915020

ENGINEERING INVESTIGATIONS AT INACTIVE HAZARDOUS WASTE SITES

PHASE II INVESTIGATION

Ferro Corporation - Electro Division Site No. 915020
City of Lackawanna Erie County

DATE: February 1990

VOLUME I

Prepared for:

New York State Department of Environmental Conservation

50 Wolf Road, Albany, New York 12233
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ENGINEERING INVESTIGATIONS AT INACTIVE HAZARDOUS WASTE SITES IN THE STATE OF NEW YORK PHASE II INVESTIGATIONS

Ferro Corporation - Electro Division
City of Lackawanna
Erie County
Site No. 915020

Volume I - Report

Prepared For:

Division of Hazardous Waste Remediation
New York State Department of Environmental Conservation
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CHAPTER 1

EXECUTIVE SUMMARY

The Ferro Corporation - Electro Division (Ferro) site is located in the City of Lackawanna, Erie County, New York (Figure 1-1). (The Electro Division is now called the Specialty Ceramics Division.) The site lies south of Willet Road and west of the Baltimore & Ohio Railroad tracks. The South Branch of Smoke Creek forms the southern boundary; a large drainage ditch and houses form the western boundary.

Ferro manufactures kiln furniture, grinding wheels, and crucibles. In the past, products that were not manufactured to Ferro specifications were disposed of on the southern portion of the property. On-site product disposal reportedly ceased in 1967.

During an inspection of the site by the New York State Department of Environmental Conservation (NYSDEC) in December 1981, a tarlike substance was observed in a drainage ditch north of Willet Road. The substance was determined to be nonhazardous. Ferro planned to clean up the ditch in 1982. NYSDEC collected soil and water samples at or near the plant. Metals and halogenated organics were detected in soil samples; polycyclic aromatic hydrocarbons (PAHs), phenolics, and halogenated organics were detected in some water samples.

Recra Research, Inc., Amherst, New York, completed a Phase I investigation for NYSDEC in 1983.

In November 1985 NYSDEC inspected the landfill and swamp as well as the two discharge drainage ditches and noted that oil was still being discharged in the north drainage ditch. In June and October

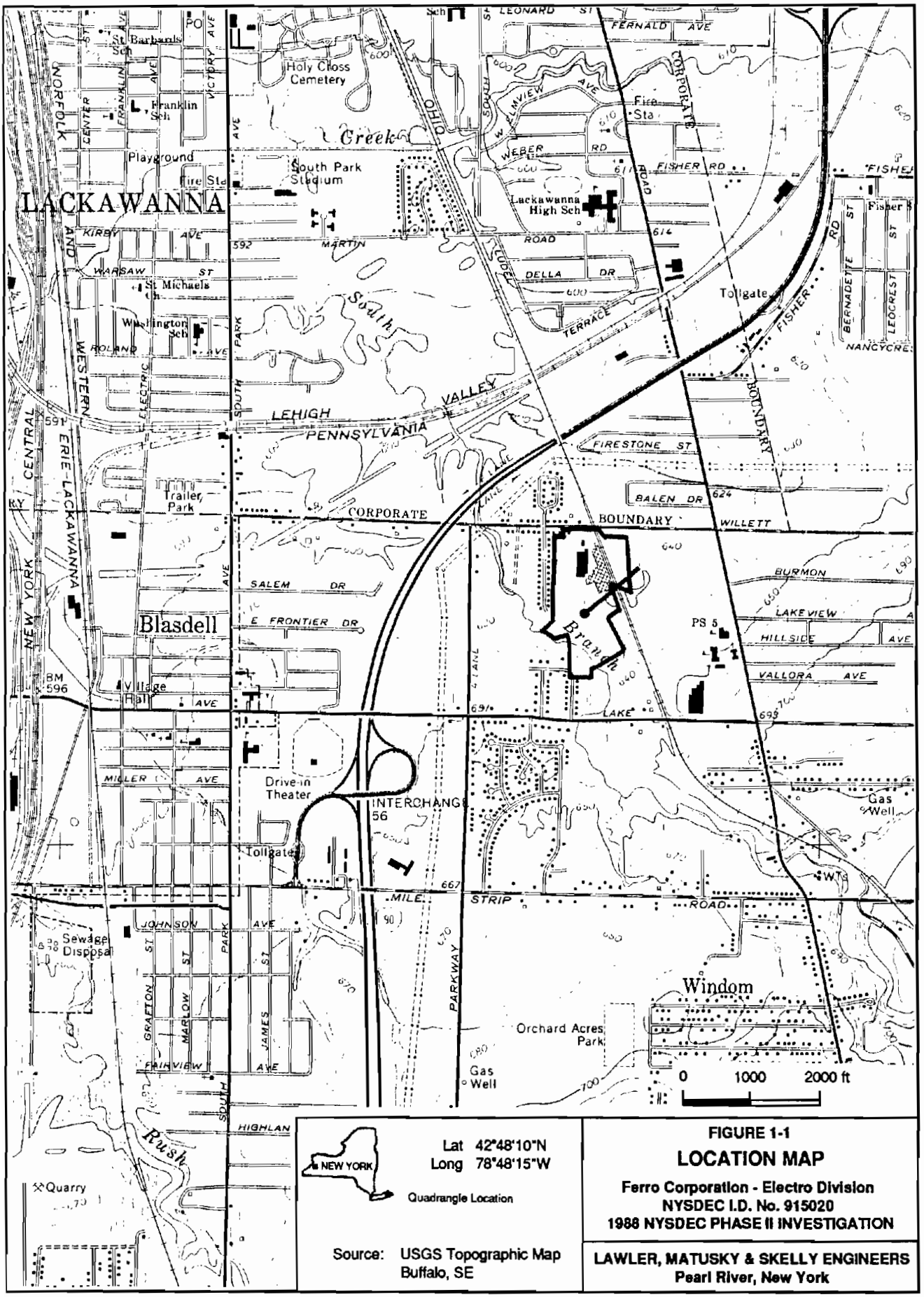


FIGURE 1-1

LOCATION MAP

Ferro Corporation - Electro Division
NYSDEC I.D. No. 915020
1988 NYSDEC PHASE II INVESTIGATION

LAWLER, MATUSKY & SKELLY ENGINEERS
Pearl River, New York

1986 NYSDEC collected soil, sediment, and water samples at the site. Metals were detected in soil and sediment from the drainage ditch.

Under NYSDEC direction a Phase II investigation was undertaken by Lawler, Matusky & Skelly Engineers (LMS). The investigation included a review of available literature, a site reconnaissance and ambient air monitoring, a geophysical survey, soil sediment and surface water sampling and analysis, and report preparation.

The conclusions of the Phase II investigation are:

Landfill Area

- Downstream water quality does not differ significantly from the upstream values; therefore, Ferro does not have a significant impact on the South Branch Creek.

- Surface soils have low to moderate levels of metals and PAH contamination from off-specification product disposal and other site wastes.

Drainage Ditches

- Surface waters in the drainage ditch containing SPDES outfall No. 004 on the north side of Willet Road west of the railroad tracks contain low levels of volatile organic compounds and low to moderate levels of semivolatile PAHs. Floating booms and absorbent pads retard oily discharges from the outfall pipe.

- An unnumbered outfall on the east side of the railroad tracks discharged a tan-yellow particulate matter that coated the drainage ditch. A sediment sample analysis showed calcium composing almost 30% of the sample.

- Drainage ditch sediment analyses indicate various levels of PAH contamination, especially in the west drainage ditch north of Willet Road. Low levels of PCBs detected do not appear to present an environmental problem.

As one element in the site assessment, the data collected during LMS' Phase II sampling and samplings by other agencies and organizations have been used to evaluate the site according to the U.S. Environmental Protection Agency's (EPA) Hazard Ranking System (HRS). EPA uses an HRS to apply uniform technical judgment in evaluating the relative hazards presented by sites under consideration for Federal Superfund remediation. HRS addresses only relative hazard. It does not assess the feasibility, desirability, or degree of cleanup required nor does it address all potential environmental or health impacts.

Under the HRS three numerical scores are computed for each site to express the relative risk or danger from the site, taking into account the population at risk; the hazardous potential of substances found at the site; the potential for contamination of drinking water supplies, for direct human contact, and for destruction of sensitive ecological systems; and other appropriate factors. The three scores are:

- S_M, reflecting the potential for harm to humans or the environment from migration of a hazardous substance from the facility by groundwater, surface water, or air. It is a composite of separate scores for each of the three routes.
- S_{FE}, reflecting the potential for harm from substances that can explode or cause fires.
- S_{DC}, reflecting the potential for harm from direct contact with hazardous substances at the facility.

The final HRS score, the hazardous substance migration (S_M) score, is a combination of the values assigned to groundwater (S_{GW}), surface water (S_{SW}), and air (S_A). Fire and explosion (S_{FE}) and direct contact (S_{DC}) are scored numerically but are not considered in the final HRS (S_M) score.

Based on information gathered from this investigation, the Ferro Corporationn - Electro Division site was scored as follows:

S_M = 6.16 (S_{GW} = 0; S_{SW} = 10.67; S_A = 0.00)

S_{FE} = not scored S_{DC} = 62.50

The total score is 6.16 out of a possible 100.

Based on the conclusions of this Phase II work, the following are recommended:

Landfill Area

- No further investigation of hazardous waste disposal is recommended. However, the landfill should be capped with at least 2 ft of topsoil and seeded. The exposed fill along the creek should be riprapped. This work should be conducted under the supervision of the Division of Solid Waste.

Drainage Ditches

- The drainage ditches on the north side of Willet Road should be cleaned up. An on-site treatment plant is recommended to neutralize the waste before it reaches the environment.

- All outfalls should have their origins and waste streams identified. Since this recommendation is beyond the scope of the Division of Hazardous Waste Remediation, it is recommended that the Division of Water conduct that identification and review.

CHAPTER 2

OBJECTIVES

Lawler, Matusky & Skelly Engineers (LMS), under contract to the New York State Department of Environmental Conservation (NYSDEC), conducted a Phase II investigation of the Ferro Corporation - Elecro Division site, in the City of Lackawanna, Erie County, New York. The investigation was targeted to address specific concerns regarding past waste disposal practices and to provide additional information on the site so that it could be scored accurately on the Hazard Ranking System (HRS). The HRS is the standard ranking system adopted by NYSDEC for state Superfund projects and inactive waste disposal sites. Specific HRS objectives of the Phase II investigation are to:

- Provide a geological and hydrogeological site assessment, including determination of depth to groundwater and aquifers of concern.
- Identify and evaluate the presence, nature, and concentration of contamination and determine to the extent limited by the scope of work its release (if any) to the environment.
- Using information compiled in the study, determine the significance of any release and the degree to which it may threaten surrounding areas.
- Provide additional information to complete the final HRS score.
- Prepare a report documenting findings and any recommendations for possible future work.

CHAPTER 3

DESCRIPTION OF PHASE II INVESTIGATION

3.1 SITE RECONNAISSANCE

Prior to drilling and sampling at Ferro, a site reconnaissance (Appendix B) was conducted to:

- Designate and mark tentative locations for test borings and sampling.
- Determine the accessibility of the site to the drill rig and identify the presence of potential drilling hazards.
- Locate a water supply for drilling.
- Determine, by air monitoring, the level of personnel protection required during future activities.

An HNU photoionization detector (PID) was used to monitor the air. Measurements were taken in the breathing zone, 4 to 6 ft above the ground surface, at upwind and downwind locations. An LMS site-specific health and safety plan (HASP) was prepared for all field personnel (Appendix C).

3.2 GEOPHYSICAL SURVEY

The purpose of the geophysical investigation at Ferro was to characterize the site by determining the vertical and lateral limits of the fill material and the presence of contaminant plumes. Dunn Geoscience Corporation, Amherst, New York, measured subsurface conductivity characteristics (Appendix D) with a Geonics Model EM-31 DL terrain conductivity (TC) meter. The findings of this survey determined final borehole locations.

The EM-31 DL TC meter is equipped with a transmitter coil and a receiving coil spaced 12 ft apart. The transmitter coil is energized with an alternating current at an audio frequency that produces a time-varying primary magnetic field. The magnetic field induces small currents into the ground, thus generating a secondary magnetic field. The ratio of the primary to the secondary magnetic field is linearly proportional to the ground conductivity. Values recorded at designated stations are plotted on base maps and used to interpret subsurface characteristics. If the groundwater is contaminated and enough electrolytic contaminants are present, the meter may detect an anomaly.

The terrain conductivity survey was conducted along the perimeter of the site on 24 August 1988. Eleven profile lines were run. The readings, taken at stations 20 ft apart, were measured parallel and perpendicular to the profile line to test lateral variations in conductivity.

3.3 GROUNDWATER INVESTIGATION

The groundwater investigation provided data pertinent to water chemistry and groundwater flow and characterized the site stratigraphy. The Phase II work plan called for the installation of three monitoring wells (one upgradient and two downgradient) in the overburden aquifer. Most of the overburden, however, has been excavated, and bedrock occurs at a shallow depth or at the surface. If no waters were encountered in the overburden, the borings would have been advanced into the shallow bedrock aquifer. Where the bedrock aquifer was recharged through the overburden veneer, the work scope called for well installation in bedrock.

On 24-25 October 1988, under LMS supervision, American Auger & Ditching Co., Inc., West Monroe, New York, drilled a boring at GW-2

on the Ferro property. The boring was advanced using 4-1/4-in. inside diameter hollow-stem augers and diamond bit coring driven by a Mobile B-57 truck-mounted drill rig. This boring revealed the depth to groundwater and the general stratigraphy of the site (Appendix E).

Following standard penetration test procedures; split-spoon samples were obtained at 5-ft intervals. The split-spoon samples were scanned with an HNU PID to monitor vapor content. An LMS geologist logged the samples and placed them in precleaned, Teflon-lined, screw-cap glass jars. The jars were labeled with job number, well number, sample depth, and date of collection.

The initial 9.5 ft of the boring was advanced through dry, dark-gray clay and weathered gray shale. The auger cuttings and split-spoon samples remained dry after two days of rain, indicating that the overburden had very low permeability. Water did not appear to be percolating through the overburden to the bedrock. The HNU detected 0.2 to 1.4 ppm organic vapors in the samples collected from 4 to 6 ft and 1-16 ppm on those taken from 8 to 10 ft; a slight petroleum odor was noted in the 8- to 10-ft sample.

Competent bedrock was encountered at approximately 9.5 ft below the top of the augers. Following standard diamond bit coring procedures and using an NX-size core barrel, a 5-ft rock core sample was taken from 9.5 to 14.5 ft. The core sample (Appendix E) showed that the bedrock was highly fractured dark-gray shale. Water was encountered at a depth of 11 ft.

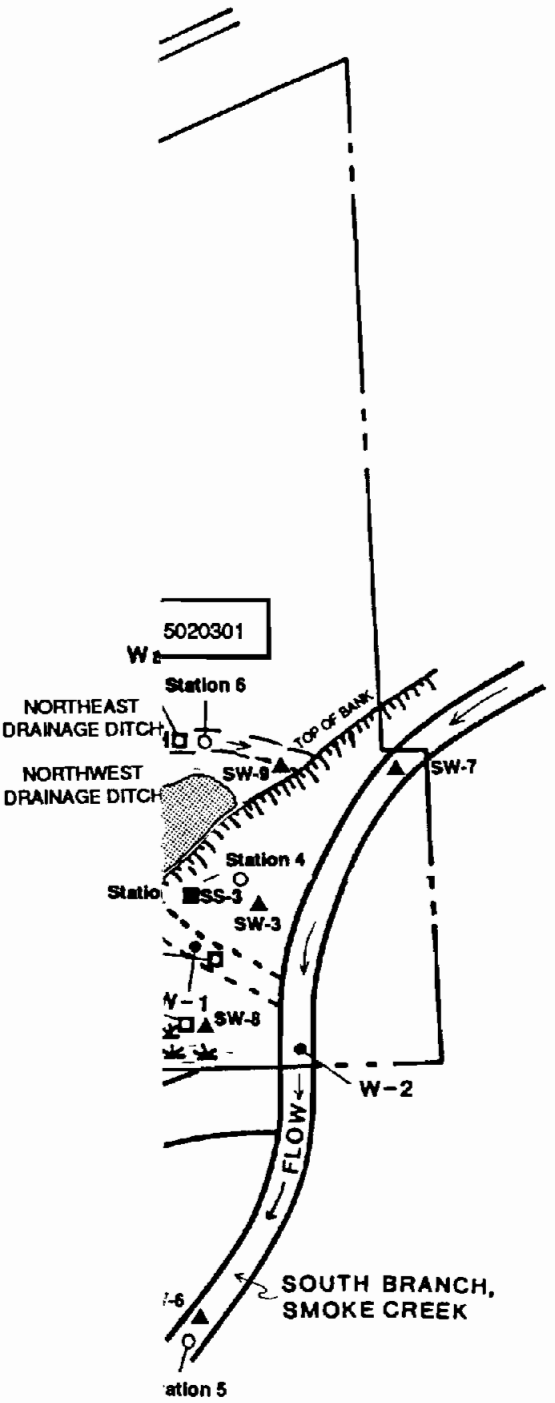
After the coring, the water was pumped from the boring, which was left to recover overnight. After 14 hrs the water level had risen to 6 ft below the top of the augers. The water was pumped out again, and recovery was measured for 1 hr. The water level rose from 10.40 to 9.73 ft below the top of the augers.

At this stage the LMS geologist and the NYSDEC representative decided to seal the borehole and not to install monitoring wells. This decision was based on the following observations: (1) the auger cuttings from the overburden and weathered shale were dry, even after several days of heavy rainfall; (2) the hole remained dry during drilling to a depth of 11 ft, but the water rose to 6 ft within the borehole; (3) the permeability of the shale below the water table was due primarily to the abundant fractures. These observations suggested that the bedrock aquifer is confined and not recharged through the overburden or weathered bedrock, which are relatively impermeable. Vertical fractures that intersect the interface between weathered and competent bedrock are probably sealed with impermeable surface material. NYSDEC recommended that the groundwater phase of this investigation be discontinued because the potential for vertical migration of surface contamination into the groundwater appeared to be very low. Consequently, soil from the boring at GW-2 was not submitted for chemical analysis.

3.4 SURFACE WATER/SEDIMENT SAMPLING

The original Phase II work plan designated seven surface water and sediment sampling locations; however, after the groundwater investigation was discontinued, the NYSDEC representative and LMS personnel increased the number of surface water sampling points. Sampling locations designated in the revised work plan (Figure 3-1) were located where any major surface water bodies (natural or man-made) were found on the site. The objective of this task was to determine whether plant discharge presented a threat to the environment and whether the water flowing through the fill material was contaminated by the fill.

On 2 November 1988 surface water and sediment samples were collected at nine points on or adjacent to the site (Appendix F).



DEC - 12/7/81
6/25/86
EC - 10/15/86

200 ft

Figure 3-1

SITE MAP AND PHASE II SAMPLING LOCATIONS

FERRO CORPORATION - ELECTRO DIVISION
NYSDEC I. D. No 915020
1988 NYSDEC PHASE II INVESTIGATION

LAWLER, MATUSKY & SKELLY ENGINEERS
Pearl River, New York

The samples were placed in precleaned bottles/vials supplied by Recra Environmental, Inc. The bottles were filled directly from each water body to obtain surface water samples. Temperature, pH, and specific conductance were measured and recorded at the time of sampling. The sediment samples were collected at approximately the same points as the surface water samples; individually dedicated stainless steel spoons were used to fill the bottles. Samples were packed in iced coolers to maintain a temperature of 4°C and delivered under chain-of-custody protocol to the Recra laboratory for analysis.

Surface water and sediment were sampled at four locations (SW-1, SW-2, SW-4, and SW-5). The samples were collected from each of the four drainage ditches located on or adjacent to the Ferro property (Figure 3-1). SW-1 is located in the northern part of the large ditch on the western perimeter of the property, which is fed by underground drainage pipes from the plant. The SW-1 samples were collected beneath one of the pipes that drain into the ditch. SW-2 is located in a smaller ditch that runs southward across the landfilled area. This ditch was sampled near its beginning, adjacent to the fence on the southwest side of the plant. There are two drainage ditches on the north side of Willet Road: across from the plant and adjacent to the railroad tracks. SW-4 was collected from a lagoon area in the ditch on the west side of the tracks. This ditch was the site of a tar spill observed by NYSDEC in 1981. During a NYSDEC site visit in 1985 oil was observed in the discharge into the ditch. The water in the ditch had a slight sheen on the surface and a strong petroleum odor. SW-5 is located in the ditch on the east side of the tracks. A tan-yellow substance that appeared to be settling out of the water covered the bottom of this ditch. NYSDEC observed this substance during 1985 and 1986 investigations. The SW-5 sediment sample was taken from this material.

SW-3 samples were collected from the side of a hill composed primarily of fill material, including grinding wheels, concrete fragments, wood, and other coarse debris. Water was seeping out from the hillside through the fill. To obtain this sample, a small weir was constructed from a piece of scrap sheet metal. The metal was bent into a "V" shape and wedged into the hill slope so that almost all the water flowed through the weir as it seeped out. The sample bottles were then filled directly from the weir. Because the surrounding material was fill, no sediment sample was collected at SW-3.

Two samples, SW-6 and SW-7, were collected from the South Branch of Smoke Creek, which flows in a west/northwesterly direction across the southwestern corner of the site (Figure 1-1). SW-6 was collected at a location downstream from the site. SW-7 was collected upstream to determine the water quality of Smoke Creek before it crosses the site. Both surface water samples were obtained at approximately midstream locations where the streambed is composed of shale bedrock. As the only sediment was fragmented shale, no sediment was collected.

SW-8 is located in a marshy area on the southwestern corner of the site. This is a low-lying area where the outfall from the large drainage ditch collects. Although the sediment was saturated with water, no water flowed through this location. Only a sediment sample was collected. Water was encountered about 5 in. below the surface. SW-9 was collected at a point where water flowing from a small drainage ditch branched into small channels and flowed down over a bedrock slope toward Smoke Creek, on the south side of the site. Because volatiles in the water may be lost as the water cascades down the slope, the sample was collected at the top of the slope. No sediment was sampled because the water flows directly over shale.

3.5 SOIL SAMPLING

The original work plan designated three soil sampling locations. SS-1, SS-2, and SS-3 were collected from old landfill areas on the site. The objective of sampling the fill was to obtain representative composite samples of the waste material in order to determine the composition of the fill and estimate its potential threat to groundwater and surface water flowing through the site. Following site reconnaissance, a fourth sampling point was added (Figure 3-1) when stained soil was observed around some tanks on the site. Transformers may have been located in the area, as indicated in a previous site visit; however, no transformers were present during the investigation. Dedicated stainless steel spoons were used to obtain soil samples on 2 November 1988. The same procedures used for surface water and sediment samples (Appendix F) were used to label and pack sample bottles and the samples were delivered to Recra for chemical analysis under chain-of-custody protocol.

SS-1 was collected from an old landfill area on the south side of the southernmost plant building. A hole was dug with a shovel to a depth of 1.5 ft. It was impossible to dig deeper through the very coarse buried rubble. A composite sample was collected from the surface to 1.5 ft with a stainless steel spoon. The sample was composed of gray-to-brown mud and silt and sand- to gravel-sized fragments of glass and other waste material.

SS-2 and SS-3 were collected near the southwest corner of the property from fill areas on the sides of a dirt road that leads down to Smoke Creek. SS-2 is located on the west side of the road at the top of a slope of fill on which sheet metal, wood, ceramic, and concrete fragments were exposed. A 2-ft-deep hole was dug with a shovel and a composite sample, composed mainly of sand-sized fragments of fill material, was collected from the surface to 2 ft with a stainless steel spoon. SS-3 is located on the east side of the

dirt road. A composite sample of mixed sand and waste material was collected from the surface of the slope with a stainless steel spoon. The slope was littered with rubble composed mainly of discarded grinding wheels, ceramic fragments, and concrete slabs. There was some metal and wood debris.

SS-4 is sited near several old tanks between the fence and the large drainage ditch on the western perimeter of the property (Figure 3-1). Some of the soil appeared to be oil-stained. A composite sample of the surface soil around the tanks was collected with a stainless steel spoon. The soil was composed of clay and silt with some sand and fragments of woody material and fill.

CHAPTER 4

SITE ASSESSMENT

4.1 SITE HISTORY

The Ferro Corporation - Electro Division site (Ferro) is located on the south side of Willet Road in the City of Lackawanna, Erie County, New York (Figure 1-1). Ferro is an active refractory that manufactures various industrial products, including kiln furniture for the ceramic industry, abrasive products such as grinding wheels and abrasive grains used for surfacing and polishing in the stone trade, and crucibles for the metals industry. The primary components of these products are silicon carbide, alumina, magnesia, silica, and clay. The plant has been in operation since 1919 (Ref. 1, Appendix A).

Over the years Ferro has disposed of off-specification products and floor sweepings in low-lying areas on the southwestern side of the property (Ref. 1, Appendix A). Disposal occurred between the plant buildings and the South Branch of Smoke Creek and in a smaller area between the southernmost plant building and the fence (Figure 3-1). A large drainage ditch runs parallel to the parking area on the northwestern corner of the site and drains into a marshy area to the southwest on the north side of Smoke Creek. The ditch is fed by two drainage pipes emerging from under the Ferro property. Another smaller ditch originating near the middle of the fence runs south/southwest through the landfilled area and discharges at the top of the bank of Smoke Creek. The plant also discharges material into two drainage ditches on both sides of the railroad tracks on the north side of Willet Road, the northeast and northwest drainage ditches (Figure 3-1).

