL	Cyanide	0.0059	NJ*		

J^ - Spike recoveries were outside of specified QC control limits in the associated spike samples and because the sample results concentration is < 4X the spike added concentrations.
B - The reported value was obtained from a reading that was less than the CRDL, but greater than or equal to the IDL.
N -The sample recovery is outside of control limits.
E - The serial dilution results are not within 10 %.
* - Sample duplicate and sample results are not within control limits.
dl - The sample concentration was high and therefore had to be diluted.
J' - The percent difference between the Initial Sample (I) result and the Serial Dilution Sample (S) result is either between 10-100% or > 100% when the concentration of I is > 10 X the instrument detection limit (IDL).
[1]- From the *Technical and Administrative Guidance Memorandum: Determination of Soil Cleanup Objectives and Cleanup Levels, Appendix A: Recommended Soil Cleanup Objectives.* Jan. 1994.
[2]-From the EPA Region III *Risk-Based Concentration Table.* October 2000.

APPENDIX A

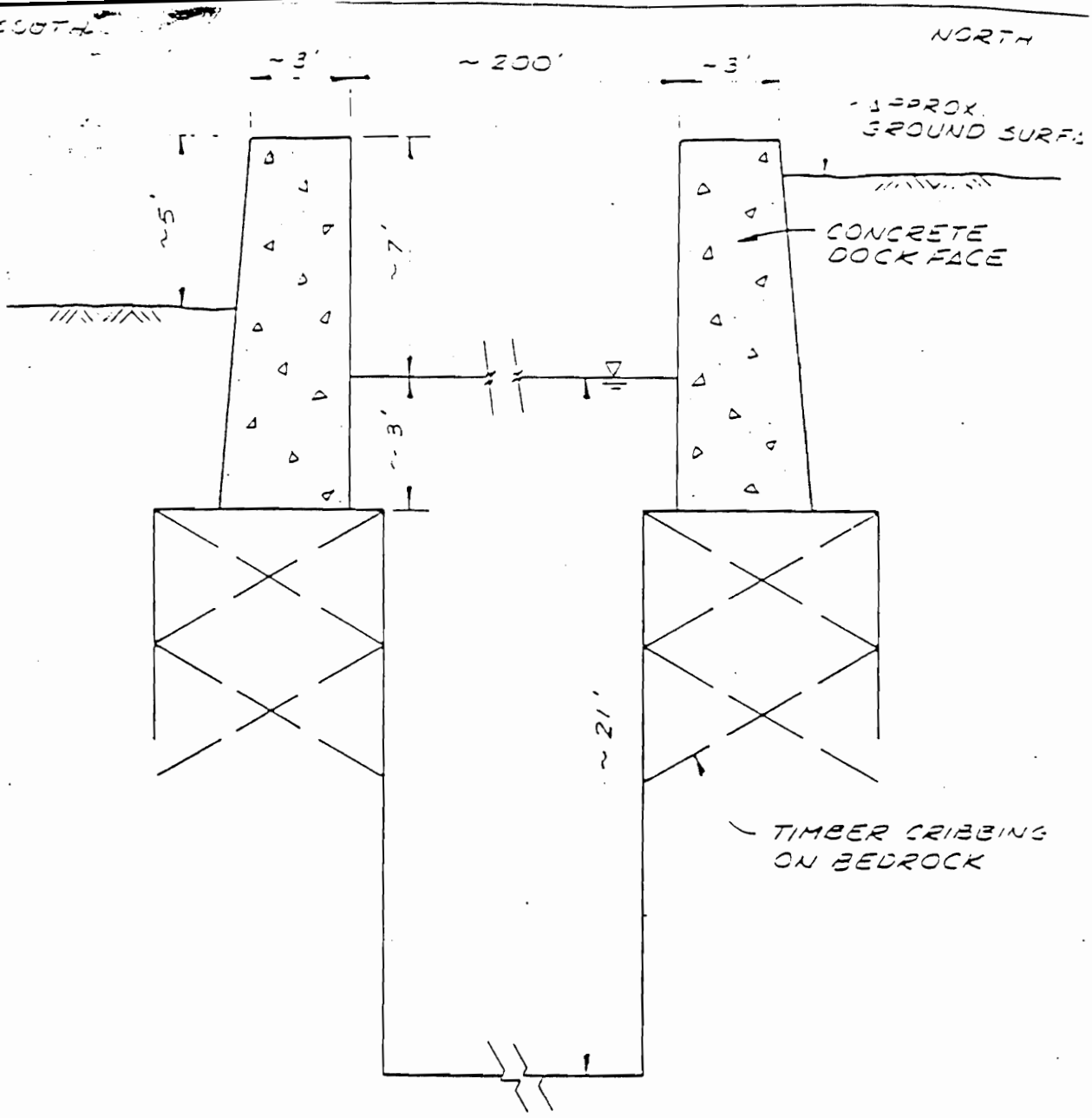
SITE MAPS



SOURCE: USGS TOPOGRAPHIC MAP BUFFALO SE QUADRANGLE 1965

Scale: 1:24,000			NYSDOT ENVIRONMENTAL ASSESSMENT OF HANNA FURNACE SITE	SITE VICINTY MAP
	By	Date		
Dwn.	LMM	2/88		
Ckd.		3/88		
Ap'vd.		5/88		
Rev.			Project No. 7C 745	A FIGURE 1-1

HYATT'S BUFFALO



NOTES:

1. THIS DRAWING WAS ADAPTED FROM A HANNA FURNACE CORPORATION DRAWING OF UNION SHIP CANAL (DRAWING NO. 3681-JULY 1961).

NOT TO SCALE

FILE NO: R5783.0

HANNA FURNACE SITE
BUFFALO, NEW YORK

SCHEMATIC DRAWING OF UNION SHIP CANAL

JUNE 1988

FIGURE 1-2

Figure A. Sampling Locations