The Erie County Department of Environment and Planning (ECDEP) inspected the site in October 1978 in response to complaints about improper dumping practices on the site (Ref. 2, Appendix A). Of particular concern was an area near the bank of Smoke Creek where exposed debris littered the stream channel. A Ferro representative reported that dumping in the area had ceased around 1967 and that the debris, mostly scrap grinding wheels, brick, and refractory materials, was not considered to be harmful. The debris apparently had been exposed by stream erosion. Ferro was advised that NYSDEC requires that the fill areas be covered and seeded (Ref. 2, Appendix A). The observed material, subject mainly to physical weathering by water and ice abrasion, was considered to be essentially harmless.

In December 1982 Ferro initiated a system to reclaim "green product scrap" for reuse in their production line. The wash water from this operation was drained to a "depressed land area" somewhere on the Ferro property. The product scrap consisted of three types of material that contain the following compounds: SiC (silicon carbide refractory), Hanover Clay, Goulac (calcium lignosulfonate), Lignosol (a series of calcium, sodium, and aluminum lignosulfonates), and silicone metal (Ref. 3, Appendix A). Lignosulfonates' color varies from light tan to dark brown (Ref. 4, Appendix A).

In 1983 Recra Research, Inc., Amherst, New York, prepared a New York State Superfund Phase I summary report for NYSDEC. The preliminary HRS for the site was determined to be 2.6 and a Phase II study was recommended (Ref. 1, Appendix A). The HRS score was revised on 18 September 1984 to 0.82 (Ref. 1, Appendix A). ECDEP reported that the metal concentrations detected in the 1981 NYSDEC soil samples (see Section 4.5) were within expected ranges for mineral soils. The PAH concentrations found in soil and water samples were within the range found in other industrial areas of Erie County and could not be directly attributed to Ferro waste or the

landfills on the property. It was the opinion of ECDEP in 1984 that the site presented a negligible environmental hazard and was not worth the cost of further investigation (Ref. 5, Appendix A).

NYSDEC inspected the Ferro site in November 1985 to revise a site sketch map and proposed work plan presented in the Recra Phase I report. Oil was observed in the discharge in the drainage ditch on Willet Road, west of the railroad tracks (the northwest drainage ditch). Yellow waste material was observed in a ditch on the east side of the tracks (the northeast drainage ditch). NYSDEC issued a State Pollutant Discharge Elimination System (SPDES) discharge permit (Ref. 6, Appendix A) allowing Ferro to form discharge points (outfalls). Outfall 001 effluent is to contain only sanitary wastes; Outfall 002, only storm water; Outfall 003 is not listed on the permit; Outfall 004 is to contain only boiler blowdown, cooling water, and storm water.

4.2 TOPOGRAPHY

Ferro is located in a combined residential and commercial area on the south side of Lackawanna, New York. The northern perimeter of the property runs parallel to Willet Road, and there are several private residences on the north side of the road west of the Ferro property limits. The Baltimore & Ohio (B&O) Railroad runs northwest/southeast through the northeast section of the property. The South Branch of Smoke Creek flows west/northwest across the southwestern corner of the property.

Ferro Corporation owns approximately 40 acres of land in the area. The Phase II investigation concentrated primarily on the property west of the B&O railroad tracks. The plant buildings are located along the northwest side of the property. The old landfilled areas, in the south/southwestern section, are separated from the plant buildings by a chain-link fence (Figure 3-1). This part of

the site is accessible through a locked gate near the southernmost building. A faint dirt road runs southwest from the gate through the landfill area to Smoke Creek. There are some old tanks to the north of the fill areas, on the west side of the fence (Figure 3-1).

A large drainage ditch runs along the western perimeter of the site. Two 6-in.-diameter drainage pipes drain into the northern end of the ditch from under the plant parking area. The ditch drains into a low-lying marshy area on the northern bank of Smoke Creek. A smaller drainage ditch begins near the middle of the fence and runs south through the fill area toward the bank of Smoke Creek (Figure 3-1). At the top of the bank the outflow from the ditch branches into smaller channels and the water flows down the bank to the creek.

Most of the land surface of the site is relatively level, sloping very slightly to the south. North of Smoke Creek the most obvious relief is along the drainage ditches, which are cut through bedrock and have relatively steep sloping sides. At their deepest points the ditches are 5 to 10 ft deep. There is a slight increase in elevation (5 to 10 ft) along the railroad tracks. Along the southwest corner of the site, there is a moderate to steep drop in elevation from the landfill area down to Smoke Creek and the marshy area on the north side of the creek.

Vegetation is sparse on the level areas of the site. The ground surface is primarily gray clay and weathered shale with patches of grassy vegetation. There is more grass and brush along the railroad tracks. Swampy vegetation, including cattails and high, thick grass, characterizes the banks of the ditches and the low-lying marsh. Trees and brush cover the banks of Smoke Creek. The slopes down to Smoke Creek and the marsh are grass covered and littered with exposed fill, including grinding wheels, concrete slabs, wood,

and scrap metal. Smoke Creek is a fast-moving stream, with a rocky bottom.

4.3 GEOLOGY

The site is located in the Erie-Ontario Lowlands physiographic province of New York State, the northeastern extension of the Central Lowlands province of North America (Ref. 7, Appendix A). The bedrock underlying central and southern Erie County is Middle to Late Devonian Age. The oldest rocks are exposed in the northern part of the county. The primary rock type is shale with interbedded limestone or sandstone. The bedrock dips very gently (an average of 40 ft per mile) to the south/southwest. Pleistocene Age glacial sediments overlie bedrock in most of the county.

4.3.1 Bedrock

During the Silurian and Devonian Periods, large areas of the Central Lowlands were covered with epicontinental seas in which thick sequences of limestone and shale accumulated (Ref. 7, Appendix A). The Devonian shale units that underlie much of Erie County represent the buildup of fine-grained sediments deposited on the sea floor. Fossils of marine organisms and marine limestone interbeds are common in the shales.

The bedrock underlying the site is predominantly shale and appears to be lying relatively flat since most of the overburden has been excavated and bedrock is at or near the surface.

Shale is exposed along the northern bank of Smoke Creek and in the drainage ditch on the west side of the site. It is medium to dark gray, thinly bedded, and fissile. Some brachiopod fossils were found in the outcrops along the stream. Boring GW-2 encountered weathered shale less than 0.5 ft below the surface. The weathered

bedrock zone extended to a depth of approximately 9.5 ft. The core sample taken from 9.5 to 14.5 ft revealed that the bedrock is highly fractured and contains some thin limestone interbeds (Ref. 1, Appendix A).

4.3.2 Overburden

The overburden sediments in Erie County are composed of glacial tills, outwash sand and gravel, and glaciolacustrine silts and clays. In the vicinity of the Ferro site most of the overburden is till consisting of mixed sand, silt, gravel, and abundant clay. These represent sediments deposited directly by glacial ice (Ref. 7, Appendix A).

According to the Soil Conservation Service Soil Survey of Erie County (Ref. 8, Appendix A), the soil surrounding most of the site is Remsen silty clay loam. This soil type is derived from till and forms on flat to gently sloping till plains. Remsen soils are commonly thick (5 to 10 ft) and usually overlie soft shale bedrock.

Most of the loamy material and underlying till has been excavated from the property; only scattered stones and a thin clay layer remain on the bedrock surface. The gray clay observed in the first 0.5 ft of boring GW-2 may represent some remaining overburden material or may be the weathered product of underlying shale.

4.4 HYDROGEOLOGY

Ferro is located in the west-central part of the Erie-Niagara drainage basin (Ref. 7, Appendix A). The drainage pattern in the area is primarily dendritic. This "treelike" pattern is common in areas underlain by uniform, horizontal, or gently dipping bedrock, indicating that there is little structural control over the drain-

age. Most of the rivers and streams flow to the west/northwest and drain into Lake Erie or the Niagara River.

In the Erie-Niagara Basin thick sequences of unconsolidated glacial deposits overlie the bedrock. In central Erie County the overburden is composed of glacial lake sediments (clay, silt, and fine sand) and glacial till with a high clay content. The water table is usually within the overburden. Because of their high clay content, till deposits generally exhibit low permeabilities (10^{-5} to 10^{-7} cm/sec) and slow infiltration rates and are poor water sources. Soils derived from till, such as the Remsen silty clay loam, also have low permeabilities (10^{-3} to 10^{-5} cm/sec) and commonly contain a seasonal perched water table.

Where the overburden is thin or absent, the water table occurs in the bedrock. The shale in the region generally has a low permeability. Permeability is greatest where the shale is fractured or contains interbedded limestone that exhibits solution porosity. Water-bearing fractures in the shale may be vertical, horizontal, or parallel to the bedding planes. The bedding plane fractures are the principal water-bearing openings in the bedrock. If open vertical fractures intersect the bedrock surface, the bedrock aquifer may be recharged from overlying sediments or precipitation on the ground surface. If the fractures are sealed with impermeable clay or the shale is not fractured, recharge to the aquifer is extremely slow. The shale bedrock aquifer generally yields only small amounts of water, primarily from the fractured zone. It is not a primary water resource in Erie County.

In western Erie County, Lake Erie and the Niagara River are the primary sources of water for community and industrial use. Most of the water is drawn from Lake Erie and distributed through public water supply systems. Some water is drawn from smaller rivers and streams. Groundwater accounts for only a small percentage of the

water supply. Wells are most commonly used in rural areas. Most wells are drilled into bedrock; shallow dug wells yield small amounts of water and are affected by seasonal water table fluctuations.

There is little or no overburden on the Ferro property, and the water table was observed in the bedrock. Depth to water in the single boring completed on the southwest section of the property was 11 ft; however, the water level rose to 6 ft within the borehole, suggesting that the aquifer is confined or semiconfined. The core sample revealed that the permeability of the shale is due primarily to the presence of fractures. The surface clay layer and weathered shale zone above the water table were almost completely dry, even after several days of heavy precipitation, indicating that this zone is relatively impermeable. Since only one boring was completed on the site, the groundwater flow gradient could not be calculated; however, the direction of flow is believed to be to the south/southwest toward Smoke Creek.

The South Branch of Smoke Creek is the only major natural surface water body in the vicinity of the site. It flows to the north/northwest across the southwest corner of the property. The source of the creek is Green Lake, approximately 5 miles southeast of the site; several smaller intermittent streams feed into it along its course. The South Branch converges with the main branch of Smoke Creek approximately three stream miles northwest of the site. Smoke Creek flows west through the main urban and industrial section of Lackawanna and empties into Lake Erie approximately 2.2 stream miles west of its confluence with the South Branch.

The low relief over most of the site limits surface runoff potential. Most of the surface runoff drains directly into the marsh and Smoke Creek or into the two drainage ditches that flow south toward the creek. The ditches also receive discharge directly from

the plant. Because of the combination of low relief and low permeability of the surface clay, areas of standing water accumulate following significant precipitation.

4.5 OTHER DATA

In December 1981 NYSDEC personnel from the Region 9 office in Buffalo conducted a site investigation and collected soil and water samples on and near the Ferro property (Figure 3-1), including the northwest drainage ditch on the north side of Willet Road (west of the railroad tracks). Sample analyses (Ref. 9, Appendix A) indicated fairly high concentrations of chromium and zinc. Halogenated organics were detected in most of the soil samples (Table 4-1). All of the water samples contained halogenated organics. Polycyclic aromatic hydrocarbons (PAHs) and phenolics were also detected in some samples. A tarlike substance was observed in the northwest drainage ditch on Willet Road. As a result of this investigation, the site was classified "F", meaning no further action required. No in-place toxics were detected above acceptable levels and the site was determined not to present a toxics hazard. The tarlike material in the ditch was determined to be nonhazardous, and Ferro Corporation planned to clean the ditch in July 1982.

In June and October 1986 NYSDEC sampled soil, surface water, and sediment (Figure 3-1) on the site (Tables 4-2 and 4-3) and the yellow waste in the eastern ditch north of Willet Road. Concentrations of several TCL metals, including iron, magnesium, manganese, and zinc, were detected in sediment and soil samples collected from the ditches and fill areas on the property (Refs. 10 and 11, Appendix A).

TABLE 4-1 (Page 1 of 2)

7 DECEMBER 1981 NYSDEC SOIL SAMPLE ANALYSES SUMMARY

Ferro Corporation - Electro Division NYSDEC I.D. No. 915020

MEDIA / PARAMETER	STATION NUMBER 1	2	3	4	5	6
METALS						
Beryllium	0.63	NR	0.58	0.37	1.1	0.63
Cadmium	0.51	NR	ND	ND	0.25	ND
Chromium	73	NR	25	190	30	25
Copper	60	NR	26	95	22	27
Lead	59	NR	32	30	3.5	28
Mercury	ND	NR	ND	ND	ND	0.57
Nickel	27	NR	48	60	60	30
Selenium	4.8	NR	ND	6.8	ND	ND
Silver	ND	NR	ND	0.22	ND	ND
Zinc	220	NR	130	130	110	93
Dry Weight (%)	71	NR	67	75	78	74
Phenolics (dry)	110	NR	0.43	29	0.3	ND
Halogenated Organic Scan (Dry as Cl_2 Lindane standard)	0.81	NR	3.6	1.8	0.41	ND
POLYNUCLEAR AROMATIC HYDROCARBONS (dry wt.)						
Acenaphthene	780	NR	ND	ND	ND	ND
Anthracene	230	NR	0.019	1.3	0.036	0.2
Benzo(a)anthracene	93	NR	0.079	1.8	0.16	0.15
Benzo(a)pyrene	72	NR	0.85	0.68	0.16	0.040
Benzo(b)fluoranthene	81	NR	0.12	1.2	0.2	0.15
Benzo(g,h,i)perylene	68	NR	0.37	1.4	0.23	0.21
Benzo(k)fluoranthene	34	NR	0.05	0.4	0.58	0.036
Chrysene	120	NR	0.2	1.6	0.29	0.31
Dibenzo(a,h)anthracene	ND	NR	0.37	ND	0.26	0.089
Fluoranthene	590	NR	0.58	12	0.68	0.81
Fluorene	250	NR	0.11	5.8	0.043	0.14
Indeno(1,2,3-cd)pyrene	21	NR	0.064	ND	0.12	0.071
Naphthalene	630	NR	0.38	8.4	ND	0.11
Phenanthrene	760	NR	0.29	16	0.22	0.65
Pyrene	420	NR	0.38	8.7	0.35	0.54

All data in mg/kg.

ND - Not detected at analytical detection level;
NR - Not run.

7 DECEMBER 1981 NYSDEC WATER SAMPLE ANALYSES SUMMARY

Ferro Corporation - Electro Division NYSDEC I.D. No. 915020

MEDIA/PARAMETER	STATION NUMBER 1	2	3	4	5	6
METALS (mg/l)						
Antimony	0.6	1.2	0.4	0.5	ND	ND
Beryllium	0.01	0.01	ND	0.01	ND	ND
Cadmium	0.008	ND	ND	ND	ND	ND
Copper	0.018	0.018	0.012	0.024	0.012	0.010
Thallium	0.2	ND	ND	ND	ND	ND
Zinc	0.072	0.096	0.260	0.053	0.029	0.078
Phenolics	0.012	ND	ND	0.023	ND	ND
TOC	6.2	27	18	100	2.3	5.5
THO	0.14	0.85	1.3	0.11	0.44	0.1
POLYNUCLEAR AROMATIC HYDROCARBONS (ug/l)						
Acenaphthene	25	ND	ND	ND	0.37	ND
Acenaphthylene	34	ND	4.5	ND	ND	0.57
Anthracene	0.31	0.047	0.14	0.40	0.051	0.019
Benzo(a)anthracene	ND	ND	3.5	ND	ND	ND
Benzo(b)fluoranthene	0.076	0.097	10	0.20	0.034	0.2
Benzo(g,h,i)perylene	0.98	0.68	ND	0.16	ND	0.22
Benzo(k)fluoranthene	0.052	0.23	8.7	1.1	0.13	ND
Chrysene	ND	0.038	8.1	0.27	0.019	ND
Dibenzo(a,h)anthracene	1.2	1.4	ND	6.6	0.23	0.51
Fluoranthene	1.7	0.47	7.1	2.5	0.40	0.059
Fluorene	6.7	0.13	ND	ND	0.044	ND
Naphthalene	25	1.2	2	ND	ND	1.2
Phenanthrene	3.6	0.13	0.45	0.47	0.051	0.035
Pyrene	ND	ND	5.6	ND	0.49	ND

ND - Not detected at analytical detection level

NR - Not run.

TABLE 4-2

25 JUNE 1986 NYSDEC SAMPLE ANALYSES SUMMARY

Ferro Corporation - Electro Division NYSDEC I.D. No. 915020

PARAMETER	SS-1	SS-2	WASTE	W-1 WATER	W-1 SEDIMENT	W-2 WATER	W-2 SEDIMENT	W-3 WATER	W-3 SOIL
METALS (ppm)									
Arsenic	11.9	198.1 ppb	10.3 ppb	2.6 ppb	6.7	40.5 ppb	30.2	7.7 ppb	23.8
Cadmium	1.2	6.0	2.1	ND	ND	ND	3.0	ND	ND
Chromium	79.3	99.0	11.4	ND	23.9	ND	45.2	ND	27.6
Copper	51.7	87.0	23.9	ND	23.9	0.03	57.2	ND	31.9
Iron	32992.8	48430.0	6197.9	3.44	15470.1	11.0	36897.6	ND	35994.2
Lead	ND	ND	ND	ND	22.2	ND	90.4	ND	ND
Magnesium	4387.0	3140.1	ND	19.0	3333.3	34.0	7831.3	21.5	7474.6
Manganese	462.7	397.3	78.1	0.57	117.8	0.6	337.3	ND	355.6
Mercury	240.4 ppb	483.1 ppb	104.2 ppb	1.0 ppb	2.1	ND	301.2 ppb	ND	145.1 ppb
Nickel	102.2	60.4	42.7	0.50	23.9	ND	45.2	ND	55.2
Silver	24.0 ppb	36.2 ppb	31.2	ND	119.7 ppb	ND	90.4 ppb	ND	29.0 ppb
Zinc	161.1	930.0	35.5	0.08	186.3	0.23	277.1	ND	116.1

ND - Not detected at analytical detection level

TABLE 4-3

1 OCTOBER 1986 NYSDEC SAMPLE ANALYSES SUMMARY*

Ferro Corporation - Electro Division NYSDEC I.D. No. 915020

PARAMETER	101** (mg/l)	102** (mg/kg)	201** (mg/kg)	301** (mg/kg)	401** (mg/kg)	501** (mg/kg)
METALS (ppm)						
Arsenic	2.8 ug/l	20682.3 ug/kg	49280.3 ug/kg	22696.4 ug/kg	35872.0 ug/kg	30194.5 ug/kg
Cadmium	ND	2.7	14.6	7.3	12.1	7.7
Chromium	ND	45.7	100.0	64.0	112.4	55.0
Copper	ND	26.9	61.0	50.6	275.7	39.7
Iron	2.0	51299.2	53183.7	52793.9	65854.6	49,130.0
Lead	ND	10.2	146.4	ND	65.6	ND
Magnesium	ND	ND	ND	ND	ND	ND
Manganese	ND	1155	1463.8	2861.7	1338.5	1253.8
Mercury	ND	53.7 ug/kg	243.9 ug/kg	ND	133.8 ug/kg	127.9 ug/kg
Nickel	ND	108.0	132.2	94.6	139.9	129.9
Silver	ND	13.4 ug/kg	463.5 ug/kg	37.0 ug/kg	80.3 ug/kg	63.9 ug/kg
Zinc	ND	161.2	487.9	222.0	1258.2	281.5

ND - Not detected at analytical detection level;

* Organic data failed QA/QC and are considered unusable.

** Each sample number is prefaced by SH9150200.

4.6 PHASE II RESULTS

4.6.1 Site Inspection

LMS personnel conducted a site reconnaissance investigation of the Ferro Corporation site on 8 August 1988. The Ferro plant manager provided property and utility maps. Arrangements were made for access to the fenced-in areas of the site. Proposed monitoring well locations were assessed for drill rig accessibility and staked. Because of its proximity to the railroad tracks, proposed GW-1 was relocated, with NYSDEC approval, approximately 40 ft east of the scoped location. Minor adjustments were made to the GW-2 and GW-3 locations.

Surface water and soil sampling points were located and staked. SS-3 was moved to the east side of the road leading down to Smoke Creek. During site inspection stained soil was noted around the tanks on the west side of the property. No transformers were on-site. The NYSDEC representative subsequently authorized the addition of soil sampling point SS-4. When the groundwater investigation was discontinued later in the Phase II investigation, surface water sampling points were revised to include a second, smaller drainage ditch.

During site reconnaissance air was monitored with an HNU photoionization detector (PID). Measurements were taken around the perimeter of the site and near the proposed monitoring well and soil sampling locations (Appendix B). No readings above background were noted on the HNU. Phone numbers and locations of the local police, fire department, and hospital were noted at this time for the LMS health and safety plan.

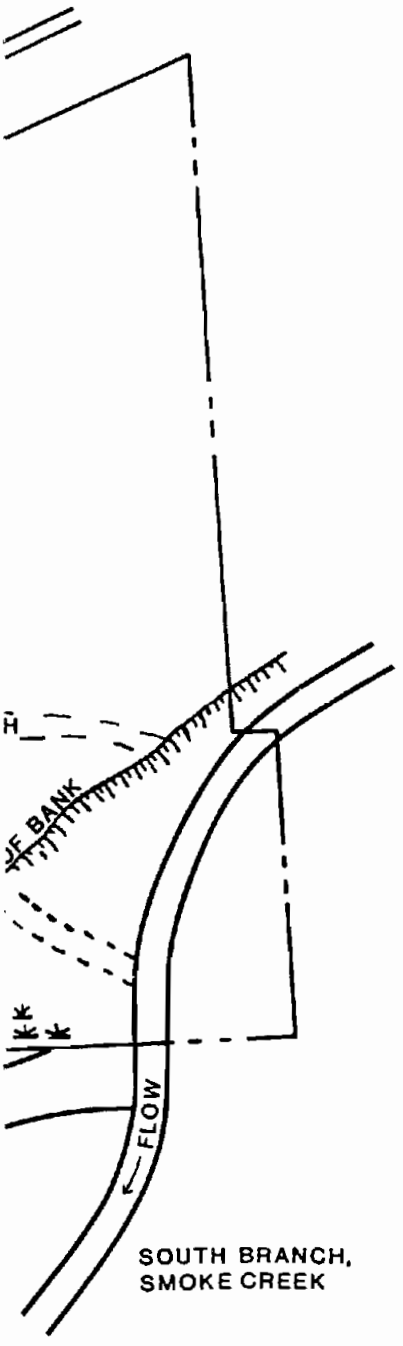
4.6.2 Phase II Geophysical Data

The terrain conductivity survey performed by Dunn Geoscience Corporation (Appendix D) along the perimeter of the site identified several areas in which anomalous values were recorded. Figure 4-1 illustrates the locations of the survey profiles and areas with anomalous readings. Most of the anomalies detected along the profiles on the southern and southwestern sides of the property were thought to indicate the presence of buried fill, including ceramic and metal debris. In many locations fill was observed littering the surface. Fill material was suspected along the northeastern profiles and possibly along the southeastern boundary; however, the presence of railroad tracks, metallic railroad debris, and chain-link fences may be responsible in part for the anomalous readings.

4.6.3 Surface Water Data

Surface water analytical results are summarized in Table 4-4. The major surface water body, the South Branch of Smoke Creek, is classified "C" (Ref. 12, Appendix A). Most of the surface water samples are either from Smoke Creek or from runoff that flows into Smoke Creek; therefore, the applicable surface water standards used in this report are Class C Ambient Water Quality Criteria.

Samples SW-6 and SW-7 are the only samples collected from stream surface water (South Branch, Smoke Creek). SW-7 is upstream of the site. SW-6 is downgradient of SW-1, SW-2, SW-3, and SW-9. SW-4 and SW-5 are from the other side of Willets Road. Samples SW-1, SW-2, SW-4, SW-5, and SW-9 were collected from drainage ditches at a point where the plant discharge was entering the ditches and, consequently, were not representative of stream surface water samples (Figure 4-2). However, for discussion purposes, the detected compounds will be compared to state standards. Sample SW-3 is a



y Line

lous Readings

200 ft

Figure 4-1

GEOPHYSICAL SURVEY
LOCATIONS (approximate)

FERRO CORPORATION - ELECTRO DIVISION
NYSDEC I. D. No 915020
1988 NYSDEC PHASE II INVESTIGATION

LAWLER, MATUSKY & SKELLY ENGINEERS
Pearl River, New York

TABLE 4-4 (Page 1 of 2)

NOVEMBER 1988 SURFACE WATER DATA SUMMARY

Ferro Corporation - Electro Division NYSDEC I.D. No. 915020

PARAMETER	SW-1	SW-1 MS	SW-1 MSD	SW-2	SW-3	SW-4	SW-5	SW-6	SW-7	SW-9	FIELD BLANK	TRIP BLANK
VOLATILE ORGANICS												
Methylene chloride	ND	ND	ND	2 j	2 j	2 j	ND	2 j	1 j	ND	5	3 j
Chloroform	ND	ND	ND	17	ND	15 j	ND	ND	ND	9	ND	ND
Bromodichloromethane	ND	ND	ND	9	ND	5 j	ND	ND	ND	3 j	ND	ND
Benzene	ND	ND	ND	ND	ND	0.07 j	ND	ND	ND	ND	ND	ND
Tentatively Identified Compounds	ND	NR	NR	ND	ND	ND	ND	ND	ND	ND	ND	ND
SEMIVOLATILE ORGANICS												
2-Chlorophenol	ND	ND	ND	ND	ND	ND	ND	ND	0.1 j	ND	ND	NR
2-Methylnaphthalene	ND	ND	ND	ND	ND	0.5 j	ND	ND	ND	ND	ND	NR
Acenaphthalene	ND	ND	ND	ND	ND	2 j	ND	ND	ND	ND	ND	NR
Phenanthrene	ND	ND	ND	ND	ND	26	ND	ND	ND	ND	ND	NR
Anthracene	ND	ND	ND	ND	ND	7 j	ND	ND	ND	ND	ND	NR
Di-n-butylphthalate	ND	ND	ND	0.5 bj	1 bj	ND	ND	ND	0.4 bj	0.7 bj	ND	NR
Fluoranthene	ND	ND	ND	ND	ND	36	ND	ND	ND	ND	ND	NR
Pyrene	ND	ND	ND	ND	ND	32	ND	ND	ND	ND	ND	NR
Benzo(a)anthracene	ND	ND	ND	ND	ND	10 j	ND	ND	ND	ND	ND	NR
Bis(2-ethylhexyl)phthalate	2 j	3 j	3 j	0.7 j	1 j	8 j	2 j	3 j	2 j	2 j	1 j	NR
Chrysene	ND	ND	ND	ND	ND	14	ND	ND	ND	ND	ND	NR
Benzo(b)fluoranthene	ND	ND	ND	ND	ND	14	ND	ND	ND	ND	ND	NR
Benzo(k)fluoranthene	ND	ND	ND	ND	ND	11	ND	ND	ND	ND	ND	NR
Indeno(1,2,3-cd)pyrene	ND	ND	ND	ND	ND	4	ND	ND	ND	ND	ND	NR
Tentatively Identified Compounds												
Alkyl hydrocarbon	ND	NR	NR	ND	ND	290 j (6)	ND	ND	ND	ND	ND	NR
Alkyl substituted compound	ND	NR	NR	ND	ND	371 j (8)	ND	ND	ND	ND	ND	NR
Longchain compound	ND	NR	NR	ND	130 j	ND	349 j (2)	63 j	49 j	ND	ND	NR
Unknown	144 j (6)	NR	NR	99 j (4)	ND	306 j (6)	41 j (2)	9 j	ND	35 j	59 j (2)	NR
Unknown alcohol	496 j (2)	NR	NR	37 j	ND	ND	ND	ND	ND	ND	ND	NR
PESTICIDES/PCBs												
Gamma-BHC (Lindane)	ND	ND	ND	ND	ND	0.075	ND	ND	ND	ND	ND	NR

All data in ug/l.

( ) - Number of compounds in group total.

b - Found in blank.

j - Estimated concentration; compound present below method detection level.

ND - Not detected at analytical detection level; see Appendix G for detection level.

NR - Not run.

NOVEMBER 1988 SURFACE WATER DATA SUMMARY

Ferro Corporation - Electro Division NYSDEC I.D. No. 915020

PARAMETER	SW-1	SW-1 DUP.	SW-2	SW-3 LEACHATE	SW-4	SW-5	SW-6	SW-7	SW-9	FIELD BLANK	CLASS C AMBIENT WATER QUALITY CRITERIA
METALS											
Aluminum	860	830	250	8,320	660	310	[110]	[110]	[150]	ND	100 (ionic)
Arsenic	ND	ND	ND	[5.1]	ND	ND	ND	ND	ND	ND	190 (dissolved)
Barium	ND	ND	ND	960	ND	ND	ND	ND	ND	ND	NS
Calcium	74100	71100	35200	154000	48700	265000	88400	88500	46400	[280]	NS
Chromium	ND	ND	ND	32	ND	19	ND	ND	ND	ND	98-365 (a)
Copper	[19]	[21]	[11]	39	49	[20]	[14]	[12]	[18]	[11]	5-21.4 (a)
Iron	980	890	110	21300	1160	980	480	530	190	[90]	300
Lead	11 g	15 g	ND g	80 g	15 g	10 g s	12 g	26 g	ND g	ND g	1-7.7 (a)
Magnesium	8730	8680	120	116000	9120	9090	14300	13400	10200	ND	NS
Manganese	77	ND	ND	316	86	37	23	22	ND	ND	NS
Nickel	ND	ND	ND	50	50	ND	ND	ND	ND	[20]	48-162 (a)
Potassium	8910	8930	[1750]	17200	[3060]	17300	[4300]	[4420]	[1840]	ND	NS
Selenium	ND	ND	ND	ND	ND	ND	ND	ND	ND	5.0	1 (a)
Sodium	35000	36000 N	11000 N	130000 N	26000 N	73000 N	35000 N	36000 N	12000 N	[1000] N	NS
Thallium	ND N	ND N	ND N	ND N	ND N	ND N	[7.9] N	ND N	ND N	ND N	NS
Zinc	25	26	[16]	ND	99	24	ND	ND	ND	ND	30
Cyanide	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	NS

All data in ug/l.

[ ] - Below contract required detection level but above instrument detection level.

g - Duplicate recovery out of control limits.

N - Spike sample recovery not within control limits.

ND - Not detected at analytical detection level; see Appendix G for detection level.

NS - No standard.

s - Value determined by method of standard addition.

(a) - Assumes a hardness range of 40 to 200 mg/l. Ref. 13, Appendix A.

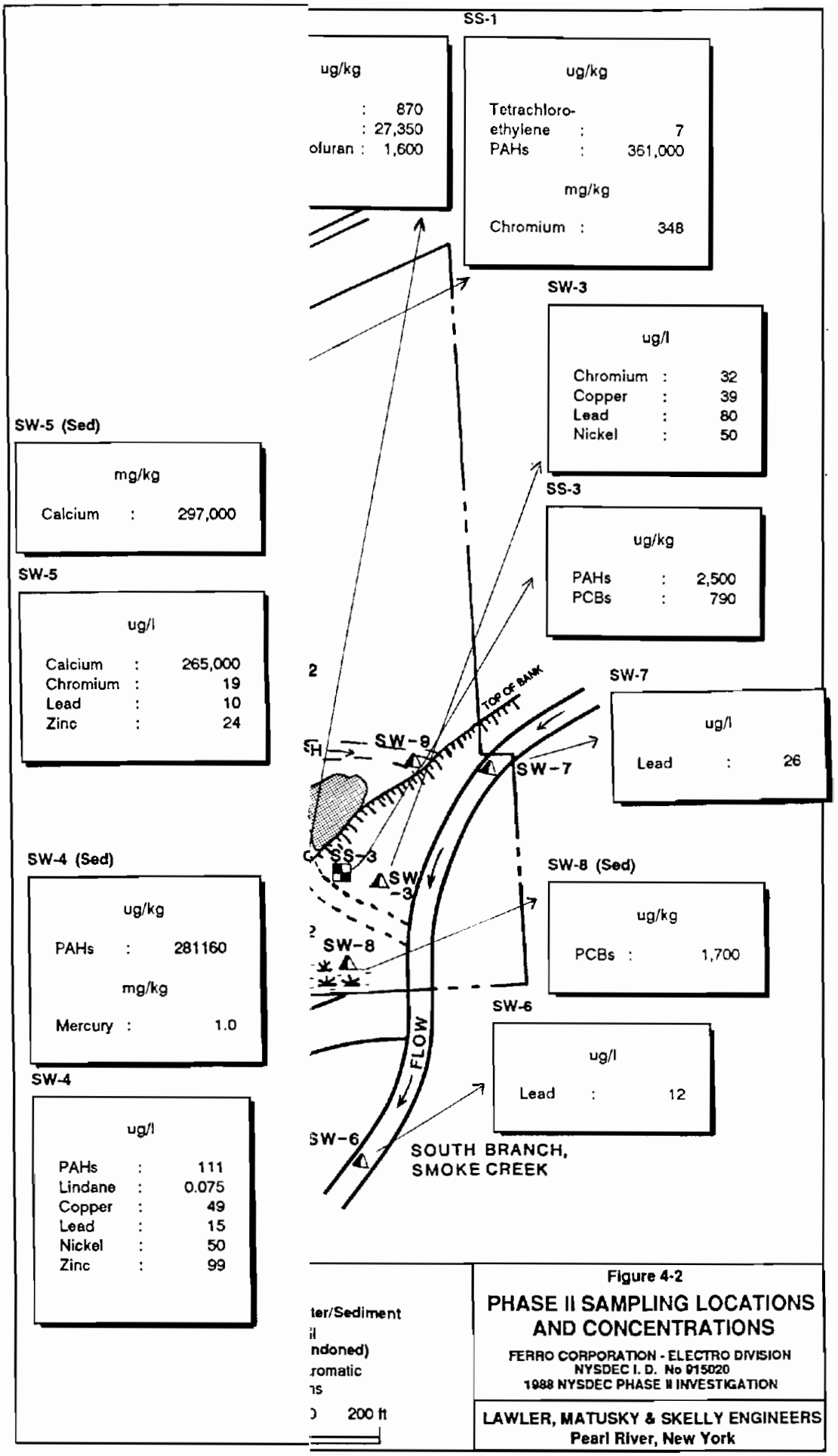


Figure 4-2

PHASE II SAMPLING LOCATIONS AND CONCENTRATIONS

FERRO CORPORATION - ELECTRO DIVISION
NYSDEC I. D. No 915020
1988 NYSDEC PHASE II INVESTIGATION

LAWLER, MATUSKY & SKELLY ENGINEERS
Pearl River, New York

leachate collected from a seep entering South Branch Creek and is included in the surface water evaluation.

The validation and usability results of these samples can be found in Appendix H.

4.6.3.1 Volatile Organics. Of the eight surface water samples collected, only three, SW-2, SW-4, and SW-9, contained detectable concentrations of volatile organic compounds. The two compounds detected in all three samples, chloroform and bromodichloromethane (BDM), are trihalomethanes and were detected at concentrations ranging from 9 to 17 ug/l for chloroform and 3 to 9 ug/l for BDM. These compounds, often found as products of water chlorination, may be derived from the plant's water treatment system or some other on-site source. There are no Class C standards for these compounds.

4.6.3.2 Semivolatile Organics. With the exception of phthalate compounds, common laboratory contaminants, the only sample that contained detectable concentrations of semivolatiles was SW-4. The phthalates, di-n-butylphthalate and bis(2-ethylhexyl)phthalate, were detected in almost all of the surface water samples at concentrations of less than 10 ug/l. The other compounds detected in sample SW-4, polycyclic aromatic hydrocarbons (PAHs), were present in concentrations ranging from 0.5 to 36 ug/l. The total concentration of PAHs was 156 ug/l. While none of the individual concentrations violate the Class C standards, there is a continuing discharge of a product that is either petroleum or some type of tar or pitch material. This discharge, evidenced by the floating product and the petroleum odor, may be in violation of state permits.

4.6.3.3 Pesticides/PCBs. One sample, SW-4, contained a pesticide, gamma-BHC (Lindane), at a concentration of 0.075 ug/l. There is no

Class C water standard for this compound. No other pesticides or PCBs were detected in any of the other surface water samples.

4.6.3.4 Metals and Cyanide. Concentrations of iron in six of the eight surface water samples violated the 300 ug/l standard for these types of waters. The concentrations in violation ranged from 480 ug/l in SW-6 to 21,300 ug/l in SW-3. Since the standards for chromium, copper, lead, nickel, and selenium depend on the water hardness, some samples may violate standards based on low hardness. Lead values in some samples exceed standards even if a high hardness value is used. One sample, SW-4, contained a concentration of zinc, 99 ug/l, that violates the 30 ug/l standard for Class C waters. There is no significant difference between up- and downgradient values (SW-7 vs SW-6, respectively); lead concentrations are higher upgradient than downgradient.

Concentrations of cyanide were undetectable in all of the surface water samples collected.

4.6.4 Surface Water Sediment Data

Surface water sediment samples were collected from the drainage ditches (SW-1, SW-2, SW-4, and SW-5) and from the on-site marsh (SW-8). The South Branch Creek's channel is composed of bedrock. Since no sediments were observed, no surface water sediment samples were collected. Table 4-5 summarizes the detected compounds in each sample.

The validation and usability results of these samples can be found in Appendix H.

4.6.4.1 Volatile Organics. Low concentrations of volatile organics were detected in samples SW-1 and SW-4 at total concentrations of 61 and 125 ug/l, respectively. (These concentrations do not

TABLE 4-5 (Page 1 of 4)

NOVEMBER 1988 SOIL & SEDIMENT DATA SUMMARY

Ferro Corporation - Electro Division NYSDEC I.D. No. 915020

PARAMETER	SS-1	SS-2	SS-3	SS-3 MS	SS-3 MSD	SS-4	SW-1 SED	SW-2 SED	SW-4 SED	SW-4 DL SED	SW-5 SED	SW-8 SED
VOLATILE ORGANICS										[Dil:10.00]		
Methylene chloride	ND	ND	ND	ND	4 j	ND	ND	ND	64	NR	ND	10 j
Acetone	4 bj	6 bj	ND	ND	ND	4 bj	15 bj	8 bj	130 b	NR	10 bj	6 bj
Carbon disulfide	5 j	ND	ND	ND	ND	2 j	5 j	14	33 j	NR	ND	5 j
1,2 Dichloroethene (total)	ND	ND	ND	ND	ND	ND	7 j	ND	ND	NR	ND	ND
Chloroform	ND	ND	ND	ND	ND	ND	ND	3 j	ND	NR	ND	ND
2-Butanone	6 bj	6 bj	ND	6 bj	6 bj	ND	11 bj	ND	50 bj	NR	6 bj	ND
Trichloroethene	ND	ND	ND	ND	ND	ND	3 j	ND	ND	NR	ND	ND
Benzene	ND	ND	ND	ND	ND	ND	ND	ND	ND	NR	1 bj	ND
Tetrachloroethene	7	ND	ND	ND	ND	ND	6 j	4 j	ND	NR	ND	7 bj
Toluene	0.5 bj	1 bj	0.4 bj	ND	ND	0.3 bj	1 bj	2 bj	29 bj	NR	1 bj	1 bj
Ethylbenzene	ND	ND	ND	ND	ND	ND	11	ND	3 j	NR	ND	ND
Total xylenes	ND	ND	ND	ND	ND	ND	34	7 j	25 j	NR	ND	5 j
Tentatively Identified Compounds												
Alkyl hydrocarbon	10 j	ND	11 j	NR	NR	10 j	16 j	34	193 j (2)	NR	ND	93 j (2)
Oxygenated compound	ND	ND	ND	NR	NR	ND	ND	60 j	ND	NR	ND	ND
Unknown	ND	ND	ND	NR	NR	ND	ND	32 j (2)	330 j (2)	NR	ND	ND
Alkyl substituted compound	ND	ND	ND	NR	NR	ND	ND	ND	ND	NR	11 j	ND

All data in ug/kg.

( ) - Number of compounds in group total.
b - Found in method blank.
d - Concentration recovered from diluted sample.
e - Value estimated due to interference.
j - Estimated concentration; compound present below method detection level.
ND - Not detected at analytical detection level; see Appendix G for detection level.
NR - Not run.

NOVEMBER 1988 SOIL & SEDIMENT DATA SUMMARY

Ferro Corporation - Electro Division NYSDEC I.D. No. 915020

PARAMETER	SS-1	SS-2	SS-3	SS-3 MS	SS-3 MSD	SS-4	SW-1 SED	SW-2 SED	SW-4 SED	SW-4 DL SED	SW-5 SED	SW-8 SED
SEMIVOLATILE ORGANICS												
Phenol	ND	870	2300 j	ND	ND	ND	ND	ND	ND	ND	ND	64 j
Naphthalene	ND	800	1700 j	1300 j	1400 j	170 j	ND	ND	590 j	1300 dj	ND	ND
2-Methylnaphthalene	ND	1300	2200 j	2400 j	3100 j	130 j	ND	13 j	640 j	1400 dj	ND	55 j
Acenaphthylene	1100 j	59 j	ND	ND	ND	37 j	ND	ND	150 j	260 dj	ND	ND
Acenaphthene	1400 j	1800	1900 j	ND	ND	87 j	ND	ND	3200	5500 dj	ND	ND
Dibenzofuran	1300 j	1600	1600 j	1800 j	2100 j	76 j	ND	ND	2300	4900 dj	ND	ND
Fluorene	ND	ND	1400 j	1400 j	1700 j	110 j	ND	ND	5000	8900 dj	ND	ND
Phenanthrene	32000	6800	6300 j	7700	7600	730 j	6300 j	250 j	24000 e	49000 d	180 j	ND
Anthracene	9800	410 j	ND	ND	ND	130 j	ND	ND	8100	14000 d	ND	ND
Di-n-butyl phthalate	ND	46 bj	ND	ND	ND	27 bj	ND	ND	ND	ND	ND	ND
Fluoranthene	79000	5000	4400 j	4700 j	5100 j	980	8900 j	540 j	23000 e	49000 d	320 j	630 j
Pyrene	72000	4800	3700 j	ND	ND	930	8500 j	820 j	35000 e	40000 d	300 j	900 j
Butylbenzyl phthalate	ND	ND	ND	ND	ND	ND	ND	130 j	ND	ND	ND	ND
Benzo(a)anthracene	31000	1400	1200 j	1200 j	1500 j	370 j	3700 j	210 j	11000	19000 d	100 j	250 j
Bis(2-ethylhexyl)phthalate	ND	77 bj	190 bj	ND	200 bj	110 bj	ND	1200 bj	560 bj	ND	360 bj	530 bj
Chrysene	30000	1400	1300	1300 j	1500 j	440 j	ND	ND	9200	19000 d	ND	ND
Di-n-octyl phthalate	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	54 j	ND
Benzo(b)fluoranthene	59000	1200	ND	ND	ND	350 j	ND	ND	5900	17000 d	ND	ND
Benzo(k)fluoranthene	5300 j	1300	190 j	1800 j	ND	77 j	ND	ND	4700	15000 d	ND	ND
Benzo(a)pyrene	25000	950	870 j	830 j	1100 j	320 j	3300 j	ND	5200	16000 d	85 j	230 j
Indeno(1,2,3-cd)pyrene	16000	550 j	490 j	ND	680 j	200 j	ND	ND	13000	9700 dj	ND	250 j
Dibenz(a,h)anthracene	3600 j	130 j	ND	ND	ND	ND	ND	ND	470 j	2100 dj	ND	ND
Benzo(g,h,i)perylene	13000	470 j	470 j	ND	520 j	180 j	ND	ND	1900	9100 dj	ND	ND

All data in ug/kg.

() - Number of compounds in group total.
b - Found in method blank.
d - Concentration recovered from diluted sample.
e - Concentration exceeds GC/MS calibration range.
j - Estimated concentration; compound present below method detection level.
ND - Not detected at analytical detection level; see Appendix G for detection level.
NR - Not run.

TABLE 4-5 (Page 3 of 4)

NOVEMBER 1988 SOIL & SEDIMENT DATA SUMMARY

Ferro Corporation - Electro Division NYSDEC I.D. No. 915020

PARAMETER	SS-1	SS-2	SS-3	SS-3 MS	SS-3 MSD	SS-4	SW-1 SED	SW-2 SED	SW-4 SED	SW-4 DL SED	SW-5 SED	SW-8 SED
SEMIVOLATILE ORGANICS										[Dil.: 10.00]		
Tentatively Identified Compounds												
Alkyl hydrocarbon	ND	910 j (2)	ND	NR	NR	ND	ND	16500 j(5)	41000 j(6)	18500 j(2)	3500 j (2)	ND
Alkyl phenol compound	24000 bj	ND	9300 j	NR	NR	ND	ND	ND	ND	ND	ND	ND
Alkyl phenol derivative	ND	10900 j(2)	4100 bj	NR	NR	ND	ND	ND	ND	4800 bj(2	ND	ND
Alkyl substituted compound	ND	1930 j(2)	3300 j	NR	NR	1400 j	16000 j	4000 j(3)	1800 bj(7	94000 j(6)	3130 j (2)	ND
Benzopyrene derivative	ND	ND	ND	NR	NR	ND	ND	ND	ND	18000 j	ND	ND
Benzothiophene derivative	ND	690 j	ND	NR	NR	ND	ND	ND	ND	ND	ND	ND
Longchain compound	ND	370 j	3700 j	NR	NR	2540 j(2)	ND	3500 j	ND	25000 j(2)	ND	5300 j (5
Naphthalene derivative	4000 j	1100 j	ND	NR	NR	ND	ND	ND	ND	ND	ND	ND
Oxygenated compound	ND	ND	ND	NR	NR	ND	ND	ND	ND	ND	ND	1500 bj
Phenalen derivative	ND	590 j	ND	NR	NR	ND	ND	ND	ND	ND	ND	ND
Phenanthrene derivative	15400 j(2)	ND	ND	NR	NR	ND	ND	ND	9000 j(2)	12000 j	ND	ND
Pyrene derivative	14150 j(3)	ND	ND	NR	NR	ND	ND	ND	ND	16000 j	ND	ND
Silicon compound	ND	ND	6000 j (3	NR	NR	ND	ND	ND	ND	ND	ND	ND
Sulfur compound	ND	ND	4600 j	NR	NR	ND	ND	ND	ND	ND	ND	ND
Unknown	8800 j	9120 j(5)	ND	NR	NR	14300 j(4)	ND	0400 bj(8	ND	8100 j (5	3860 bj (	1960 j (1
PESTICIDES/PCBs												
Aroclor-1260	ND	ND	790	360 j	1900	570	1500	ND	ND	NR	ND	1,700

All data in ug/kg.

( ) - Number of compounds in group total.

b - Found in method blank.

d - Concentration recovered from diluted sample.

e - Value estimated due to interference.

j - Estimated concentration; compound present below method detection level.

ND - Not detected at analytical detection level; see Appendix G for detection level.

NR - Not run.

NOVEMBER 1988 SOIL & SEDIMENT DATA SUMMARY

Ferro Corporation - Electro Division NYSDEC I.D. No. 915020

PARAMETER	SS-1	SS-2	SS-3	SS-3 DUPLICATE	SS-4	SW-1 SED	SW-2 SED	SW-4 SED	SW-5 SED	SW-6 SED
METALS										
Aluminum	10600	20100	8340	7301	12000	15020	7760	13400	1990	254
Antimony	1.3	ND	ND	ND	ND	ND	2.2	ND	ND	2.2
Arsenic	10.9 fg	25.6 g s	12.6 g	8.6 g	18.9 g s	15.2 f g	5.5 g s	5.2 g	3.2 g	26.5 f g
Barium	65.5 g	50.0 g	46.4 g	60.0 g	20.3 g	114 g	40.3 g	73.8 g	13.8 g	59.1 g
Beryllium	0.79	0.71	ND	ND	1.1	1.3	ND	ND	ND	1.1
Cadmium	0.65	ND	ND	ND	ND	ND	2.5	1.2	ND	ND
Calcium	103000 g	30720 g	16400 g	20600 g	110500 g	150000 g	86300 g	23300 g	297000 g	8300 g
Chromium	348	139	147	129	24.8	113	72.4	49.9	5.0	40.1
Cobalt	6.7 g	12.8 g	14.5 g	8.4 g	6.1 g	14.6 g	17.7 g	11.2 g	11.8 g	15.3 g
Copper	51.4 g	153 g	180 g	142 g	32.9 g	10.1 g	84.9 g	79.4 g	8.1 g	39.6 g
Iron	63080	64800	70560	63500	30800	42700	17000	24100	3160	28000
Lead	95.6 g	781 g	507 g	5680 g	27.4 g	189 g	73.9 g	97.8 g	24.2 g	87.6 g
Magnesium	22500 g	6310 g	3670 g	2580 g	597 g	9680 g	4706 g	5590 g	3120 g	8540 g
Manganese	10020 g	570 g	552 g	793 g	680 g	2520 g	605 g	707 g	8640 g	591 g
Mercury	ND	ND	ND	ND	ND	0.3	13.3	1.0	ND	ND
Nickel	70.7 N g	112 N g	83.1 N g	64.6 N g	36.9 N g	55.9 N g	40.3 N g	8.0 N g	6.9 N g	39.4 N g
Potassium	1250	2480	1740	1760	2880	2730	739	1750	746	3086
Silver	ND N	ND N	ND N	1.7 N g	ND N	ND N	ND N	ND N	ND N	ND N
Sodium	3740	3308	2330	1970	771	1550	623	964	391	766
Thallium	ND	ND	0.54	ND	ND	ND	ND	ND	0.86	ND
Vanadium	147	43.6	23.7	27.9	18.7	69.4	69.2	39.9	4.7	38.7
Zinc	107 g	162	237 g	180 g	78.4 g	464 g	1,720 g	307 g	59.6 g	235 g
Percent Solids (%)	76.2	83.7	92.6	92.6	83.8	46.5	44.6	50.1	57.9	45.5
Cyanide	ND	ND	0.58	ND	ND	ND	1.2	2.0	ND	ND

All data in mg/kg.

f - Indicates correlation coefficient for method of standard addition is less than 0.995.
g - Duplicate analysis is not within control limits.
N - Spike sample recovery not within control limits.

include concentrations of volatiles that were also detected in the laboratory blank, i.e., acetone, 2-butanone, and toluene.) Generally, the volatile organic compounds detected were aromatics, ethylbenzene, and xylenes; however, some chlorinated compounds were also detected: methylene chloride and tetrachloroethene. The contaminants detected appear to be from residual petroleum or tar contamination and are not considered a significant threat to the environment in the concentrations detected.

4.6.4.2 Semivolatile Organics. Moderate to high concentrations of semivolatile organics were detected in almost all of the surface water sediment samples. The major group of compounds detected, the PAHs, were detected in concentrations ranging from 1400 ug/kg in sample SW-5 SED to 281,160 ug/kg in sample SW-4 SED. The other semivolatile organic compounds, phthalates and phenols, were mainly undetected in all of the samples. The levels and the distribution of the contamination indicated that the on-site source of the contamination is the tar tank located in the northern portion of the site (Figure 4-2). The tar tank contained a coal-tar product used in manufacturing and it has either leaked, spilled, or discharged into the drain leading to the ditch where SW-4 was sampled. The sediment in this ditch contains high levels of PAHs that constitute a significant threat to the environment. The other concentrations detected, 1400 to 30,000 ug/kg, are considerably lower and probably represent only minor contamination of other areas.

4.6.4.3 Pesticides/PCBs. Concentrations of PCBs were detected in two of the five surface water sediment samples. Samples SW-1 SED and SW-8 SED contained 1500 and 1700 ug/kg, respectively, of PCB Aroclor 1260. None of the samples contained any detectable concentrations of pesticides. The presence of the PCBs in the surface water sediments indicates the presence and release of the compounds on the site and is supported by the detection of PCBs in two of the four surficial soils; however, the source, extent, and magnitude of

the PCB contamination is not defined by these analyses. If the levels of PCBs detected here, less than 2000 ug/kg, are the highest concentrations on site, then the presence of the PCBs probably does not pose a significant threat to the environment because they are well below the generally accepted EPA cleanup criteria of 10,000 ug/kg (Ref. 14, Appendix A).

4.6.4.4 Metals and Cyanide. Contamination by metals was evident in the concentrations of chromium, mercury, lead, vanadium, and zinc in one or more of the surface water sediment samples. Sample SW-1 SED contained chromium at 113, lead at 189, vanadium at 69.4, and zinc at 464 mg/kg. While there are no standards for soil, these values are in the range considered as contaminated. Sample SW-2 SED contained very high concentrations of mercury at 13.3 mg/kg, 69.2 mg/kg of vanadium, and 1720 mg/kg of zinc. Sample SW-4 SED contained lead at 98, mercury at 1.0, and vanadium at 39.9 mg/kg. Sample SW-5 SED contained very high concentrations of calcium, 297,000 mg/kg. While calcium is not an extremely hazardous metal, this concentration represents nearly 30% of the total sediment weight and may explain the presence of the tan-yellow sediment found in this drainage ditch. The sediment may be some type of calcium-based compound used in the plant operations and discharged to the surface water. The only metal concentration in SW-8 SED that appeared elevated was vanadium at a concentration of 38.7 mg/kg.

Cyanide was detected in two of the surface water sediment samples, SW-2 and SW-4 SED, at concentrations of 1.2 and 2.0 mg/kg, respectively. These concentrations do not appear to represent severe contamination.

4.6.5 Soil Data

Four soil samples were collected at the site. Samples SS-1 and SS-2 were collected from the landfilled area; sample SS-3 was col-

lected in a brown sand at the base of the landfill scrap. Sample SS-4 was collected near several old oil tanks where there was some surficial soil staining.

The validation and usability results of these samples can be found in Appendix H.

4.6.5.1 Volatile Organics. With the exception of laboratory contaminants, only one (SS-1) of the four samples contained a detectable concentration of volatile organic compounds: 7 ug/kg of tetrachloroethene. This compound, a common degreasing solvent, was not detected in any of the other soil samples; however, it was detected at trace levels in three of the surface water sediment samples. While these concentrations demonstrate the presence of the contaminant, the levels detected in themselves do not represent gross contamination and, based on the absence of any other volatile organic compound contamination, require no remedial action.

4.6.5.2 Semivolatile Organics. Semivolatile organics, primarily PAHs, were detected in all four of the surface soil samples in concentrations ranging from 5300 ug/kg in SS-4 to 379,500 ug/kg in SS-1. The concentrations in three of the samples are above the 10,000 ug/kg total semivolatiles concentration that is considered contaminated soil (Ref. 15, Appendix A). The source of the surface soil contamination is not known; however, the use and disposal of products that contained coal tars is the most likely source of the contamination. Coal tars are composed primarily of PAHs.

4.6.5.3 PCBs/Pesticides. As in the surface water sediment samples, the soils showed low concentrations of PCBs, ranging from 790 to 570 ug/kg in samples SS-3 and SS-4, respectively. The matrix spike and the matrix spike duplicate of sample SS-3 (essentially replicates of SS-3) also contained detectable levels of PCBs at 360 and 1900 ug/kg, respectively. All of these concentrations are be-

low the EPA cleanup criterion of 10,000 ug/kg (Ref. 14, Appendix A) and do not pose a significant contamination problem.

No pesticides were detected in any of the soil samples.

4.6.5.4 Metals and Cyanide. Concentrations of chromium in all four of the soil samples were above 100 mg/kg and ranged up to 348 mg/kg in sample SS-1. Lead concentrations in samples SS-2 and SS-3 were 781 and 5680 mg/kg. The nickel concentration in sample SS-2 was 112 mg/kg, and the vanadium concentration in all of the samples was over 19 mg/kg and under 147 mg/kg.

The cyanide concentration in sample SS-3 was 0.58 mg/kg.

4.6.5.5 Extraction Procedure Toxicity. None of the four soil samples contained concentrations of metals that were high enough to cause them to fail the EP toxicity test (Table 4-6).

4.7 CONCLUSIONS

4.7.1 Surface Water

4.7.1.1 Landfill Area. The downstream water quality does not appear to be significantly different from upstream water quality in spite of leachate and drainage additions to the creek. Lead concentrations are higher in the upgradient sample, suggesting an upstream source. In both samples iron and lead concentrations violated the Class C standard.

4.7.1.2 Discharge Ditches. Ferro's SPDES permit was examined in relation to Phase II sample locations. Outfall 001 contained only sanitary discharge that is routed from the southwest corner of Building 45 to the leachfield in back of the building. Outfall 002 discharges roof drainage to the large drainage ditch on the proper-

TABLE 4-6

NOVEMBER 1988 EP TOXICITY DATA SUMMARY

Ferro Corporation - Electro Division NYSDEC I.D. No. 915020

PARAMETER	EPA MAX. CONC.	SS-1	SS-2	SS-3	SS-4
EP TOXICITY					
Total Arsenic	5.0	<0.005	0.005	0.010	<0.005
Total Barium	100.0	0.16	0.06	0.28	0.11
Total Cadmium	1.0	<0.006	<0.006	0.008	<0.006
Total Chromium	5.0	<0.010	0.012	<0.010	<0.010
Total Lead	5.0	<0.05	0.39	1.6	0.06
Total Mercury	0.2	<0.008	0.0019	<0.0005	<0.0005
Total Selenium	1.0	<0.005	<0.005	<0.005	<0.005
Total Silver	5.0	<0.010	<0.010	<0.010	<0.010

All data in mg/l.

ty's western edge where sample SW-1 was collected. Outfall 003 empties into the large drainage ditch west of Building 35. No Phase II sample was collected at this point. Sample SW-4 was collected downstream from Outfall 004, which is located on the west side of the railroad tracks north of Willet Road. Ferro does not know the discharge source of the unnumbered outfalls from which samples SW-2 and SW-5 were collected.

The two plant discharge ditches on the north side of Willet Road are problem areas. Both locations appear to be waste discharge streams from Ferro. The drainage ditch on the west side of the railroad appears to drain the adjacent area where the tar tank and other structures are located. The water from this area (SPDES outfall No. 004 and sample SW-4) contained low concentrations of volatile organic compounds and low to moderate concentrations of semivolatile organics, mainly PAHs. These observations are consistent with previous observations of spills and ongoing discharge of oil-water mixtures that are mitigated by sorbent pads and booms floating in the open drainage ditch.

The discharge pipe on the east side of the railroad tracks (SPDES outfall number unknown and sample SW-5) contained a tan-yellow flocculate that settled out of the waste stream as it discharged into the ditch. Although the ditch was lined with this material, the water analysis revealed no volatile or semivolatile organic contamination. The only other parameters that showed elevated concentrations were calcium, potassium, and sodium. The tan-yellow material appears to be the calcium lignosulfonates decanted from Ferro's Ball Mill Wash Station operation (Refs. 3 and 4, Appendix A). The material is either discharged as a suspended solid or precipitates out of the water after discharge to the ditch. The material appears to be nonhazardous and, based on these data, poses no significant threat to the environment.

Two drainage ditch samples (SW-2 and SW-4) showed low concentrations of volatile organics chloroform and bromodichloromethane; however, the concentrations were not in violation of any surface water standards for Class C surface water bodies used for comparison purposes.

The concentrations of copper, iron, lead, and zinc in at least one of the five drainage ditch samples violated the Class C ambient water quality criteria used for comparison purposes. In one case the iron concentration violated the standard by 70 times (SW-3). Generally, the lead values were one to 10 times greater than the standard and only one zinc concentration (SW-4) violated the standard.

4.7.2 Surface Water Sediment

4.7.2.1 Landfill Area. No true surface water sediment samples were collected. Samples (SW-1 and SW-2) from drainage ditches show low concentrations of volatile organics and a PCB. These sediments do not appear to have an effect on South Branch Creek water quality.

4.7.2.2 Drainage Ditches. The major contaminants in the drainage ditch (surface water) sediments are PAHs. High concentrations of these compounds, especially in the ditch on the north side of Willet Road, indicate that the plant has leaked or spilled the coal-tar product used in the manufacturing process. Generally, the contamination seems to be from miscellaneous disposal and/or periodic discharges of small quantities of product. This appears to be especially true in the case of the west ditch on the north side of Willet Road.

Records indicate historic spills in this ditch and observations during the sampling call for an ongoing treatment system to collect

floating product. If the treatment process, booms and adsorbent pads, is employed at the plant and if the ditch is periodically dredged of contaminated sediment, then the discharge to the environment should be measured after this treatment system. However, the use of the ditch as a "treatment basin" may be inappropriate and may need to be addressed through the NYSDEC Division of Water. In any case the sediment concentration in this ditch does pose a threat to the environment if left unmitigated. The release of PAHs to the environment through floating product or dissolved product movement is also a threat.

Low concentrations of PCBs do not appear to be a significant contamination problem and, based on other soil and water analyses, do not appear to be part of a large contamination problem.

Metals contamination is apparent in the drainage ditch sediments; however, with the exception of iron and lead, metals do not impact surface water quality in the South Branch Creek. The use and disposal of metal-containing products may be the source of this contamination.

4.7.3 Surface Soils

The major surface soil contaminants in the landfill areas were PAHs, PCBs, and metals. Low to moderate PAH contamination seems to be from the disposal of off-specification products and/or improper disposal of floor sweepings and other plant wastes.

PCB contamination is generally low and does not appear to constitute a threat. The source of the PCB contamination is unknown.

As in the case of the PAH contamination, the metals contamination seems to be from the disposal of factory refuse across the site.

4.8 RECOMMENDATIONS

Based on the data and information contained in this report, the Ferro landfill site does not need further investigation; however, several areas of contamination identified by the investigation do require remedial action under other NYSDEC programs. The recommendations are as follows:

Landfill Area

- Surficial soils and sediments contain elevated levels of metals that require attention. On-site disposal of low-quality products should be stopped and past disposal areas should be graded with 2 ft of clean fill. The exposed fill facing the creek should be riprapped to prevent further lateral erosion by the South Branch Creek. The riprap caliber provided should be sufficient to prevent erosion from a 100-year flood. This corrective work should be conducted under the supervision of the Division of Solid Waste.

Drainage Ditches

- The western drainage ditch on the north side of Willet Road has a history of tar spills and seems to have ongoing discharges that pose a threat to the environment. If the plant cannot stop the continued spillage of tar product, the containment boom and adsorbent pads now used should be used in a contained and permitted treatment basin. Establishment of such an on-site treatment facility and dredging and cleaning of the drainage ditch is recommended.

- The waste stream leading into the eastern drainage ditch on the north side of Willet Road should be treated to stop the discharge of the suspected lignosulfonates. The waste stream's source should be positively identified. Installation of a precipitation and sand-filtering system is recommended to mitigate the discharge to the environment.

- A study of Ferro's processes and the location of their routes of disposal is beyond the scope of this Phase II investigation and the DHWR. The Division of Water should review Ferro's outfalls, determine the location of each outfall, and identify the liquids routed to each outfall.

CHAPTER 5

FINAL APPLICATION OF THE HAZARD RANKING SYSTEM

5.1 NARRATIVE SUMMARY

The 5-acre Ferro Corporation - Electro Division site is located in the City of Lackawanna, Erie County, New York. Ferro manufactures grinding wheels, kiln furniture, and crucibles. In the past, finished products that did not meet specifications were landfilled on the south and southeast portions of the property.

Ferro has four SPDES permitted outfalls. One of these outfalls had a tarlike substance in the drainage ditch. Flotation skimmers are currently installed across the ditch. A second outfall north of the site is coated with a tan-yellow sediment. According to tests conducted by NYSDEC and by LMS for NYSDEC, the soil, surface water sediment, and surface water contain low levels of volatile organics, semivolatile organics (primarily polycyclic aromatic hydrocarbons), or metals.

Ferro is situated in a residential and commercial area south of Lackawanna. Railroad tracks form the eastern border for the manufacturing buildings, Willet Road forms the northern boundary, the South Branch of Smoke Creek forms the southern border, and a drainage ditch and houses form the western border. It is not known how many people may be affected by surface water or direct soil/waste contact. Ferro dredged some of the tarlike material from one of the northern drainage ditches; there has been no other cleanup action at the site. No enforcement action has been initiated.

5.2 LOCATION MAP

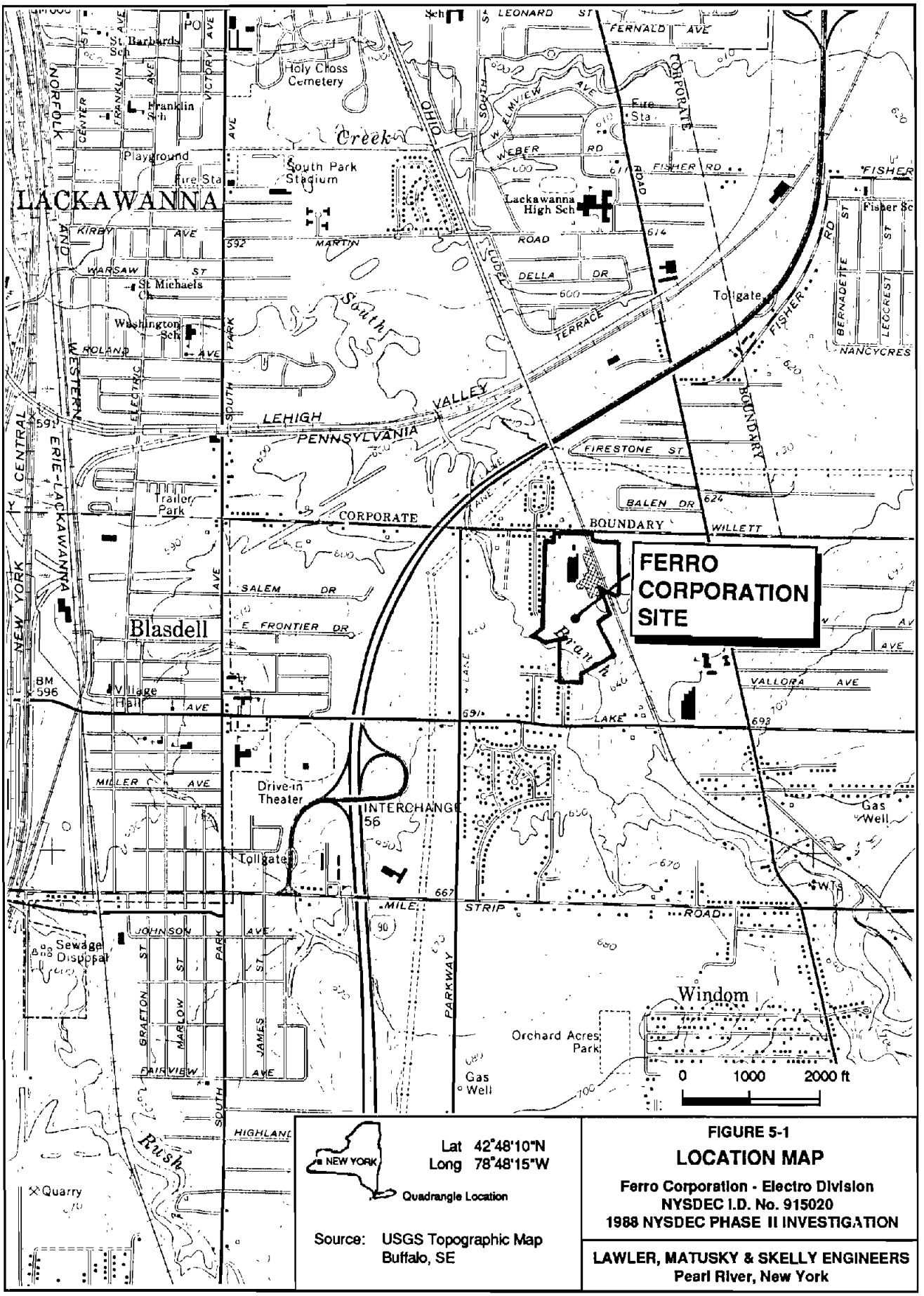


FIGURE 5-1

LOCATION MAP

Ferro Corporation - Electro Division
NYSDEC I.D. No. 915020
1988 NYSDEC PHASE II INVESTIGATION

LAWLER, MATUSKY & SKELLY ENGINEERS
Pearl River, New York

5.3 HRS WORKSHEETS

HRS COVER SHEET

Facility Name: Ferro Corporation - Electro Division

Location: 661 Willet Rd., Lackawanna, Erie County, NY 14128

EPA Region: 2

Person(s) in charge of the facility: Daniel Parshall Engineering Manager
661 Willet Rd.
Lackawanna, NY 14128

Name of Reviewer: William C. Thayer / Mark G. Creager **Date:** 11 April 1989

General description of the facility:
(For example: landfill, surface impoundment, pile, container; types of hazardous substances; location of the facility; contamination route of major concern; types of information needed for rating; agency action; etc.)

The Ferro Corporation manufactures crucibles, grinding wheels and refractory items. By-products and finished product that did not meet required specifications were landfilled in two areas on the south and southeastern portions of the site. Metals, including arsenic, cadmium, mercury, and aluminum have been detected in water and sediment samples collected from on-site drainage swales and in South Branch. PCBs were detected in samples collected from on-site drainage ditches. PAHs have been detected in drainage ditches. Surface water is the major route of concern. Direct contact with wastes and contaminated water by the population is also of concern. No enforcement action has been initiated.

Scores: S_M= 6.16 (S_{GW}= 0 S_{SW}= 10.67 S_A= 0)

S_{FE}= not scored

S_{DC}= 62.50

GROUNDWATER ROUTE WORK SHEET

	RATING FACTOR	ASSIGNED VALUE (circle one)	MULTIPLIER	SCORE	MAXIMUM SCORE	REFERENCE (section)
1	OBSERVED RELEASE	(0) 45	1	0	45	3.1
	If observed release is given a score of 45, proceed to line [4]					
	If observed release is given a score of 0, proceed to line [2]					
2	ROUTE CHARACTERISTICS					3.2
	Depth of Aquifer of Concern	0 1 2 (3)	2	6	6	
	Net Precipitation	0 1 (2) 3	1	2	3	
	Permeability of the Unsaturated Zone	0 (1) 2 3	1	1	3	
	Physical State	0 1 2 (3)	1	3	3	
	Total Route Characteristics Score			12	15	
3	CONTAINMENT	0 1 2 (3)	1	3	3	3.3
4	WASTE CHARACTERISTICS					3.4
	Toxicity/Persistance	0 3 6 9 12 15 (18)	1	18	18	
	Hazardous Waste Quantity	0 1 2 3 (4) 5 6 7 8	1	4	8	
	Total Waste Characteristics Score			22	26	
5	TARGETS					3.5
	Ground Water Use	(0) 1 2 3	3	0	9	
	Distance to Nearest Well/Population Served	(0) 4 6 8 10 12 16 18 20 24 30 32 35 40	1	0	40	
				0	49	
6	If line [1] is 45, multiply [1] X [4] X [5]					
	If line [1] is 0, multiply [2] X [3] X [4] X [5]			0	57,330	
7	Divide line [6] by 57,330 and multiply by 100		S_{gw} =	0		

SURFACE WATER ROUTE WORK SHEET

	RATING FACTOR	ASSIGNED VALUE (circle one)	MULTIPLIER	SCORE	MAXIMUM SCORE	REFERENCE (section)
1	OBSERVED RELEASE	(0) 45	1	0	45	4.1
	If observed release is given a value of 45, proceed to line 4					
	If observed release is given a value of 0, proceed to line 2					
2	ROUTE CHARACTERISTICS					4.2
	Facility Slope and Intervening Terrain	0 1 (2) 3	1	2	3	
	1-yr 24-hr Rainfall	0 1 (2) 3	1	2	3	
	Distance to Nearest Surface Water	0 1 2 (3)	2	6	6	
	Physical State	0 1 2 (3)	1	3	3	
	Total Route Characteristics Score			13	15	
3	CONTAINMENT	0 1 2 (3)	1	3	3	4.3
4	WASTE CHARACTERISTICS					4.4
	Toxicity/Persistance	0 3 6 9 12 15 (18)	1	18	18	
	Hazardous Waste Quantity	0 1 2 3 (4) 5 6 7 8	1	4	8	
	Total Waste Characteristics Score			22	26	
5	TARGETS					4.5
	Surface Water Use	0 1 (2) 3	3	6	9	
	Distance to a Sensitive Environment	0 (1) 2 3	2	2	6	
	Population Served/ Distance to Water Intake Downstream	(0) 4 6 8 10 / 12 16 18 20 / 24 30 32 35 40	1	0	40	
	Total Targets Score			8	55	
6	If line 1 is 45, multiply 1 X 4 X 5 If line 1 is 0, multiply 2 X 3 X 4 X 5			6,864	64,350	
7	Divide line 6 by 64,350 and multiply by 100		S_{sw} =	10.67		

AIR ROUTE WORK SHEET

	RATING FACTOR	ASSIGNED VALUE (circle one)	MULTIPLIER	SCORE	MAXIMUM SCORE	REFERENCE (section)
1	OBSERVED RELEASE	(0) 45	1	0	45	5.1
	DATE AND LOCATION:					
	SAMPLING PROTOCOL:					
	If line 1 is 0, then Sa = 0. Enter on line 5					
	If line 1 is 45, then proceed to line 2					
2	WASTE CHARACTERISTICS					5.2
	Reactivity and Incompatibility	(0) 1 2 3	1	0	3	
	Toxicity	0 1 2 (3)	3	9	9	
	Hazardous Waste Quantity	0 1 2 3 (4) 5 6 7 8	1	4	8	
	Total Waste Characteristics Score			13	20	
3	TARGETS					5.3
	Population Within 4-Mile Radius	} 0 9 12 15 18 (21) 24 27 30	1	21	30	
	Distance to Sensitive Environment	0 (1) 2 3	2	2	6	
	Land Use	0 1 2 (3)	1	3	3	
	Total Targets Score			26	39	
4	Multiply 1 X 2 X 3			-	35,100	
5	Divide line 4 by 35,100 and multiply by 100		S_A = 0			

WORKSHEET FOR COMPUTING S_M

	S	S^2
GROUNDWATER ROUTE SCORE (S_{GW})	0	0
SURFACE WATER ROUTE SCORE (S_{SW})	10.67	113.85
AIR ROUTE SCORE (S_A)	0	0
$S^2_{GW} + S^2_{SW} + S^2_A$		113.85
$\sqrt{S^2_{GW} + S^2_{SW} + S^2_A}$		10.67
$\sqrt{S^2_{GW} + S^2_{SW} + S^2_A} / 1.73$ (S_M)		6.16

FIRE AND EXPLOSION WORK SHEET

	RATING FACTOR	ASSIGNED VALUE (circle one)	MULTIPLIER	SCORE	MAXIMUM SCORE	REFERENCE (section)
1	CONTAINMENT	1 3	1		3	7.1
2	WASTE CHARACTERISTICS					7.2
	Direct Evidence	0 3	1		3	
	Ignitability	0 1 2 3	1		3	
	Reactivity	0 1 2 3	1		3	
	Incompatibility	0 1 2 3	1		3	
	Hazardous Waste Quantity	0 1 2 3 4 5 6 7 8	1		8	
	Total Waste Characteristics Score				20	
3	TARGETS					7.3
	Distance to Nearest Population	0 1 2 3 4 5	1		5	
	Distance to Nearest Building	0 1 2 3	1		3	
	Distance to Sensitive Environment	0 1 2 3	1		3	
	Land Use	0 1 2 3	1		3	
	Population Within 2-Mile Radius	0 1 2 3 4 5	1		5	
	Buildings Within 2-Mile Radius	0 1 2 3 4 5	1		5	
	Total Target Score				24	
4	Multiply [1] X [2] X [3]				1,440	
5	Divide line [4] by 1,440 and multiply by 100		S_{FE} = not scored			

DIRECT CONTACT WORK SHEET

	RATING FACTOR	ASSIGNED VALUE (circle one)	MULTIPLIER	SCORE	MAXIMUM SCORE	REFERENCE (section)
1	OBSERVED INCIDENT	(0) 45	1	0	45	8.1
	If line 1 is 45, proceed to line 4 If line 1 is 0, proceed to line 2					
2	ACCESSIBILITY	0 1 2 (3)	1	3	3	8.2
3	CONTAINMENT	0 (15)	1	15	15	8.3
4	WASTE CHARACTERISTICS TOXICITY	0 1 2 (3)	5	15	15	8.4
5	TARGETS					8.5
	Population Within a 1-Mile Radius	0 1 2 3 (4) 5	4	16	20	
	Distance to a Critical Habitat	0 (1) 2 3	4	4	12	
	Total Targets Score			20	32	
6	If line 1 is 45, multiply 1 X 4 X 5 If line 1 is 0, multiply 2 X 3 X 4 X 5			13,500	21,600	
7	Divide line 6 by 21,600 and multiply by 100		S_{DC} =	62.50		

5.4 HRS DOCUMENTATION RECORDS

DOCUMENTATION RECORDS
FOR
HAZARD RANKING SYSTEM

INSTRUCTIONS: The purpose of these records is to provide a convenient way to prepare an auditable record of the data and documentation used to apply the Hazard Ranking System to a given facility. As briefly as possible summarize the information you used to assign the score for each factor (e.g., "Waste quantity = 4230 drums plus 800 cubic yards of sludges"). The source of information should be provided for each entry and should be a bibliographic-type reference that will make the document used for a given data point easier to find. Include the location of the document and consider appending a copy of the relevant page(s) for ease in review.

FACILITY NAME: Ferro Corporation - Electro Division

LOCATION: Lackawanna, Erie County, NY

DATE SCORED: 11 April 1989

PERSON SCORING: William Thayer

PRIMARY SOURCE(S) OF INFORMATION (e.g., EPA region, state, FIT, etc.):

LMS Phase II report
Recra Environmental, Inc., Phase I report
NYSDEC, Region 9 (Buffalo), files
NYSDEC, Albany, files
Erie County Department of Environment and Planning files

FACTORS NOT SCORED DUE TO INSUFFICIENT INFORMATION:

See records for specific items.

COMMENTS OR QUALIFICATIONS:

N/A

GROUNDWATER ROUTE

1 OBSERVED RELEASE

Contaminants detected (5 maximum):

No groundwater samples have been collected.
Assigned Value = 0

Rationale for attributing the contaminants to the facility:

N/A

* * *

2 ROUTE CHARACTERISTICS

Depth to Aquifer of Concern

Name/description of aquifer(s) of concern:

Aquifer of concern is the Marcellus shale and overlying glacial materials. Upper portion of shale is highly fractured. Groundwater flows primarily through fractures and bedding joints. Thin veins of limestone are found in the shale. Wells completed in the shale typically yield 100-300 gpd.
Ref. 1

Depth(s) from the ground surface to the highest seasonal level of the saturated zone [water table(s)] of the aquifer of concern:

Groundwater was encountered during the advancement of GW-2 on-site in October 1988 at 11 ft below the ground surface.
Refs. 1, 2

Depth from the ground surface to the lowest point of waste disposal/storage:

No borings have been advanced in either of the two fill areas. The terrain conductivity geophysical survey conducted on 24 August 1988 as part of the Phase II investigation indicated fill material exists in the areas previously suspected (or known) to have been landfilled. However, an estimate of the depth of fill was not provided. Assume maximum depth = 6 ft.

Depth from lowest point of waste disposal/storage to the highest seasonal level of the saturated zone of the aquifer of concern (substract the above figures):

Depth to aquifer of concern = 11 ft - 6 ft = 5 ft.
Refs. 1, 2
Assigned Value = 3

Net Precipitation

Mean annual or seasonal precipitation (list months for seasonal):

35 in.
Ref. 3

Mean annual lake or seasonal evaporation (list months for seasonal):

27 in.
Ref. 3

Net precipitation (subtract the above figures):

8 in.
Assigned Value = 2

Permeability of Unsaturated Zone

Soil type in unsaturated zone:

Soil in the area is classified as Remsen silty clay loam derived from the underlying till. Usually is found 5 to 10 ft thick; much of the soil and underlying till has been removed from the Ferro Corp. property, however.
Refs. 1, 2, 4, 5

Permeability associated with soil type:

10^{-5} to 10^{-7} cm/sec
Refs. 1, 4
Assigned Value = 1

Physical State

Physical state of substances at time of disposal (or at present time for generated gases):

Material known to be landfilled includes grinding wheels, crucibles and refractory kiln furniture products, and manufacturing wastes (i.e., floor scraps). Also, sludge material from Ball Mill Wash Station.
Refs. 5, 6, 7, 8, 9
Assigned Value = 3

* * *

3 CONTAINMENT

Containment

Method(s) of waste or leachate containment evaluated:

Landfill: No liner; moderately permeable cover; ponding occurs; no run-on control.
Piles: Piles uncovered; waste unstabilized; no liner.
Refs. 8, 9

Method with highest score:

Both result in same score.
Assigned Value = 3

* * *

4 WASTE CHARACTERISTICS

Toxicity and Persistence

Compound(s) evaluated:

Benzo(a)pyrene
PCB (Aroclor 1260)
Metals - arsenic, beryllium, chromium, copper, lead, nickel, zinc, cadmium, mercury
Refs. 5, 10, 11, 12

Compound with highest score:

All of the above have a toxicity/persistence matrix score of 18.
Ref. 13
Matrix Value = 18

Hazardous Waste Quantity

Total quantity of hazardous substances at the facility, excluding those with a containment score of 0 (give a reasonable estimate even if quantity is above maximum):

179 yd^3

Basis of estimating and/or computing waste quantity:

Assumed average depth of fill = 6 ft
Area of fill = 66,000 ft^2 (1.5 acres)
Volume of fill = 396,000 ft^3 = 14,667 yd^3
Combined average concentration of hazardous substances = 12,212 ppm
Estimated quantity of hazardous waste = 179 yd^3
In the 126 to 250 yd^3 category
Refs. 5, 10, 11, 12, 14, 15, 16
Assigned Value = 4

* * *

5 TARGETS

Groundwater Use

Use(s) of aquifer(s) of concern within a 3-mile radius of the facility:

City of Lackawanna and communities located within 3 miles of site are supplied with water from Lake Erie.
Refs. 1, 17
Assigned Value = 0

Distance to Nearest Well

Location of nearest well drawing from aquifer of concern or occupied building not served by a public water supply:

Location of nearest building withdrawing water from the aquifer of concern has not been determined. Assumed distance is greater than 3 miles.
Refs. 1, 17
Assigned Value = 0

Distance to above well or building:

N/A

Population Served by Groundwater Wells Within a 3-Mile Radius

Identified water supply well(s) drawing from aquifer(s) of concern within a 3-mile radius and populations served by each:

No water supply wells have been identified within 3 miles of the site.
Ref. 17

Computation of land area irrigated by supply well(s) drawing from aquifer(s) of concern within a 3-mile radius, and conversion to population (1.5 people per acre):

No irrigation wells have been identified within 3 miles of site.
Ref. 17

Total population served by groundwater within a 3-mile radius:

Population served = 0
Ref. 17
Assigned Value = 0

SURFACE WATER ROUTE

1 OBSERVED RELEASE

Contaminants detected in surface water at the facility or downhill from it (5 maximum):

None

Rationale for attributing the contaminants to the facility:

The downgradient surface water sample is not significantly different from the upgradient sample; therefore, there is no observed release. Several drainage ditches were sampled and low levels of contaminants were detected. For HRS scoring purposes the drainage ditches are assumed to have intermediate flow.
Refs. 5, 10, 11, 12

* * *

2 ROUTE CHARACTERISTICS

Facility Slope and Intervening Terrain

Average slope of facility in percent:

1%
Ref. 13

Name/description of nearest downslope surface water:

South Branch of Smoke Creek
Ref. 13

Average slope of terrain between facility and above-cited surface water body in percent:

11%
Ref. 13
Assigned Value = 2

Is the facility located either totally or partially in surface water?

No

Is the facility completely surrounded by areas of higher elevation?

No

1-Year 24-Hour Rainfall in Inches

2.29 in. In the 2.1 to 3.0 in. category.
Ref. 14
Assigned Value = 2

Distance to Nearest Downslope Surface Water

200 ft. In less than 1000 ft category.
Ref. 13
Assigned Value = 3

Physical State of Waste

Solid = 0
Liquid (sludge) = 3
Refs. 5, 6, 7, 8, 9
Assigned Value = 3

* * *

3 CONTAINMENT

Method(s) of waste or leachate containment evaluated:

Solid waste equates to landfill for HRS purposes - not covered, no diversion - 3
Outfalls (001-004) not rated within this context.

Method with highest score:

Not covered, no diversion.
Ref. 14
Assigned Value = 3

* * *

4 WASTE CHARACTERISTICS

Toxicity and Persistence

Compound(s) evaluated:

Chromium, zinc, arsenic, lead, nickel
Refs. 5, 10, 11, 12

Compound with highest score:

All have toxicity/persistence matrix scores equal to 18.
Refs. 14, 15

Hazardous Waste Quantity

Total quantity of hazardous substances at the facility, excluding those with a containment score of 0 (give a reasonable estimate even if quantity is above maximum):

179 yd^3

Basis of estimating and/or computing waste quantity:

Assumed average depth of fill = 6 ft
Area of fill = 66,000 ft^2 (1.5 acres)
Volume of fill = 396,000 ft^3 = 14,667 yd^3
Combined average concentration of hazardous substances = 12,212 ppm
Estimated quantity of hazardous waste = 179 yd^3
In the 126 to 250 yd^3 category
Refs. 5, 10, 11, 12, 14, 15, 16
Assigned Value = 4

* * *

5 TARGETS

Surface Water Use

Use(s) of surface water within 3 miles downstream of the hazardous substance:

South Branch is a Class C surface water body subject to C standards. Water is suitable for fishing, fish propagation, and primary and secondary recreation. No drinking water or irriga-

tion intakes have been identified within 3 miles of the site.
Refs. 13, 18
Assigned Value = 2

Is there tidal influence?

No

Distance to a Sensitive Environment

Distance to 5-acre (minimum) coastal wetland, if 2 miles or less:

>2 miles
Ref. 13

Distance to 5-acre (minimum) freshwater wetland, if 1 mile or less:

>1 mile
Ref. 19

Distance to critical habitat of an endangered species or national wildlife refuge, if 1 mile or less:

0.5 to 1 mile
No Federal endangered species within a 1-mile radius of the site. However, the state may give the plant Erigenia bulbosa legal status as a rare, threatened, or endangered plant when the state next revises its rare plant list. It is not known exactly when the legal status will be given. For HRS scoring purposes the lowest nonzero number is used.
Ref. 20
Assigned Value = 1

Population Served by Surface Water

Location(s) of water supply intake(s) within 3 miles (free-flowing bodies) or 1 mile (static water bodies) downstream of the hazardous substance and population served by each intake:

No surface water supply intakes have been identified within 3 miles of the site.
Ref. 17

Computation of land area irrigated by above-cited intake(s) and conversion to population (1.5 people per acre):

N/A

Total population served:

0
Assigned Value = 0

Name/description of nearest of above water bodies:

N/A

Distance to above-cited intakes, measured in stream miles:

N/A

AIR ROUTE

1 OBSERVED RELEASE

Contaminants detected:

No contaminants detected.
Assigned Value = 0, therefore $S_A = 0$

Date and location of detection of contaminants:

HNU photoionization detector

Methods used to detect the contaminants:

N/A

Rationale for attributing the contaminants to the site:

N/A

* * *

2 WASTE CHARACTERISTICS

Reactivity and Incompatibility

Most reactive compound:

None
Ref. 14

Most incompatible pair of compounds:

None
Ref. 14
Assigned Value = 0

Toxicity

Most toxic compound:

Chromium
Ref. 14
Assigned Value = 3

Hazardous Waste Quantity

Total quantity of hazardous waste:

179 yd^3

Basis of estimating and/or computing waste quantity:

Assumed average depth of fill = 6 ft
Area of fill = 66,000 ft^2 (1.5 acres)
Volume of fill = 396,000 ft^3 = 14,667 yd^3
Combined average concentration of hazardous substances = 12,212 ppm
Estimated quantity of hazardous waste = 179 yd^3
In the 126 to 250 yd^3 category
Refs. 5, 10, 11, 12, 14, 15, 16
Assigned Value = 4

* * *

3 TARGETS

Population Within 4-Mile Radius

Circle radius used, give population, and indicate how determined:

0 to 4 mi	0 to 1 mi	0 to 1/2 mi	0 to 1/4 mi
population = 39,471	population = 2,691	population = 829	population = 236
Value = 21	Value = 18	Value = 18	Value = 21

Ref. 21
Assigned Value = 21

Distance to a Sensitive Environment

Distance to 5-acre (minimum) coastal wetland, if 2 miles or less:

Greater than 2 miles
Ref. 13

Distance to 5-acre (minimum) freshwater wetland, if 1 mile or less:

Greater than 1 mile
Ref. 19
Assigned Value = 0

Distance to critical habitat of an endangered species, if 1 mile or less:

0.5 to 1 mile
No Federal endangered species within a 1-mile radius of the site. However, the state may give the plant Erigenia bulbosa legal status as a rare, threatened, or endangered plant when the state next revises its rare plant list. It is not known exactly when the legal status will be given. For HRS scoring purposes the lowest nonzero number is used.
Ref. 20
Assigned Value = 1

Land Use

Distance to commercial/industrial area, if 1 mile or less:

2400 ft SE. In the 0.25 to 0.5 mile category
Ref. 13
Assigned Value = 2

Distance to national or state park, forest, or wildlife reserve, if 2 miles or less:

Greater than 2 miles
Ref. 13
Assigned Value = 0

Distance to residential area, if 2 miles or less:

400 ft west. In the less than 0.25 mile category
Ref. 13
Assigned Value = 3

Distance to agricultural land in production within past 5 years, if 1 mile or less:

Assumed greater than 1 mile
Ref. 13
Assigned Value = 0

Distance to prime agricultural land in production within past 5 years, if 2 miles or less:

Assumed greater than 2 miles
Ref. 13

Is a historic or landmark site (National Register of Historic Places and National Natural Landmarks) within view of the site?

No

FIRE AND EXPLOSION

1 CONTAINMENT

Hazardous substances present:

Site has not been determined to be a significant fire or explosive threat by a state or local fire marshal. Therefore, S_{FE} has not been scored.

Type of containment, if applicable:

* * *

2 WASTE CHARACTERISTICS

Direct Evidence

Type of instrument and measurements:

None

Ignitability

Compound used:

None
Ref. 14

Reactivity

Most reactive compound:

None
Ref. 14

Incompatibility

Most incompatible pair of compounds:

None
Ref. 14

Hazardous Waste Quantity

Total quantity of hazardous substances at the facility:

179 yd^3

Basis of estimating and/or computing waste quantity:

Assumed average depth of fill = 6 ft
Area of fill = 66,000 ft^2 (1.5 acres)
Volume of fill = 396,000 ft^3 = 14,667 yd^3
Combined average concentration of hazardous substances = 12,212 ppm
Estimated quantity of hazardous waste = 179 yd^3
In the 126 to 250 yd^3 category
Refs. 5, 10, 11, 12, 14, 15, 16
Assigned Value = 4

* * *

3 TARGETS

Distance to Nearest Population

400 ft west
Ref. 13

Distance to Nearest Building

400 ft west
Ref. 13

Distance to Sensitive Environment

Distance to wetlands:

Greater than 100 ft
Ref. 19

Distance to critical habitat:

0.5 to 1 mile
No Federal endangered species within a 1-mile radius of the site. However, the state may give the plant Erigenia bulbosa

legal status as a rare, threatened, or endangered plant when the state next revises its rare plant list. It is not known exactly when the legal status will be given. For HRS scoring purposes the lowest nonzero number is used.
Ref. 20
Assigned Value = 1

Land Use

Distance to commercial/industrial area, if 1 mile or less:

2400 ft southeast
Ref. 13

Distance to national or state park, forest, or wildlife reserve, if 2 miles or less:

Greater than 2 miles
Ref. 13

Distance to residential area, if 2 miles or less:

400 ft west
Ref. 13

Distance to agricultural land in production within past 5 years, if 1 mile or less:

Assumed greater than 1 mile
Ref. 13

Distance to prime agricultural land in production within past 5 years, if 2 miles or less:

Assumed greater than 2 miles

Is a historic or landmark site (National Register of Historic Places and National Natural Landmarks) within view of the site?

No

Population Within 2-Mile Radius

11,807 people
Ref. 21

Buildings Within 2-Mile Radius

3107
Ref. 21

DIRECT CONTACT

1 OBSERVED INCIDENT

Date, location, and pertinent details of incident:

No records of injury, illness, or death to humans or other animals caused by direct contact with hazardous waste present on site have been identified.
Assigned Value = 0

* * *

2 ACCESSIBILITY

Describe type of barrier(s):

Fence does not completely surround site.
Ref. 13
Assigned Value = 3

* * *

3 CONTAINMENT

Type of containment, if applicable:

Hazardous material is present in uncovered piles; in sediment and water in drainage ditches and South Branch.
Refs. 5, 8, 9, 10, 11, 12
Assigned Value = 15

* * *

4 WASTE CHARACTERISTICS

Toxicity

Compounds evaluated:

PCB (Aroclor 1260), fluoranthene, pyrene, aluminum, chromium, copper
Refs. 5, 10, 11, 12

Compound with highest score:

All of the above are assigned toxicity values = 3.
Refs. 14, 15

* * *

5 TARGETS

Population Within 1-Mile Radius

Approximately 3520
Ref. 21
Assigned Value = 4

Distance to Critical Habitat (of Endangered Species)

0.5 to 1 mile
No Federal endangered species within a 1-mile radius of the site. However, the state may give the plant Erigenia bulbosa legal status as a rare, threatened, or endangered plant when the state next revises its rare plant list. It is not known exactly when the legal status will be given. For HRS scoring purposes the lowest nonzero number is used.
Ref. 20
Assigned Value = 1

5.5 HRS REFERENCES

HRS REFERENCES

[1] LaSala, A.M. Jr. 1968. Erie-Niagara Basin Ground-Water Resources. Ref. 7, Appendix A, this report.

[2] Soil boring log from GW-2. Appendix E, this report.

[3] Geraghty, Miller, Van Der Leeden, Troise. 1973. Water Atlas of the United States. Water Information Center. 122 plates.

[4] U.S. Department of Agriculture, Soil Conservation Service. 1986. Ref. 8, Appendix A, this report.

[5] 7 December 1981 NYSDEC field sampling and analyses. Ref. 9, Appendix A, this report.

[6] Ferro Corporation. 21 July 1983 letter. Ref. 3, Appendix A, this report.

[7] Erie County Department of Environment and Planning. 13 January 1984. Memo. Ref. 5, Appendix A, this report.

[8] Buechi, P. 3 December 1985 NYSDEC memo to C. Hoffman.

[9] Erie County Department of Environment and Planning correspondence. 1978. Ref. 2, Appendix A, this report.

[10] New York State Department of Environmental Conservation (NYSDEC). 25 June 1986 field sampling results. Ref. 10, Appendix A, this report.

[11] New York State Department of Environmental Conservation (NYSDEC). 15 October 1986 field sampling results. Ref. 11, Appendix A, this report.

[12] Surface water analytical data summary. November 1988. Appendix G, this report.

[13] U.S. Geological Survey. 1965. Buffalo S.E. Quadrangle, Erie County, New York. Figure 5-1, this report.

[14] U.S. Environmental Protection Agency (EPA). 1984. Uncontrolled Hazardous Waste Site Ranking System, A Users Manual.

[15] Sax, N.I., and R.J. Lewis, Sr. 1989. Dangerous Properties of Industrial Materials. 7th ed. New York: Van Nostrand Reinhold. 3527 pp.

[16] Lawler, Matusky & Skelly Engineers (LMS). 5 August 1988. Ferro Corporation photograph log.

[17] New York State Atlas of Community Water System Sources. 1982. NYSDH, Division of Environmental Protection, Bureau of Public Water Supply Protection. 79 pp.

[18] 6 NYCRR Title 6 Environmental Conservation. Ref. 12, Appendix A, this report.

[19] New York State Department of Environmental Conservation (NYSDEC). Wetland map. Buffalo S.E. Quadrangle, Erie County, New York.

[20] New York State Significant Habitat Unit file review via Lawrence Brown (518-439-7486).

[21] House count.

REFERENCE 3

WATER ATLAS *of the* UNITED STATES

GERAGHTY • MILLER • VAN DER LEEDEN • TROISE

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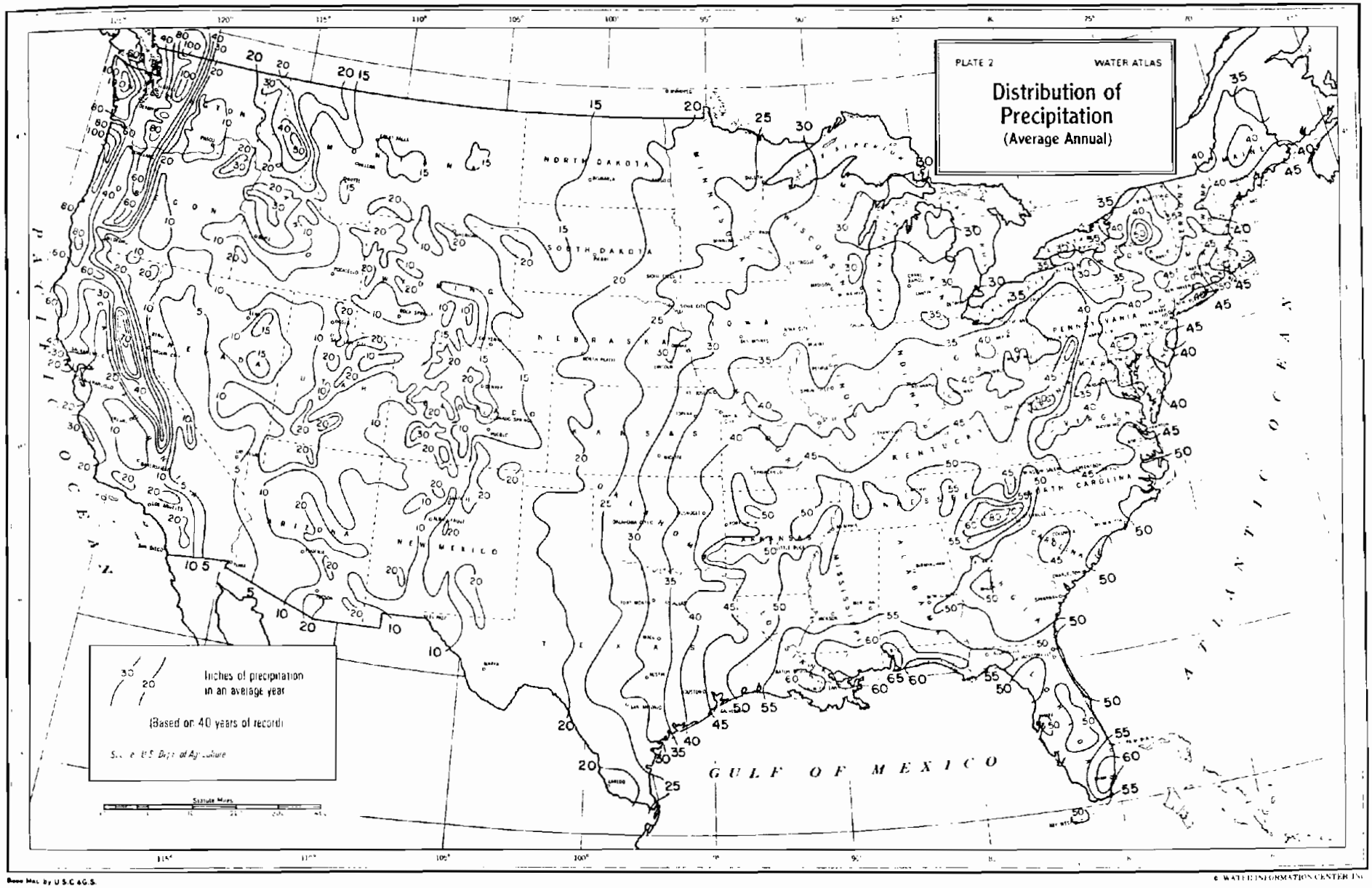
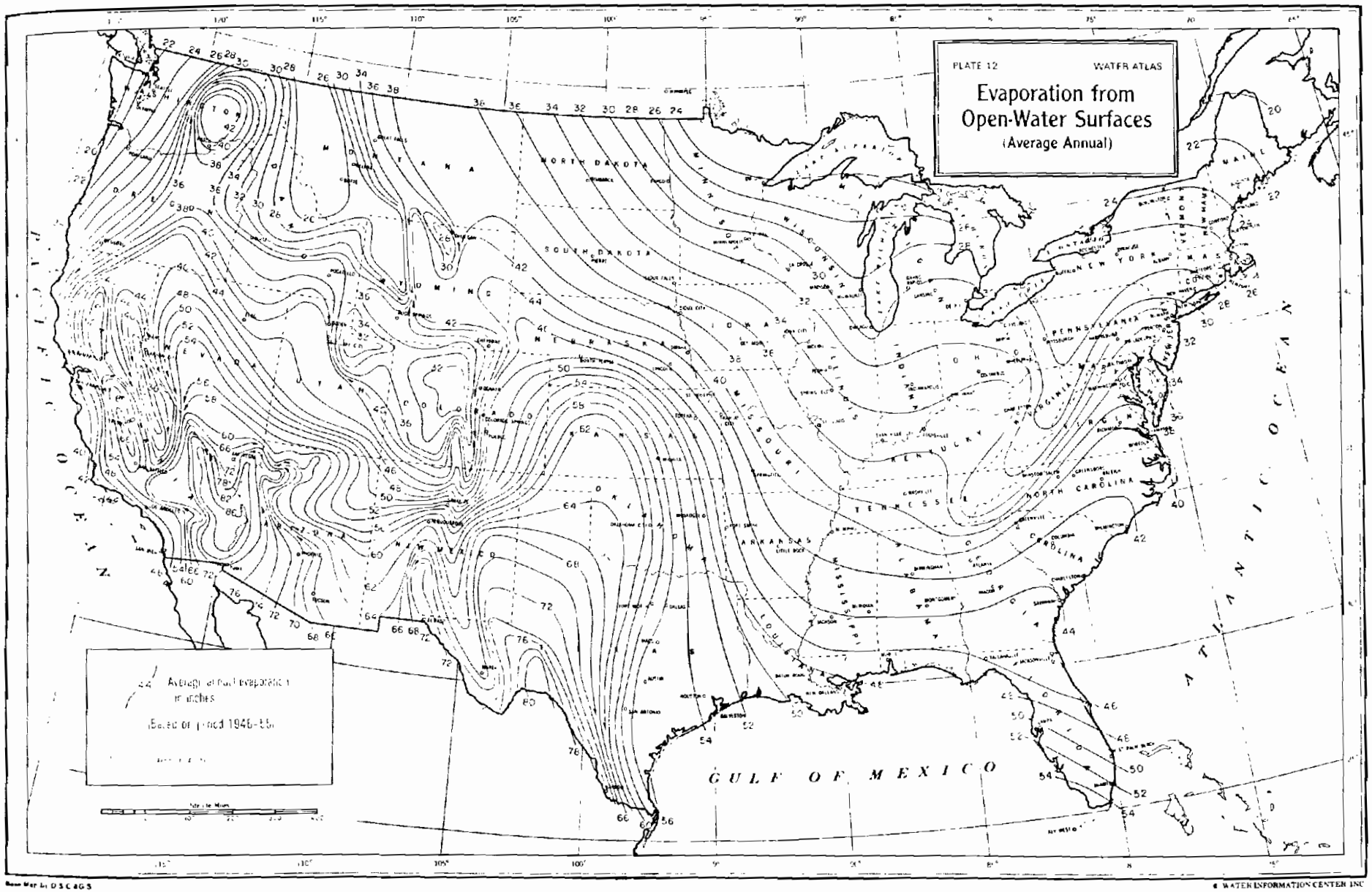


Base Map by U.S.C.&G.S.



Base Map by U.S.C.&G.S.

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REFERENCE 8

Jerome Miller
8-4

Erie C. DEP

M

Mr. Carl Hoffman
Lawrence Clare
Ferro Corp., Site No. 915020

December 3, 1985

Attached is a revised site sketch of the Ferro Corp. site as we discussed during our November inspection and again by telephone on November 30th. In addition, I have met with Erie County Department of Environment and Planning personnel regarding this site. Erie County has two complaint investigations relating to this site in their solid waste files. No site profile has been completed on this site nor has any aerial photo interpretation been made.

With respect to this site, the following observations appear pertinent:

1) The Phase I Report by Recra did not address the fill area along Smokes Creek but rather appeared to be limited to the shallow fill area within the plant fence. The Phase I Work Plan proposed in the Phase I Report is, therefore, of very limited value.

2) The fill area along Smokes Creek needs to be defined better in terms of depth and extent to the northeast. With the scattered scrap waste over the entire surface, the amount of filling actually done is not easily determined.

3) The entire area between the south fence and the ECSD No. 3 Trunk appears to have been stripped of topsoil within the past 3-5 years. Is this the result of ECSD No. 3 construction? - cleaning up by Ferro? - or filling in the swamp? What conditions existed at the time the Phase I Report was prepared?

4) The discharge from Ferro to the drainage ditch on the north side of Willet Road (west side of railroad) was inspected on November 7th and December 1st. Oil was being discharged on both dates. The earthen dam was repaired between these dates and a new pipe installed to prevent surface oil loss. (It was not installed very well). The sorbent pads were saturated on 12/1 with free heavy oil in the open water.

The ditch on the east side of the railroad contained a pastel yellow material (paint like) on the bottom - both dates. No floating, suspended or dissolved material was evident. Both problems have been referred to the Water Section in Region 9 for appropriate followup.

5) In a June, 1983 complaint it is noted that sand waste is disposed after being mixed with water. (See attached Sketch 1). This disposal area may be a source of groundwater contamination. Note also that this sketch shows a disposal area along Smokes Creek! There is no indication in the Phase I Report that Erie County files were ever checked.

6) In October, 1978, in conjunction with an investigation of the Chemtrol Site (Site No. 915015), Erie County performed some sampling in Smokes Creek adjacent to the Ferro (See attached Sketches No. 2 and 3). I am currently attempting to obtain copies of the results of this sampling.

The Work Plan for the Phase II Investigation should address both the landfill within the plant fence and the disposal area along Smokes Creek. With the relatively shallow shale exposed along Smokes Creek, it would be prudent to consider several borings over the sight area to define the bedrock layer and a concentration of sampling effort on surface water rather than on groundwater (the flow direction is indicated as southwest toward either Smokes Creek or the westerly drainage ditch whether it would be intercepted). In addition, please consider:

1) Tar spills in the northeast corner of the plant have been recorded. Surface drainage in this area is to the west side of the railroad, north of Willet Road.

2) Any and all upstream groundwater monitoring wells should be located East of the railroad to be certain of no influence from surface spills/sand evaporation.

3) Surface sampling recommendations should be limited to the plant site. Smokes Creek is affected by too many upstream sources to anticipate documentation of any effect on it from this source.

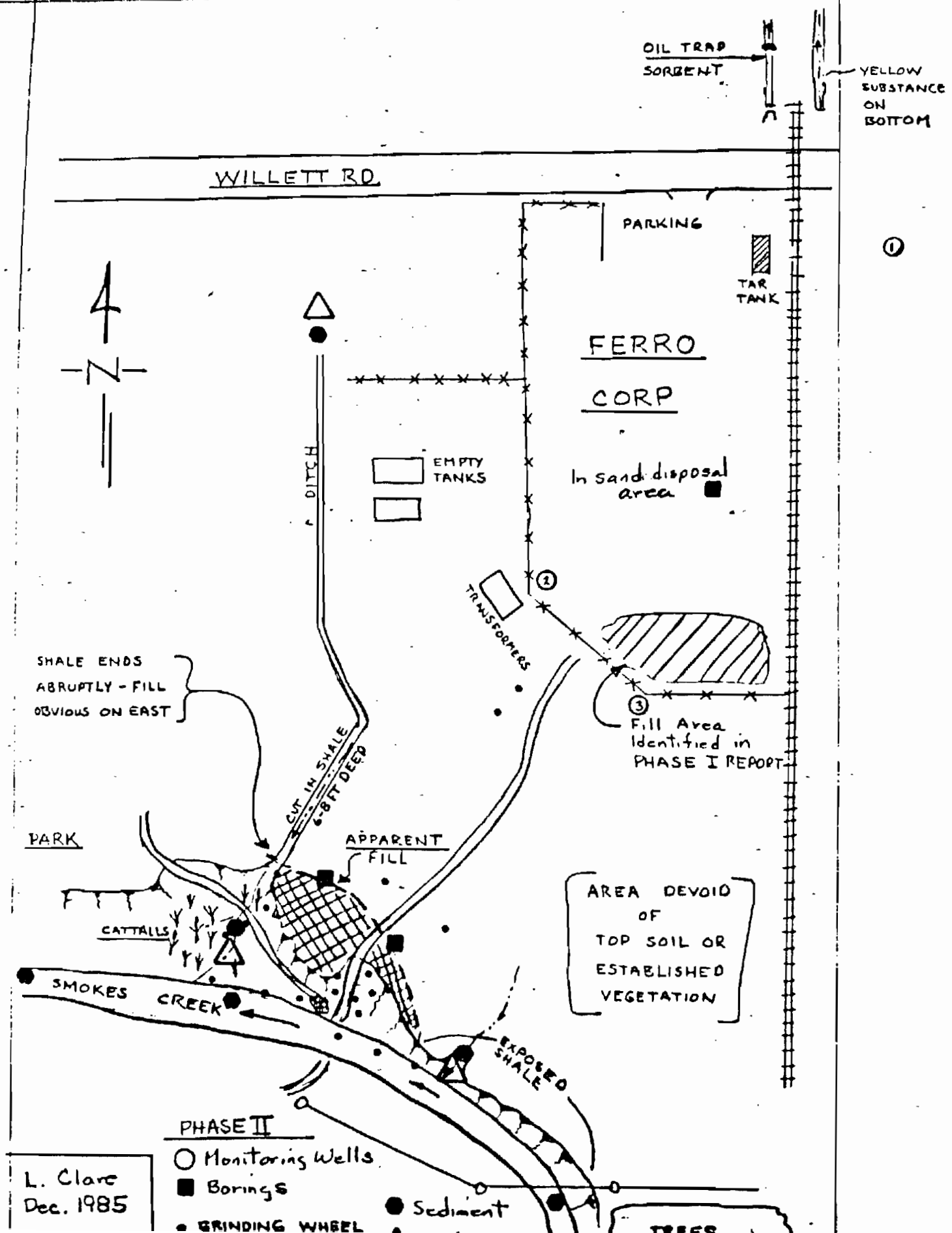
4) Sediment sampling is recommended in lieu of water sampling.

cc: Peter Buechi

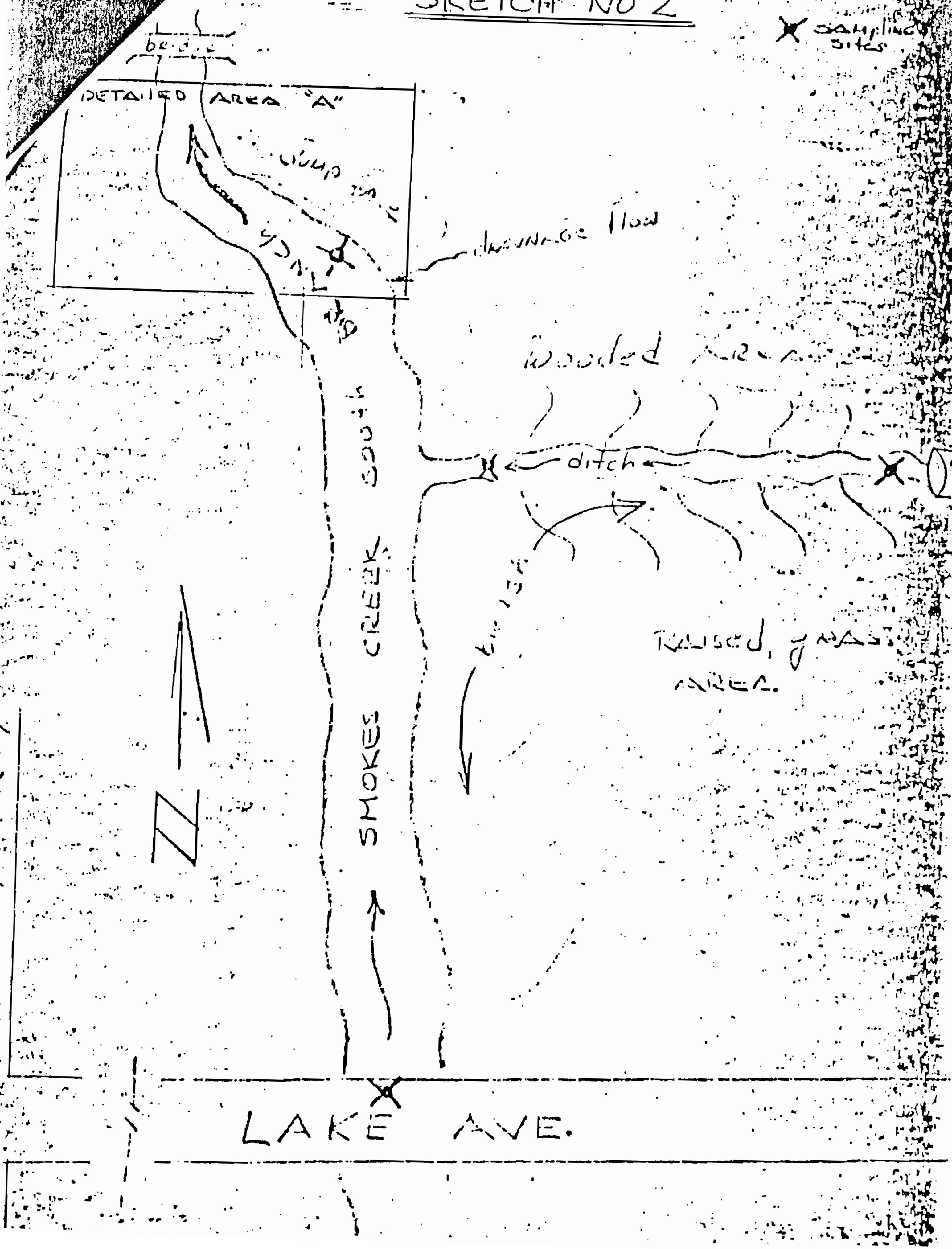
LGC:jps

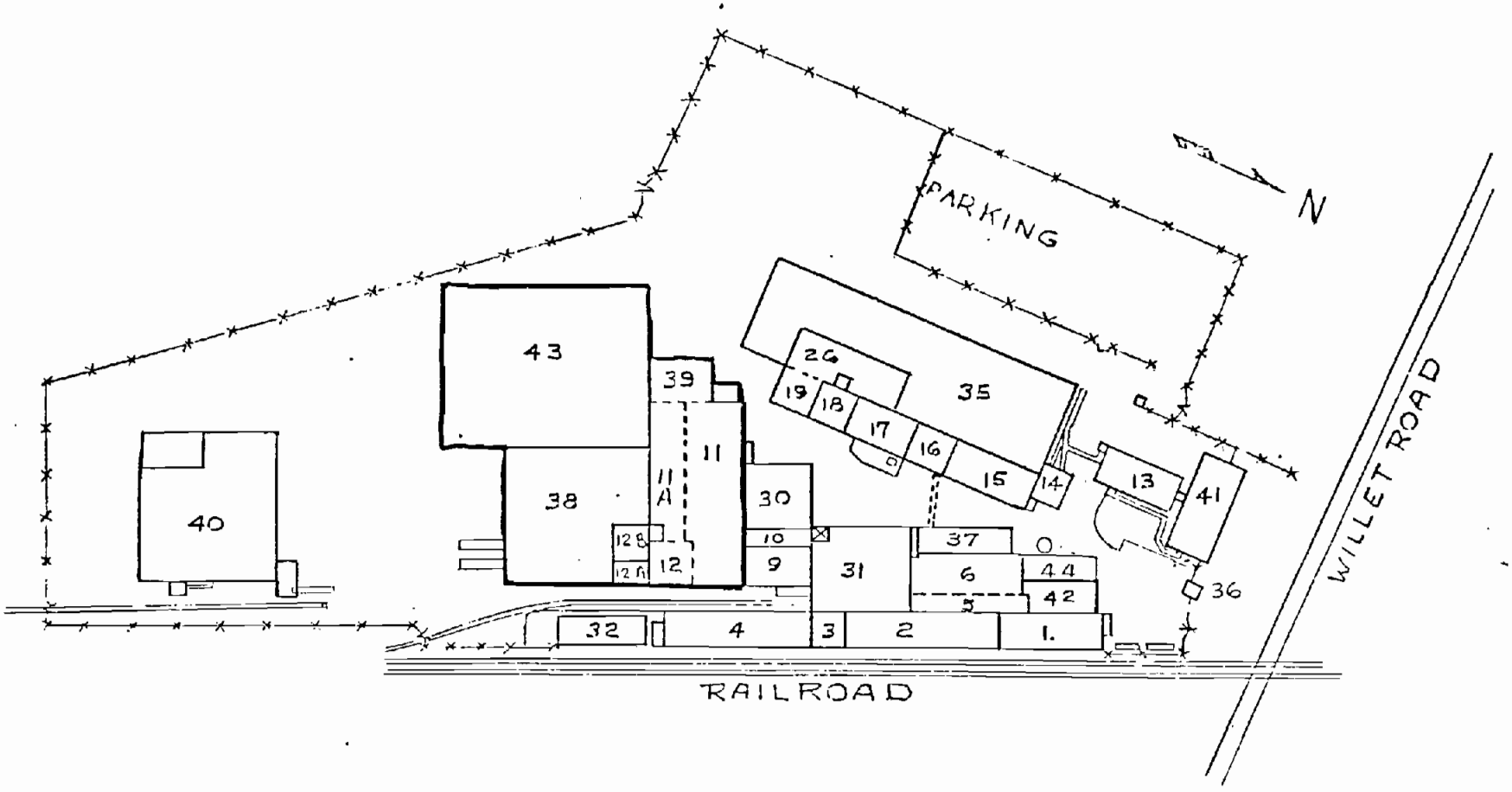
Attach.

FERRO CORP - SITE NO 915020



SKETCH NO 2


sampling sites
DETAILED AREA "A"
dump
drainage flow
Wooded
ditch
SMOKES CREEK
Raised, grass
AREA
LAKE AVE.



FERRO CORP. — ELECTRO DIV.
BUFFALO, N.Y. 14218

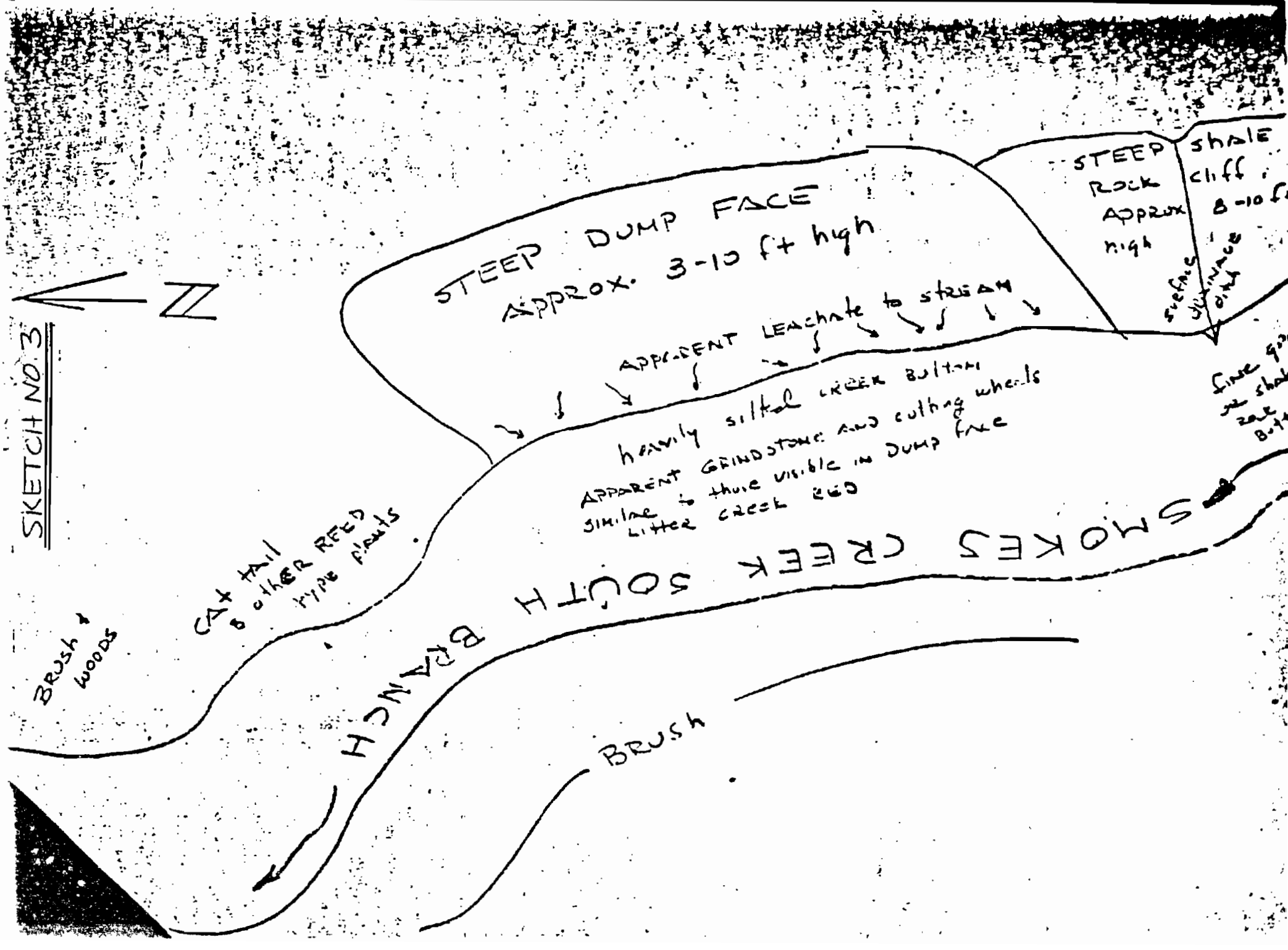
PLANT LAY OUT

SYM.	REVISIONS	DATE	BY	AUTH. BY
1	ADDED BLDG NO 44	5-13-77	A.C.	J.M.

SCALE 1/2" = 100' | JUNE 4, 1975 | DESIGNED BY | CHECKED BY | DRAWN BY A. CONIGLIO

D-120-196

SULLIVAN-McKEEGAN CO., INC., BUFFALO NO. 10 3159 ALBANENE TRACING PAPER


SKETCH NO. 3
N
STEEP DUMP FACE
APPROX. 3-10 ft high
STEEP ROCK APPROX high
shale cliff
APPARENT LEACHate to stream
heavily silted CREEK BOTTOM
APPARENT GRINDSTONE AND cutting wheels
similar LITTER CREEK EGO
CAT TAIL & other REED type plants
BRUSH & WOODS
SMOKES CREEK SOUTH BRANCH
BRUSH

REFERENCE 14

Uncontrolled Hazardous Waste Site Ranking System

A Users Manual
(HW-10)

Originally Published in
the July 16, 1982, *Federal Register*

United States
Environmental Protection
Agency

1984

REFERENCE 15

Dangerous Properties of Industrial Materials

Seventh Edition

Volume II

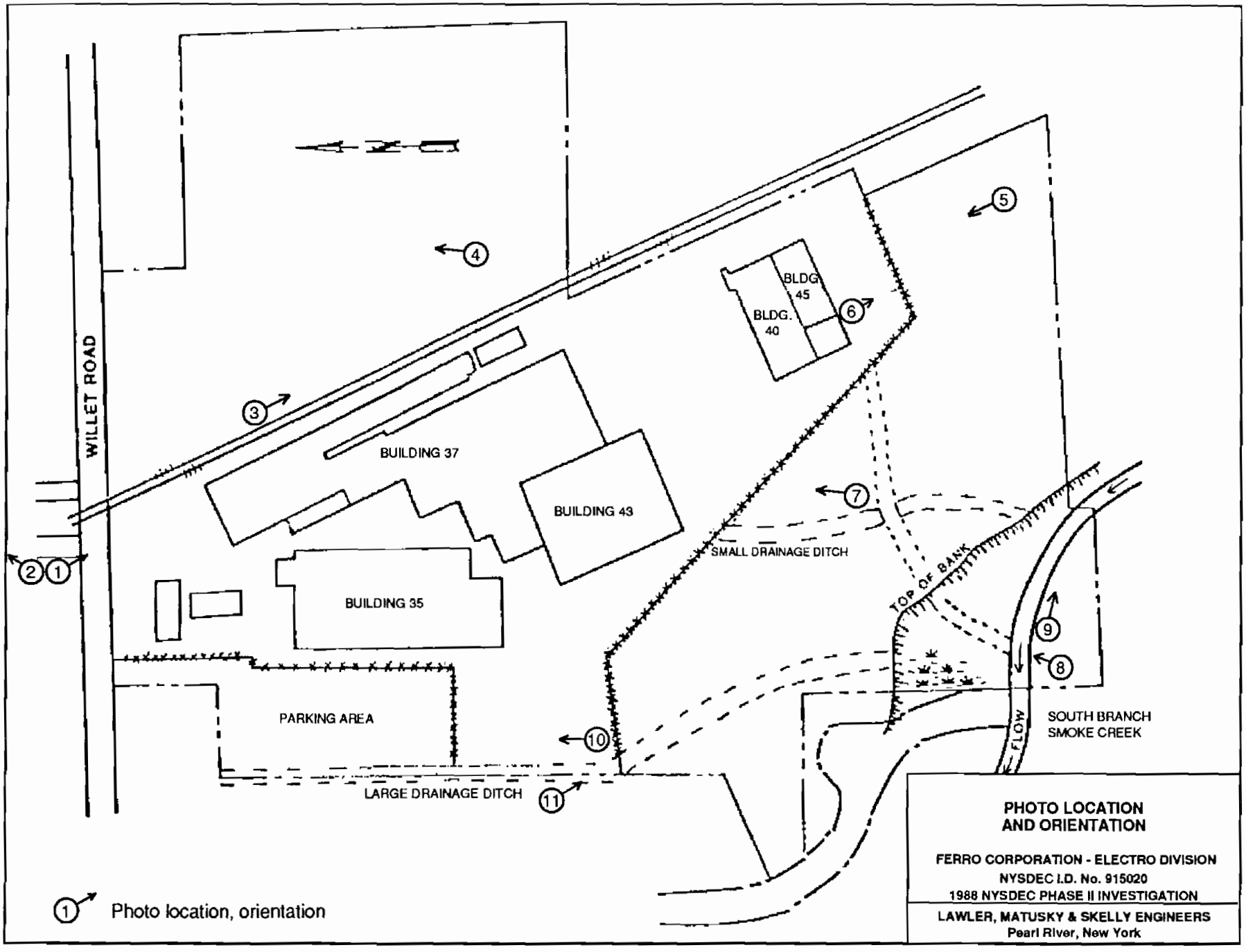
N. IRVING SAX

and

RICHARD J. LEWIS, SR.

VAN NOSTRAND REINHOLD
NEW YORK

REFERENCE 16


WILLET ROAD
BUILDING 37
BUILDING 43
BUILDING 35
BLDG. 40
BLDG 45
PARKING AREA
SMALL DRAINAGE DITCH
TOP OF BANK
LARGE DRAINAGE DITCH
SOUTH BRANCH SMOKE CREEK
FLOW
1 2 3 4 5 6 7 8 9 10 11
1 Photo location, orientation
PHOTO LOCATION AND ORIENTATION
FERRO CORPORATION - ELECTRO DIVISION
NYSDEC I.D. No. 915020
1988 NYSDEC PHASE II INVESTIGATION
LAWLER, MATUSKY & SKELLY ENGINEERS
Pearl River, New York

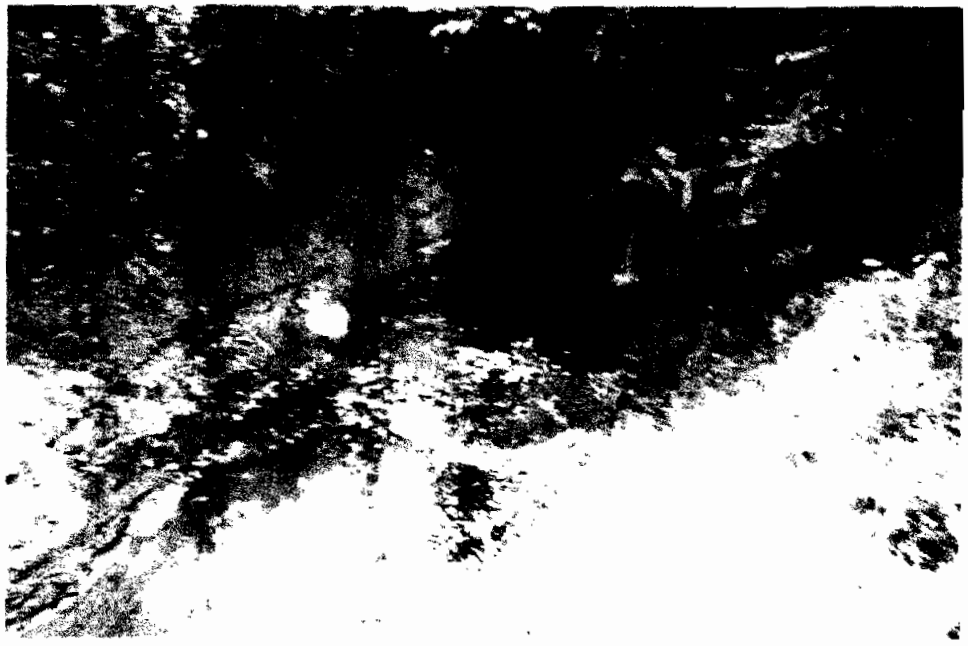


PHOTO 1. Site for SW-4 and SW-4 sediment sample, looking south (tar spill).

PHOTO 2. Site for SW-4 and SW-4 sediment sample, looking north.

PHOTO 3. Original site for GW-1 was moved because of access reasons (train tracks and hill).

PHOTO 4. Proposed new site for GW-1 was moved southeast of original location.

PHOTO 5. Site for GW-3, looking north.

PHOTO 6. Site for SS-1, looking south (in fill, gravel to the east).

PHOTO 7. Site for GW-2, looking northeast.

PHOTO 8. SS-2 site, looking north across Smoke Creek. SS-3 and SW-3 sites are on opposite side of road.

PHOTO 9. Smoke Creek by access road, looking east (upstream).

PHOTO 10. Ditch on west end of property, looking north.

PHOTO 11. Looking south-southeast over open area.

REFERENCE 17

New York State Atlas of Community Water System Sources 1982

NEW YORK STATE DEPARTMENT OF HEALTH
DIVISION OF ENVIRONMENTAL PROTECTION
BUREAU OF PUBLIC WATER SUPPLY PROTECTION

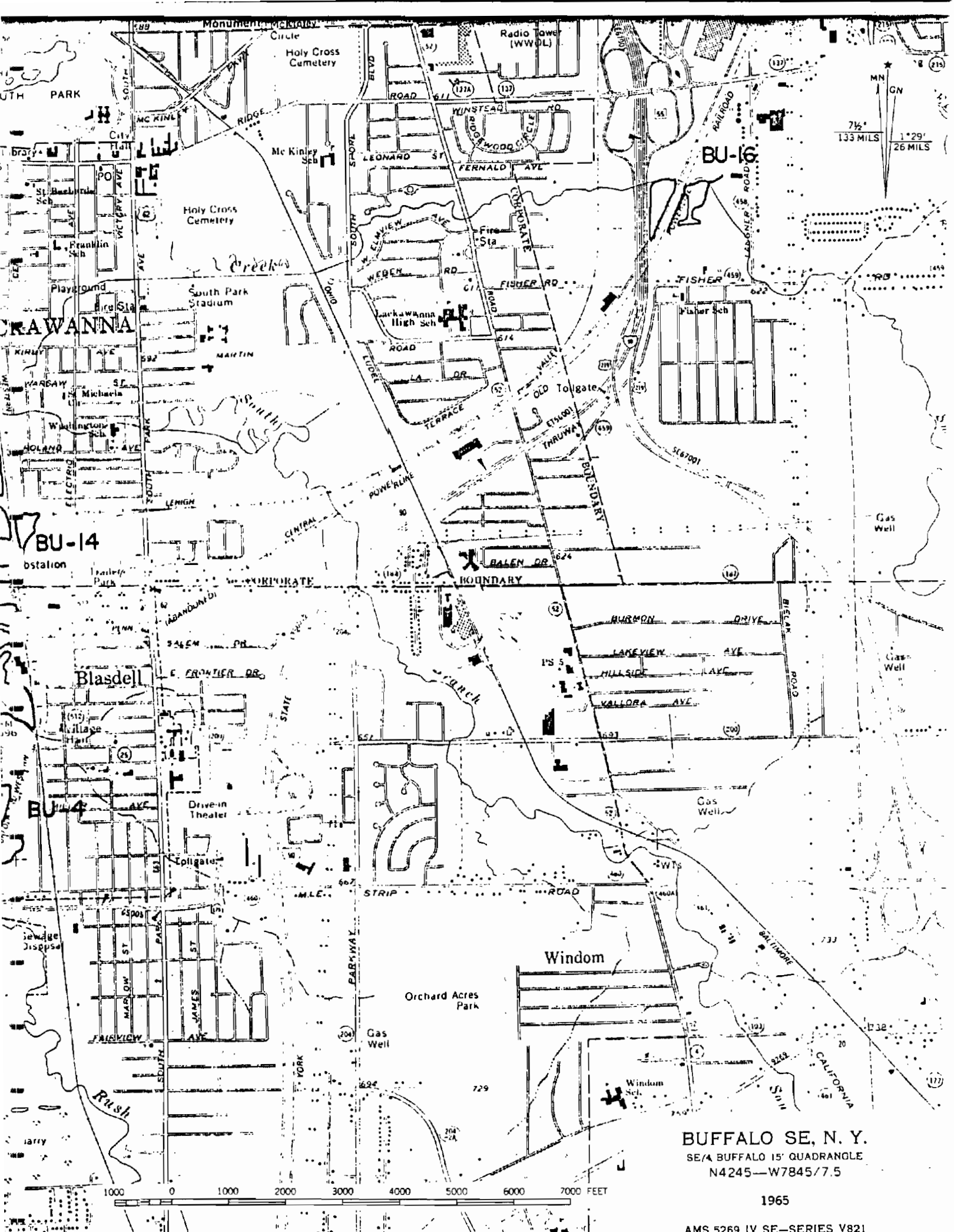
LOCATION OF COMMUNITY WATER SYSTEM SOURCES-1982

DIVISION OF ENVIRONMENTAL ...
BUREAU OF PUBLIC WATER SUPPLY PROTECTION

ERIE COUNTY

ID NO	COMMUNITY WATER SYSTEM	POPULATION	SOURCE
Municipal Community			
	Akron Village (See No 1 Wyoming Co, Page 10).	3640	
1	Alden Village.	3460.	Wells
2	Angola Village.	8500.	Lake Erie
3	Buffalo City Division of Water.	357870.	Lake Erie
4	Carfee Water Company.	210.	Wells
5	Collins Water District #3.	704.	Wells
6	Collins Water Districts #1 and #2.	1384.	Wells
7	Erie County Water Authority (Sturgeon Point Intake).	375000.	Lake Erie
8	Erie County Water Authority (Van DeWater Intake).	NA.	Niagara River - East Branch
9	Grand Island Water District #2.	9390.	Niagara River
10	Holland Water District.	1670.	Wells
11	Lawtons Water Company.	138.	Wells
12	Lockport City (Niagara Co).		Niagara River - East Branch
13	Niagara County Water District (Niagara Co).		Niagara River - West Branch
14	Niagara Falls City (Niagara Co).		Niagara River - West Branch
15	North Collins Village.	1500.	Wells
16	North Tonawanda City (Niagara Co).		Niagara River - West Branch
17	Orchard Park Village.	3671.	Pipe Creek Reservoir
18	Springville Village.	4169.	Wells
19	Tonawanda City.	18538.	Niagara River - East Branch
20	Tonawanda Water District #1.	91269.	Niagara River
21	Wanakah Water Company.	10750.	Lake Erie
Non-Municipal Community			
22	Aurora Mobile Park.	125.	Wells
23	Bush Gardens Mobile Home Park.	270.	Wells
24	Circle B Trailer Court.	50.	Wells
25	Circle Court Mobile Park.	125.	Wells
26	Creekside Mobile Home Park.	120.	Wells
27	Donnelly's Mobile Home Court.	99.	Wells
28	Gowanda State Hospital.	NA.	Clear Lake
29	Hillside Estates.	160.	Wells
30	Hunters Creek Mobile Home Park.	150.	Wells
31	Knox Apartments.	NA.	Wells
32	Maple Grove Trailer Court.	72.	Wells
33	Millgrove Mobile Park.	100.	Wells
34	Perkins Trailer Park.	75.	Wells
35	Quarry Hill Estates.	400.	Wells
36	Springville Mobile Park.	114.	Wells
37	Springwood Mobile Village.	132.	Wells
38	Taylors Grove Trailer Park.	39.	Wells
39	Valley View Mobile Court.	42.	Wells
40	Villager Apartments.	NA.	Wells

REFERENCE 19



BUFFALO SE, N. Y.

SE/4 BUFFALO 15' QUADRANGLE

N4245—W7845/7.5

1965

AMS 5269 IV SE—SERIES V821

REFERENCE 21

HRS REFERENCE 21

HOUSE COUNT

RADIUS (miles)	QUADRANT NE	SE	SW	NW	HOUSE COUNT TOTAL
0-0.25	1	0	36	25	62
0.25-0.5	90	19	37	10	156
0.5-1	127	159	181	23	490
1-2	263	589	741	806	2,399
2-3	923	522	400	656	2,501
3-4	2,029	753	196	1,801	4,779

TOTAL (miles)	QUADRANT NE	SE	SW	NW	HOUSE COUNT TOTAL	POPULATION TOTAL (House X 3.8)
0-0.25	1	0	36	25	62	236
0-0.5	91	19	73	35	218	829
0-1	218	178	254	58	708	2,691
0-2	481	767	995	864	3,107	11,807
0-3	1,404	1,289	1,395	1,520	5,608	21,311
0-4	3,433	2,042	1,591	3,321	10,387	39,471

House count taken from the following USGS topographic maps:

Orchard Park, NY 1965.
Buffalo SE, NY 1965.


2 MILES
3 MILES

5.6 EPA POTENTIAL HAZARDOUS WASTE SITE, SITE INSPECTION REPORT (Form 2070-13)

POTENTIAL HAZARDOUS WASTE SITE
SITE INSPECTION REPORT
PART 1 - SITE LOCATION AND INSPECTION INFORMATION

EPA

I. IDENTIFICATION

01 STATE	02 SITE NUMBER
NY	D043814003

II. SITE NAME AND LOCATION

01 SITE NAME (Legal, common, or descriptive name of site)	02 STREET, ROUTE NO., OR SPECIFIC LOCATION IDENTIFIER				
Ferro Corporation-Electro Division	661 Willet Rd.				
03 CITY	**04 STATE**	**05 ZIP CODE**	**06 COUNTY**	**07 COUNTY CODE**	**08 CONG DIST**
Lackawanna	NY	14218	Erie	029	

09 COORDINATES LATITUDE 42 48 10.7 | LONGITUDE 078 48 15.5

10 TYPE OF OWNERSHIP (Check one)
■ A. PRIVATE ☐ B. FEDERAL _____ ☐ C. STATE ☐ D. COUNTY ☐ E. MUNICIPAL
☐ F. OTHER _____ ☐ G. UNKNOWN

III. INSPECTION INFORMATION

01 DATE OF INSPECTION	02 SITE STATUS	03 YEARS OF OPERATION
8 / 8 / 88 (MONTH DAY YEAR)	■ ACTIVE ☐ INACTIVE	1919 (BEGINNING YEAR) present (ENDING YEAR) ___ UNKNOWN

04 AGENCY PERFORMING INSPECTION (Check all that apply)
☐ A. EPA ☐ B. EPA CONTRACTOR _____ (Name of firm) ☐ C. MUNICIPAL ☐ D. MUNICIPAL CONTRACTOR _____ (Name of firm)
☐ E. STATE ■ F. STATE CONTRACTOR LMS Engineers (Name of firm) ☐ G. OTHER _____ (Specify)

05 CHIEF INSPECTOR	06 TITLE	07 ORGANIZATION	08 TELEPHONE NO
Edward A. Maikish	Environmental Engineer	LMS Engineers	(914 735-8300
09 OTHER INSPECTORS	**10 TITLE**	**11 ORGANIZATION**	**12 TELEPHONE NO**
Kevin McGuinness	Geologist	LMS Engineers	(914 735-8300
Anthony Magliocchino	Geologist	LMS Engineers	(914 735-8300
Ralph Costa	Geologist	LMS Engineers	(914 735-8300
John Guzewich	Supervisor: Field Operations	LMS Engineers	(914 735-8300
Edward Hastings	Coordinator: Hazwaste/ Groundwater Programs	LMS Engineers	(914 735-8300

13 SITE REPRESENTATIVES INTERVIEWED	14 TITLE	15 ADDRESS	16 TELEPHONE NO
N/A			( )
			( )
			( )
			( )
			( )
			( )

17 ACCESS GAINED BY (Check one)	18 TIME OF INSPECTION	19 WEATHER CONDITIONS
■ PERMISSION ☐ WARRANT	0930	85-90° F, 45-50% humidity; NW wind

IV. INFORMATION AVAILABLE FROM

01 CONTACT	02 OF (Agency/Organization)	03 TELEPHONE NO
Michael Komoroske	NYSDEC/DHWR/BHSC	(518)457-0639

04 PERSON RESPONSIBLE FOR SITE INSPECTION FORM	05 AGENCY	06 ORGANIZATION	07 TELEPHONE NO.	08 DATE
Edward A. Maikish		LMS Engineers	914/ 735-8300	4 / 26 / 89 (MONTH DAY YEAR)

EPA FORM 2070-13 (7-81)

EPA

POTENTIAL HAZARDOUS WASTE SITE
SITE INSPECTION REPORT
PART 2 - WASTE INFORMATION

I. IDENTIFICATION

01 STATE	02 SITE NUMBER
NY	D043814003

II. WASTE STATES, QUANTITIES, AND CHARACTERISTICS

01 PHYSICAL STATES (Check all that apply)

- ■ A SOLID
- ■ B POWDER, FINES
- ☐ C SLUDGE
- ☐ D OTHER — Tars (Specify)
- ☐ E SLURRY
- ■ F LIQUID
- ☐ G GAS

02 WASTE QUANTITY AT SITE (Measures of waste quantities must be independent)

- TONS:
- CUBIC YARDS:
- NO OF DRUMS: 179

03 WASTE CHARACTERISTICS (Check all that apply)

- ■ A TOXIC
- ☐ B CORROSIVE
- ☐ C RADIOACTIVE
- ■ D PERSISTENT
- ■ E SOLUBLE
- ☐ F INFECTIOUS
- ☐ G FLAMMABLE
- ☐ H IGNITABLE
- ☐ I HIGHLY VOLATILE
- ☐ J EXPLOSIVE
- ☐ K REACTIVE
- ☐ L INCOMPATIBLE
- ☐ M NOT APPLICABLE

III. WASTE TYPE

CATEGORY	SUBSTANCE NAME	01 GROSS AMOUNT	02 UNIT OF MEASURE	03 COMMENTS
SLU	SLUDGE			
OLW	OILY WASTE			
SOL	SOLVENTS			
PSD	PESTICIDES			
OCC	OTHER ORGANIC CHEMICALS			
IOC	INORGANIC CHEMICALS			
ACU	ACIDS			
BAS	BASES			Heavy metals are constituents of
MES	HEAVY METALS	177	yd^3	fill.

IV. HAZARDOUS SUBSTANCES (See Appendix for most frequently cited CAS Numbers)

01 CATEGORY	02 SUBSTANCE NAME	03 CAS NUMBER	04 STORAGE/DISPOSAL METHOD	05 CONCENTRATION	06 MEASURE OF CONCENTRATION
MES	Arsenic	7440-38-2	Constituents of floor	198-30,195	ppb
"	Cadmium	7440-43-9	scraps & off-spec	ND-7,700	"
"	Chromium	7440-47-3	product used as fill	55000/348000	"
"	Copper	7440-50-2		39700/180000	"
"	Lead	7439-92-1		ND-781000	"
"	Mercury	7439-97-6		ND-483	"
"	Nickel	7440-02-0		60400/129900	"
"	Silver	7440-22-4		ND-64	"
"	Zinc	7440-66-6		107000/930000	"
OCC	Fluoranthene	356-12-7		4400-79000	"
"	Pyrene	129-00-0		3700/72000	"
"	PCB (aroclor 1260)	11096-82-5		ND-790	"

V. FEEDSTOCKS (See Appendix for CAS Numbers)

CATEGORY	01 FEEDSTOCK NAME	02 CAS NUMBER	CATEGORY	01 FEEDSTOCK NAME	02 CAS NUMBER
FDS			FDS		
FDS			FDS		
FDS			FDS		
FDS			FDS		

VI. SOURCES OF INFORMATION (Cite specific references, e.g. state files, sample analysis, reports)

RECRA Research, Inc. Phase I Report
LMS Phase II report
NYSDEC Region 9 Files

EPA

POTENTIAL HAZARDOUS WASTE SITE
SITE INSPECTION REPORT
PART 3 - DESCRIPTION OF HAZARDOUS CONDITIONS AND INCIDENTS

I. IDENTIFICATION

01 STATE	02 SITE NUMBER
NY	D043814003

II. HAZARDOUS CONDITIONS AND INCIDENTS

01 ■ A GROUNDWATER CONTAMINATION — 02 ☐ OBSERVED (DATE _____) ■ POTENTIAL ☐ ALLEGED
03 POPULATION POTENTIALLY AFFECTED: 0
04 NARRATIVE DESCRIPTION
No known groundwater wells within 3 mi of the site. Bedrock aquifer may be confined or semi-confined in the vicinity of the site, however, the potential for the groundwater to become contaminated may exist.

01 ■ B SURFACE WATER CONTAMINATION — 02 ■ OBSERVED (DATE 11/88) ☐ POTENTIAL ☐ ALLEGED
03 POPULATION POTENTIALLY AFFECTED: 0
04 NARRATIVE DESCRIPTION
Contamination detected in seepage faces on fill adjacent to South Branch; contaminants detected in samples of water & sediment collected from drainage ditches on-site & in South Branch, downgradient of site. South Branch is a class C waterbody.

01 ■ C CONTAMINATION OF AIR — 02 ☐ OBSERVED (DATE _____) ■ POTENTIAL ☐ ALLEGED
03 POPULATION POTENTIALLY AFFECTED: _____
04 NARRATIVE DESCRIPTION
No volatile contaminants detected in air. Wind-blown dirt & dust contaminated with metals & semi-volatiles represent a potential for air contamination.

01 ☐ D FIRE EXPLOSIVE CONDITIONS — 02 ☐ OBSERVED (DATE _____) ☐ POTENTIAL ☐ ALLEGED
03 POPULATION POTENTIALLY AFFECTED: _____
04 NARRATIVE DESCRIPTION
There is no information available that indicates a potential fire or explosive condition exists at the site.

01 ■ E DIRECT CONTACT — 02 ☐ OBSERVED (DATE _____) ■ POTENTIAL ☐ ALLEGED
03 POPULATION POTENTIALLY AFFECTED: _____
04 NARRATIVE DESCRIPTION
There is open access to portions of the site known to contain hazardous substances in uncovered sediments, fill material, drainage ditches and adjacent creek. Estimated population within 1 mile of site = 3,520.

01 ■ F. CONTAMINATION OF SOIL — 02 ■ OBSERVED (DATE 11/88) ☐ POTENTIAL ☐ ALLEGED
03 AREA POTENTIALLY AFFECTED: 5.5 (Acres)
04 NARRATIVE DESCRIPTION
Approximately 5.5 acres located on the southeast & southwest of the site were landfilled with waste materials. Geophysical survey indicated other landfill areas exist on-site, however, no samples were collected to confirm or discount this possibility.

01 ■ G DRINKING WATER CONTAMINATION — 02 ☐ OBSERVED (DATE _____) ☐ POTENTIAL ☐ ALLEGED
03 POPULATION POTENTIALLY AFFECTED: 0
04 NARRATIVE DESCRIPTION
No water intake points have been identified within 3 mi downstream of site. South Branch discharges to Smoke Creek which flows into Lake Erie. City of Lackawanna & many surrounding municipalities obtain potable water from Lake Erie.

01 ☐ H WORKER EXPOSURE/INJURY — 02 ☐ OBSERVED (DATE _____) ☐ POTENTIAL ☐ ALLEGED
03 WORKERS POTENTIALLY AFFECTED: _____
04 NARRATIVE DESCRIPTION
Unknown. The potential exists if metal & semi-volatiles are present in airborne soil and waste material.

01 ☐ I. POPULATION EXPOSURE/INJURY — 02 ☐ OBSERVED (DATE _____) ☐ POTENTIAL ☐ ALLEGED
03 POPULATION POTENTIALLY AFFECTED: _____
04 NARRATIVE DESCRIPTION
Unknown.

EPA

POTENTIAL HAZARDOUS WASTE SITE
SITE INSPECTION REPORT
PART 3 - DESCRIPTION OF HAZARDOUS CONDITIONS AND INCIDENTS

I. IDENTIFICATION

01 STATE	02 SITE NUMBER
NY	D043814003

II. HAZARDOUS CONDITIONS AND INCIDENTS (Continued)

01 ☐ J DAMAGE TO FLORA — 02 ☐ OBSERVED (DATE _____) ☐ POTENTIAL ☐ ALLEGED
04 NARRATIVE DESCRIPTION

No damage was observed.

01 ☐ K DAMAGE TO FAUNA — 02 ☐ OBSERVED (DATE _____) ☐ POTENTIAL ☐ ALLEGED
04 NARRATIVE DESCRIPTION (Include name(s) of species)

No damage was observed.

01 ■ L CONTAMINATION OF FOOD CHAIN — 02 ☐ OBSERVED (DATE _____) ■ POTENTIAL ☐ ALLEGED
04 NARRATIVE DESCRIPTION

Potential exists due to metals & semi-volatiles detected in surface water and sediment samples collected in South Branch.

01 ■ M UNSTABLE CONTAINMENT OF WASTES (Spills Runoff Standing liquids Leaking drums) — 02 ☐ OBSERVED (DATE _____) ☐ POTENTIAL ☐ ALLEGED
03 POPULATION POTENTIALLY AFFECTED _____ 04 NARRATIVE DESCRIPTION

Landfill has no liner. Leachate seeps have been observed on slopes of fill adjacent to South Branch.

01 ☐ N DAMAGE TO OFFSITE PROPERTY — 02 ☐ OBSERVED (DATE _____) ☐ POTENTIAL ☐ ALLEGED
04 NARRATIVE DESCRIPTION

No damage has been documented.

01 ☐ O CONTAMINATION OF SEWERS, STORM DRAINS, WWTPs — 02 ☐ OBSERVED (DATE _____) ☐ POTENTIAL ☐ ALLEGED
04 NARRATIVE DESCRIPTION

No data available.

01 ☐ P ILLEGAL/UNAUTHORIZED DUMPING — 02 ☐ OBSERVED (DATE _____) ☐ POTENTIAL ☐ ALLEGED
04 NARRATIVE DESCRIPTION

All the landfilling activities associated with the site have been conducted without a permit. Discharges to drainage ditches are subject to monitoring under SPDES Permit Number 003081.

05 DESCRIPTION OF ANY OTHER KNOWN, POTENTIAL, OR ALLEGED HAZARDS

None.

III. TOTAL POPULATION POTENTIALLY AFFECTED: unknown

IV. COMMENTS

None.

V. SOURCES OF INFORMATION (Cite specific references, e.g., state files, sample analysis, reports)

RECRA Research, Inc. Phase I Report
LMS Phase II Report
NYSDEC Region 9 Files

FORM 2070-13 (7-81)

EPA

POTENTIAL HAZARDOUS WASTE SITE
SITE INSPECTION
PART 4 - PERMIT AND DESCRIPTIVE INFORMATION

I. IDENTIFICATION

01 STATE	02 SITE NUMBER
NY	D 043814003

II. PERMIT INFORMATION

01 TYPE OF PERMIT ISSUED (Check all that apply)	02 PERMIT NUMBER	03 DATE ISSUED	04 EXPIRATION DATE	05 COMMENTS
☐ A. NPDES				
☐ B. UIC				
☐ C. AIR				
■ D. RCRA	SWPI0199842	unknown	unknown	
☐ E. RCRA INTERIM STATUS				
☐ F. SPCC PLAN				
☐ G. STATE (Specify)				
☐ H. LOCAL (Specify)				
■ I. OTHER (Specify) SPDES	003081	2/1/87	2/1/92	permit is for discharges to
☐ J. NONE				drainage ditches

III. SITE DESCRIPTION

01 STORAGE/DISPOSAL (Check all that apply)	02 AMOUNT	03 UNIT OF MEASURE
☐ A. SURFACE IMPOUNDMENT		
☐ B. PILES		
☐ C. DRUMS, ABOVE GROUND		
☐ D. TANK, ABOVE GROUND		
☐ E. TANK, BELOW GROUND		
■ F. LANDFILL	26,500	yd^3
☐ G. LANDFARM		
☐ H. OPEN DUMP		
☐ I. OTHER (Specify)		

04 TREATMENT (Check all that apply)

- ☐ A. INCINERATION
- ☐ B. UNDERGROUND INJECTION
- ☐ C. CHEMICAL/PHYSICAL
- ☐ D. BIOLOGICAL
- ☐ E. WASTE OIL PROCESSING
- ☐ F. SOLVENT RECOVERY
- ☐ G. OTHER RECYCLING/RECOVERY
- ☐ H. OTHER (Specify)

05 OTHER

- ■ A. BUILDINGS ON SITE

06 AREA OF SITE

45 (Acres)

07 COMMENTS

Portions of the site were landfilled with off-spec product and waste material. Metals, semi-volatiles and PCBs have been detected in samples collected from fill areas, drainage ditches and South Branch.

IV. CONTAINMENT

01 CONTAINMENT OF WASTES (Check one)

☐ A. ADEQUATE, SECURE ☐ B. MODERATE ■ C. INADEQUATE, POOR ☐ D. INSECURE, UNSOUND, DANGEROUS

02 DESCRIPTION OF DRUMS, DIKING, LINERS, BARRIERS, ETC.

Landfilled areas have no liners. Groundwater seeps have been observed on the slopes of fill material located adjacent to South Branch. Analysis of seepage samples indicated the presence of metals & semi-volatiles.

V. ACCESSIBILITY

01 WASTE EASILY ACCESSIBLE ■ YES ☐ NO

02 COMMENTS

Fence only partially encloses the site. Some wastes are uncovered. Surface water and sediments in drainage ditches and South Branch are directly accessible.

VI. SOURCES OF INFORMATION (Cite specific references, e.g. state files, sample analysis reports)

RECRA Research, Inc. Phase I Report.
LMS Phase II Report

EPA

POTENTIAL HAZARDOUS WASTE SITE
SITE INSPECTION REPORT
PART 5 - WATER, DEMOGRAPHIC, AND ENVIRONMENTAL DATA

I. IDENTIFICATION
01 STATE: NY | 02 S.I.E NUMBER: D043814003

II. DRINKING WATER SUPPLY

01 TYPE OF DRINKING SUPPLY (Check as appropriate)	SURFACE	WELL	02 STATUS ENDANGERED	AFFECTED	MONITORED	03 DISTANCE TO SITE
COMMUNITY	A ■	B ☐	A. ☐	B ☐	C ☐	A. > 3 (mi)
NON-COMMUNITY	C ☐	D. ☐	D ☐	E. ☐	F. ☐	B. _____ (mi)

III. GROUNDWATER

01 GROUNDWATER USE IN VICINITY (Check one)

☐ A. ONLY SOURCE FOR DRINKING ☐ B. DRINKING (Other sources available) COMMERCIAL, INDUSTRIAL, IRRIGATION (No other water sources available) ☐ C. COMMERCIAL, INDUSTRIAL, IRRIGATION (Limited other sources available) ■ D. NOT USED, UNUSEABLE

02 POPULATION SERVED BY GROUND WATER: 0

03 DISTANCE TO NEAREST DRINKING WATER WELL: > 3 (mi)

04 DEPTH TO GROUNDWATER	05 DIRECTION OF GROUNDWATER FLOW	06 DEPTH TO AQUIFER OF CONCERN	07 POTENTIAL YIELD OF AQUIFER	08 SOLE SOURCE AQUIFER
11 (ft)	unknown; assumed to be towards southwest	11 (ft)	unknown (gpd)	☐ YES ☐ NO

09 DESCRIPTION OF WELLS (including useage, depth, and location relative to population and buildings)

No monitoring wells have been installed on-site. No groundwater wells have been identified within 3 mi of the site.

10 RECHARGE AREA		11 DISCHARGE AREA	
☐ YES ☐ NO	COMMENTS	■ YES ☐ NO	COMMENTS: A soil boring conducted on-site indicated bedrock aquifer may be confiend. However, marsh areas exist on-site.

IV. SURFACE WATER

01 SURFACE WATER USE (Check one)

■ A. RESERVOIR, RECREATION, DRINKING WATER SOURCE ☐ B. IRRIGATION, ECONOMICALLY IMPORTANT RESOURCES ☐ C. COMMERCIAL, INDUSTRIAL ☐ D. NOT CURRENTLY USED

02 AFFECTED/POTENTIALLY AFFECTED BODIES OF WATER

NAME	AFFECTED	DISTANCE TO SITE
South Branch	■	adjacent (mi)
Smoke Creek	☐	1.5 (mi)
Lake Erie	☐	> 3 (mi)

V. DEMOGRAPHIC AND PROPERTY INFORMATION

01 TOTAL POPULATION WITHIN

ONE (1) MILE OF SITE	TWO (2) MILES OF SITE	THREE (3) MILES OF SITE
A. 3520 NO OF PERSONS	B. 11,807 NO OF PERSONS	C. 20000 NO OF PERSONS

02 DISTANCE TO NEAREST POPULATION: 0.03 (mi)

03 NUMBER OF BUILDINGS WITHIN TWO (2) MILES OF SITE: 2399

04 DISTANCE TO NEAREST OFF-SITE BUILDING: 0.03 (mi)

05 POPULATION WITHIN VICINITY OF SITE (Provide narrative description of nature of population within vicinity of site, e.g., rural, village, densely populated urban area)

The area surrounding the Ferro plant is primarily residential. The site is located on the southeast side of Lackawanna. The City of Buffalo is located north of Lackawanna; Woodlawn and Blasdell are located west of the site. Rural and suburban areas exist east, southeast and south of the site.

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POTENTIAL HAZARDOUS WASTE SITE
SITE INSPECTION REPORT
PART 5 - WATER, DEMOGRAPHIC, AND ENVIRONMENTAL DATA

I. IDENTIFICATION

01 STATE	02 SITE NUMBER
NY	D043814003

VI. ENVIRONMENTAL INFORMATION

01 PERMEABILITY OF UNSATURATED ZONE (Check one)

☐ A 10^{-6} – 10^{-8} cm/sec ■ B 10^{-4} – 10^{-6} cm/sec ☐ C 10^{-4} – 10^{-3} cm/sec ☐ D. GREATER THAN 10^{-3} cm/sec

02 PERMEABILITY OF BEDROCK (Check one)

☐ A IMPERMEABLE (Less than 10^{-6} cm sec) ☐ B RELATIVELY IMPERMEABLE (10^{-4} – 10^{-6} cm sec) ■ C RELATIVELY PERMEABLE (10^{-2} – 10^{-4} cm sec) ☐ D VERY PERMEABLE (Greater than 10^{-2} cm sec)

03 DEPTH TO BEDROCK	04 DEPTH OF CONTAMINATED SOIL ZONE	05 SOIL pH	
11 (ft)	0-6 (ft)		

06 NET PRECIPITATION	07 ONE YEAR 24 HOUR RAINFALL	08 SLOPE		
		SITE SLOPE	DIRECTION OF SITE SLOPE	TERRAIN AVERAGE SLOPE
8 (in)	2.25 (in)	1 %	southwest	10 %

09 FLOOD POTENTIAL

SITE IS IN _____ YEAR FLOODPLAIN

10 ☐ SITE IS ON BARRIER ISLAND, COASTAL HIGH HAZARD AREA, RIVERINE FLOODWAY

11 DISTANCE TO WETLANDS (5 acre minimum)

ESTUARINE: A. _____ (mi)

OTHER: B. 3 (mi)

12 DISTANCE TO CRITICAL HABITAT (of endangered species)

>1 (mi)

ENDANGERED SPECIES: at present

13 LAND USE IN VICINITY

DISTANCE TO

COMMERCIAL/INDUSTRIAL	RESIDENTIAL AREAS; NATIONAL/STATE PARKS, FORESTS, OR WILDLIFE RESERVES	AGRICULTURAL LANDS: PRIME AG LAND	AGRICULTURAL LANDS: AG LAND
A. 0.45 (mi)	B. 0.076 (mi)	C. >3 (mi)	D. 1 (mi)

14 DESCRIPTION OF SITE IN RELATION TO SURROUNDING TOPOGRAPHY

Site occupies a flat, low-lying area adjacent to South Branch which flows northwest until it converges with Smoke Creek; Smoke Creek flows west to Lake Erie. Portions of the south-southwest areas of the site are occuppied by marshes. Areas north and west of the site occur at elevations approximately the same or slightly less than the site. Ground surface elevations increase gradually to the south and east.

VII. SOURCES OF INFORMATION (Cite specific references, e.g., state files, sample analysis reports)

RECRA Research, Inc. Phase I Report
LMS Phase II Report
Buffalo SE Quadrangle, 7.5 minute topo

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POTENTIAL HAZARDOUS WASTE SITE
SITE INSPECTION REPORT
PART 6 - SAMPLE AND FIELD INFORMATION

I. IDENTIFICATION

01 STATE	02 SITE NUMBER
NY	D043814003

II. SAMPLES TAKEN

SAMPLE TYPE	01 NUMBER OF SAMPLES TAKEN	02 SAMPLES SENT TO	03 ESTIMATED DATE RESULTS AVAILABLE
GROUNDWATER	-	no monitoring wells on-site	
SURFACE WATER	17	RECRA Research, Inc./NYSDEC	available
WASTE	-		
AIR	-		
RUNOFF	-		
SPILL	1	RECRA Research, Inc./NYSDEC	available
SOIL /sediment	22	RECRA Research, Inc./NYSDEC	available
VEGETATION	-		
OTHER Groundwater seeps	2	RECRA Research, Inc./NYSDEC	available

III. FIELD MEASUREMENTS TAKEN

01 TYPE	02 COMMENTS
Air	Air monitoring with HNU photoionization detector during the site reconnaissance and field sampling conducted by LMS in August and November of 1988 did not detect air contaminants above background levels.

IV. PHOTOGRAPHS AND MAPS

01 TYPE ■ GROUND ■ AERIAL

02 IN CUSTODY OF LMS Engineers
(Name of organization or individual)

03 MAPS ■ YES ☐ NO

04 LOCATION OF MAPS: LMS Engineers; RECRA Research, Inc.

V. OTHER FIELD DATA COLLECTED (Provide narrative description)

VI. SOURCES OF INFORMATION (Cite specific references, e.g. state files, sample analysis, reports)

RECRA Research, Inc. Files & Phase I Report
LMS Phase II Report
NYSDEC Region 9 Files
NYSDEC/DHWR/BHSC Files

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POTENTIAL HAZARDOUS WASTE SITE
SITE INSPECTION REPORT
PART 7 - OWNER INFORMATION

I. IDENTIFICATION

01 STATE	02 SITE NUMBER
NY	D043814003

II. CURRENT OWNER(S) | **PARENT COMPANY** (If applicable)

01 NAME	02 D+B NUMBER	08 NAME	09 D+B NUMBER
Ferro Corp-Spec Ceramic Div.		Ferro Corp.	

03 STREET ADDRESS (P.O. Box, RFD #, etc.)	04 SIC CODE	10 STREET ADDRESS (P.O. Box, RFD #, etc.)	11 SIC CODE
661 Willet Road		One Erieview Plaza	

05 CITY	06 STATE	07 ZIP CODE	12 CITY	13 STATE	14 ZIP CODE
Lackawanna	NY	14218	Cleveland	OH	44114

01 NAME	02 D+B NUMBER	08 NAME	09 D+B NUMBER

03 STREET ADDRESS (P.O. Box, RFD #, etc.)	04 SIC CODE	10 STREET ADDRESS (P.O. Box, RFD #, etc.)	11 SIC CODE

05 CITY	06 STATE	07 ZIP CODE	12 CITY	13 STATE	14 ZIP CODE

01 NAME	02 D+B NUMBER	08 NAME	09 D+B NUMBER

03 STREET ADDRESS (P.O. Box, RFD #, etc.)	04 SIC CODE	10 STREET ADDRESS (P.O. Box, RFD #, etc.)	11 SIC CODE

05 CITY	06 STATE	07 ZIP CODE	12 CITY	13 STATE	14 ZIP CODE

01 NAME	02 D+B NUMBER	08 NAME	09 D+B NUMBER

03 STREET ADDRESS (P.O. Box, RFD #, etc.)	04 SIC CODE	10 STREET ADDRESS (P.O. Box, RFD #, etc.)	11 SIC CODE

05 CITY	06 STATE	07 ZIP CODE	12 CITY	13 STATE	14 ZIP CODE

III. PREVIOUS OWNER(S) (List most recent first) | **IV. REALTY OWNER(S)** (If applicable; list most recent first)

01 NAME	02 D+B NUMBER	01 NAME	02 D+B NUMBER

03 STREET ADDRESS (P.O. Box, RFD #, etc.)	04 SIC CODE	03 STREET ADDRESS (P.O. Box, RFD #, etc.)	04 SIC CODE

05 CITY	06 STATE	07 ZIP CODE	05 CITY	06 STATE	07 ZIP CODE

01 NAME	02 D+B NUMBER	01 NAME	02 D+B NUMBER

03 STREET ADDRESS (P.O. Box, RFD #, etc.)	04 SIC CODE	03 STREET ADDRESS (P.O. Box, RFD #, etc.)	04 SIC CODE

05 CITY	06 STATE	07 ZIP CODE	05 CITY	06 STATE	07 ZIP CODE

01 NAME	02 D+B NUMBER	01 NAME	02 D+B NUMBER

03 STREET ADDRESS (P.O. Box, RFD #, etc.)	04 SIC CODE	03 STREET ADDRESS (P.O. Box, RFD #, etc.)	04 SIC CODE

05 CITY	06 STATE	07 ZIP CODE	05 CITY	06 STATE	07 ZIP CODE

V. SOURCES OF INFORMATION (Cite specific references, e.g., state files, sample analysis, reports)

LMS Phase II Report

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POTENTIAL HAZARDOUS WASTE SITE
SITE INSPECTION REPORT
PART 8 - OPERATOR INFORMATION

I. IDENTIFICATION

01 STATE	02 SITE NUMBER
NY	D043814003

II. CURRENT OPERATOR (Provide if different from owner)

01 NAME	02 D+B NUMBER
Ferro Corp-Spec. Ceramic Div.	

03 STREET ADDRESS (P.O. Box, RFD #, etc.)	04 SIC CODE
661 Willet Road	

05 CITY	06 STATE	07 ZIP CODE
Lackawanna	NY	14218

08 YEARS OF OPERATION	09 NAME OF OWNER

OPERATOR'S PARENT COMPANY (If applicable)

10 NAME	11 D+B NUMBER
Ferro Corp.	

12 STREET ADDRESS (P.O. Box, RFD #, etc.)	13 SIC CODE
One Erieview Plaza	

14 CITY	15 STATE	16 ZIP CODE
Cleveland	OH	44114

III. PREVIOUS OPERATOR(S) (List most recent first, provide only if different from owner)

01 NAME	02 D+B NUMBER

03 STREET ADDRESS (P.O. Box, RFD #, etc.)	04 SIC CODE

05 CITY	06 STATE	07 ZIP CODE

08 YEARS OF OPERATION	09 NAME OF OWNER DURING THIS PERIOD

PREVIOUS OPERATORS' PARENT COMPANIES (If applicable)

10 NAME	11 D+B NUMBER

12 STREET ADDRESS (P.O. Box, RFD #, etc.)	13 SIC CODE

14 CITY	15 STATE	16 ZIP CODE

01 NAME	02 D+B NUMBER

03 STREET ADDRESS (P.O. Box, RFD #, etc.)	04 SIC CODE

05 CITY	06 STATE	07 ZIP CODE

08 YEARS OF OPERATION	09 NAME OF OWNER DURING THIS PERIOD

10 NAME	11 D+B NUMBER

12 STREET ADDRESS (P.O. Box, RFD #, etc.)	13 SIC CODE

14 CITY	15 STATE	16 ZIP CODE

01 NAME	02 D+B NUMBER

03 STREET ADDRESS (P.O. Box, RFD #, etc.)	04 SIC CODE

05 CITY	06 STATE	07 ZIP CODE

08 YEARS OF OPERATION	09 NAME OF OWNER DURING THIS PERIOD

10 NAME	11 D+B NUMBER

12 STREET ADDRESS (P.O. Box, RFD #, etc.)	13 SIC CODE

14 CITY	15 STATE	16 ZIP CODE

IV. SOURCES OF INFORMATION (Cite specific references, e.g. state files, sample analysis, reports)

LMS Phase II Report

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POTENTIAL HAZARDOUS WASTE SITE
SITE INSPECTION REPORT
PART 9 - GENERATOR/TRANSPORTER INFORMATION

I. IDENTIFICATION	
01 STATE	02 SITE NUMBER
NY	D043814003

II. ON-SITE GENERATOR

01 NAME	02 D+B NUMBER
Ferro Corporation	

03 STREET ADDRESS (P.O. Box, RFD #, etc.)	04 SIC CODE
661 Willet Road	

05 CITY	06 STATE	07 ZIP CODE
Lackawanna	NY	14218

III. OFF-SITE GENERATOR(S)

01 NAME	02 D+B NUMBER	01 NAME	02 D+B NUMBER
03 STREET ADDRESS (P.O. Box, RFD #, etc.)	04 SIC CODE	03 STREET ADDRESS (P.O. Box, RFD #, etc.)	04 SIC CODE
05 CITY	06 STATE / 07 ZIP CODE	05 CITY	06 STATE / 07 ZIP CODE
01 NAME	02 D+B NUMBER	01 NAME	02 D+B NUMBER
03 STREET ADDRESS (P.O. Box, RFD #, etc.)	04 SIC CODE	03 STREET ADDRESS (P.O. Box, RFD #, etc.)	04 SIC CODE
05 CITY	06 STATE / 07 ZIP CODE	05 CITY	06 STATE / 07 ZIP CODE

IV. TRANSPORTER(S)

01 NAME	02 D+B NUMBER	01 NAME	02 D+B NUMBER
03 STREET ADDRESS (P.O. Box, RFD #, etc.)	04 SIC CODE	03 STREET ADDRESS (P.O. Box, RFD #, etc.)	04 SIC CODE
05 CITY	06 STATE / 07 ZIP CODE	05 CITY	06 STATE / 07 ZIP CODE
01 NAME	02 D+B NUMBER	01 NAME	02 D+B NUMBER
03 STREET ADDRESS (P.O. Box, RFD #, etc.)	04 SIC CODE	03 STREET ADDRESS (P.O. Box, RFD #, etc.)	04 SIC CODE
05 CITY	06 STATE / 07 ZIP CODE	05 CITY	06 STATE / 07 ZIP CODE

V. SOURCES OF INFORMATION (Cite specific references, e.g., state files, sample analysis, reports)

RECRA Research, Inc. Phase I Report

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POTENTIAL HAZARDOUS WASTE SITE
SITE INSPECTION REPORT
PART 10 - PAST RESPONSE ACTIVITIES

I. IDENTIFICATION

01 STATE	02 SITE NUMBER
NY	D043814003

II. PAST RESPONSE ACTIVITIES

01 ☐ A. WATER SUPPLY CLOSED — 02 DATE _____ — 03 AGENCY _____
04 DESCRIPTION
No history.

01 ☐ B. TEMPORARY WATER SUPPLY PROVIDED — 02 DATE _____ — 03 AGENCY _____
04 DESCRIPTION
No history.

01 ☐ C. PERMANENT WATER SUPPLY PROVIDED — 02 DATE _____ — 03 AGENCY _____
04 DESCRIPTION
No history.

01 ■ D. SPILLED MATERIAL REMOVED — 02 DATE _____ — 03 AGENCY _____
04 DESCRIPTION
Coal tar spill cleaned up from Ferro outfall pipe; however, LMS observed lingering contamination during 11/88 field sampling.

01 ☐ E. CONTAMINATED SOIL REMOVED — 02 DATE _____ — 03 AGENCY _____
04 DESCRIPTION
N/A

01 ☐ F. WASTE REPACKAGED — 02 DATE _____ — 03 AGENCY _____
04 DESCRIPTION
N/A

01 ☐ G. WASTE DISPOSED ELSEWHERE — 02 DATE _____ — 03 AGENCY _____
04 DESCRIPTION
N/A

01 ■ H. ON SITE BURIAL — 02 DATE _____ — 03 AGENCY _____
04 DESCRIPTION
Approximately 26,500 yd^3 of wastes were landfilled on southwest & southeast areas of the site.

01 ☐ I. IN SITU CHEMICAL TREATMENT — 02 DATE _____ — 03 AGENCY _____
04 DESCRIPTION
N/A

01 ☐ J. IN SITU BIOLOGICAL TREATMENT — 02 DATE _____ — 03 AGENCY _____
04 DESCRIPTION
N/A

01 ☐ K. IN SITU PHYSICAL TREATMENT — 02 DATE _____ — 03 AGENCY _____
04 DESCRIPTION
N/A

01 ☐ L. ENCAPSULATION — 02 DATE _____ — 03 AGENCY _____
04 DESCRIPTION
N/A

01 ☐ M. EMERGENCY WASTE TREATMENT — 02 DATE _____ — 03 AGENCY _____
04 DESCRIPTION
N/A

01 ☐ N. CUTOFF WALLS — 02 DATE _____ — 03 AGENCY _____
04 DESCRIPTION
N/A

01 ☐ O. EMERGENCY DIKING/SURFACE WATER DIVERSION — 02 DATE _____ — 03 AGENCY _____
04 DESCRIPTION
N/A

01 ☐ P. CUTOFF TRENCHES/SUMP — 02 DATE _____ — 03 AGENCY _____
04 DESCRIPTION
N/A

01 ☐ Q. SUBSURFACE CUTOFF WALL — 02 DATE _____ — 03 AGENCY _____
04 DESCRIPTION
N/A

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POTENTIAL HAZARDOUS WASTE SITE
SITE INSPECTION REPORT
PART 10 - PAST RESPONSE ACTIVITIES

I. IDENTIFICATION

01 STATE	02 SITE NUMBER
NY	D043814003

II PAST RESPONSE ACTIVITIES (Continued)

01 ☐ R BARRIER WALLS CONSTRUCTED — 02 DATE _____ — 03 AGENCY _____
04 DESCRIPTION
N/A

01 ☐ S CAPPING/COVERING — 02 DATE _____ — 03 AGENCY _____
04 DESCRIPTION
N/A

01 ☐ T BULK TANKAGE REPAIRED — 02 DATE _____ — 03 AGENCY _____
04 DESCRIPTION
N/A

01 ☐ U GROUT CURTAIN CONSTRUCTED — 02 DATE _____ — 03 AGENCY _____
04 DESCRIPTION
N/A

01 ☐ V BOTTOM SEALED — 02 DATE _____ — 03 AGENCY _____
04 DESCRIPTION
N/A

01 ☐ W GAS CONTROL — D2 DATE _____ — Q3 AGENCY _____
04 DESCRIPTION
N/A

01 ☐ X FIRE CONTROL — 02 DATE _____ — 03 AGENCY _____
04 DESCRIPTION
N/A

01 ☐ Y LEACHATE TREATMENT — 02 DATE _____ — 03 AGENCY _____
04 DESCRIPTION
N/A

01 ☐ Z AREA EVACUATED — 02 DATE _____ — 03 AGENCY _____
04 DESCRIPTION
N/A

01 ☐ 1 ACCESS TO SITE RESTRICTED — 02 DATE _____ — 03 AGENCY _____
04 DESCRIPTION
N/A

01 ☐ 2 POPULATION RELOCATED — 02 DATE _____ — 03 AGENCY _____
04 DESCRIPTION
N/A

01 ☐ 3 OTHER REMEDIAL ACTIVITIES — 02 DATE _____ — 03 AGENCY _____
04 DESCRIPTION

III. SOURCES OF INFORMATION (Cite specific references e.g., state files, sample analyses, reports)

RECRA Research, Inc. Phase I Report
NYSDEC Region 9 Files
LMS Phase II Report
Erie County Dept. of Environmental & Planning Files

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POTENTIAL HAZARDOUS WASTE SITE
SITE INSPECTION REPORT
PART 11 - ENFORCEMENT INFORMATION

I. IDENTIFICATION	
01 STATE	02 SITE NUMBER
NY	D043814003

II. ENFORCEMENT INFORMATION

01 PAST REGULATORY/ENFORCEMENT ACTION ☐ YES ☒ NO

02 DESCRIPTION OF FEDERAL, STATE, LOCAL REGULATORY/ENFORCEMENT ACTION

N/A

SOURCES OF INFORMATION (Cite specific references, e.g., state files, sample analysis, reports)

NYSDEC, Albany & Region 9 Files
RECRA Research, Inc., Phase I Report