

ENGINEERING INVESTIGATIONS AT INACTIVE HAZARDOUS WASTE SITES

PHASE II INVESTIGATION

Buffalo Pumps Division-
Buffalo Forge Company

City of N. Tonawanda

Site No. 932044

Niagara County



Prepared for:
New York State
Department of
Environmental Conservation
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By:

ENGINEERING-SCIENCE

**ENGINEERING INVESTIGATIONS AT
INACTIVE HAZARDOUS WASTE SITES
IN THE STATE OF NEW YORK - PHASE II INVESTIGATIONS**

**BUFFALO PUMPS
DIVISION OF BUFFALO FORGE COMPANY SITE
NEW YORK STATE SITE NUMBER 932044
CITY OF NORTH TONAWANDA
NIAGARA COUNTY, NEW YORK STATE**

**Prepared For
DIVISION OF HAZARDOUS WASTE REMEDIATION
NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION
50 WOLF ROAD
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SECTION I

EXECUTIVE SUMMARY

SITE BACKGROUND

The Buffalo Pumps site is located approximately eight miles north of Buffalo, New York on Oliver Street in the City of North Tonawanda, Erie County, New York. Abandoned Conrail tracks pass through the property. The site is shown on the U.S.G.S. Tonawanda West, New York 7 1/2 minute quadrangle map (Figure I-1). The site is owned and operated by the Buffalo Pumps Division, Buffalo Forge Company, which manufactures centrifugal pumps. Operations at this site can be traced back to 1891.

There are two fill areas on the Buffalo Pumps property (Figure I-2). A two-acre area adjacent to and beneath the present facility received foundry sands from bronze and iron casting operations between 1900 and 1953. The second was formerly a low-lying swampy area on the west side of the railroad tracks. Both fill areas received ash from the incineration of wood, paper and paint sludge until 1971. Between 1978 and 1980, debris from the demolition of a portion of the manufacturing facility was placed in the former swampy area and was covered by debris and soil from a storm sewer excavation. The Buffalo Pumps site remains an active manufacturing facility, but the landfills have been inactive since the early 1980's. A portion of the former swampy areas has been paved over by the owner of that property. The areas recently landfilled by Buffalo Pumps are located north of that paved lot.

The USGS installed two monitoring wells in the area filled with demolition debris during 1982. No organic compounds were detected, but chromium, copper and iron were found in excess of applicable drinking water or Class GA groundwater standards. A sediment sample was also analyzed and found to contain a concentration of copper above that for undisturbed soils in the site vicinity.

PHASE II INVESTIGATION

Three groundwater monitoring wells were installed as part of this study. Three groundwater and three waste samples were collected and analyzed for Hazardous Substance List (HSL) organic compounds and metals. Air monitoring was also conducted to define the extent of hazardous substances at the Buffalo Pumps site.

The geophysical studies originally planned for this site were not performed due to delays in receiving permission to access the site by the site owners.

SITE ASSESSMENT

The geologic stratigraphy of the site can be summarized as up to 6.5 feet of fill overlying up to 5.5 feet of fine sand and silt over up to 22.3 feet of lacustrine clay over Camillus Shale bedrock. The depth to water in the monitoring wells during this Phase II investigation was less than 7 feet with local groundwater flow to the north, or northeast.

Three waste samples were collected from the fill areas with a split spoon sampler and tested for HSL organic compounds (volatiles, semivolatiles, pesticides/PCBs), metals and total organic halogens (TOX). Sixteen HSL organic compounds were detected in these samples. Most of these compounds were polynuclear aromatic hydrocarbons, and may be related to the boiler ash dumped in the fill areas. One sample contained a low concentration of Aroclor 1254, a polyvinyl chlorinated biphenyl (PCB) compound.

Nineteen HSL metals were detected in the waste samples. In sample B-1, cadmium and zinc were present at levels in excess of published, naturally-occurring ranges for New York State and conterminous United States soils. In samples B-2 and B-3, the concentration of manganese was above the published, naturally-occurring ranges.

Three groundwater samples were collected at the Buffalo Pumps site and analyzed for (HSL) organic compounds, metals and TOX. Seven HSL organic compounds were detected in these samples. The results for five of these compounds were rejected, since these compounds were also detected in laboratory or field blanks, and their presence was attributed to laboratory contamination. Of the remaining compounds, none were present in downgradient wells in excess of three times the concentration found in the most upgradient well. Seventeen HSL metals were detected in the groundwater samples. Eight metals were detected in downgradient samples at concentrations which exceeded that found in the most upgradient well concentration by at least three times. Of these eight metals, The Class GA groundwater standards or guidance values for barium, beryllium and zinc were exceeded in GW-3, a downgradient well. These data indicate that releases of metals to groundwater are occurring from the Buffalo Pumps site. These groundwaters are not known to be a drinking water supply source within three miles of the site.

The type and concentrations of organic compounds and metals present in the waste and groundwater are consistent with the former use of the site. Those compounds are likely to be present in an environment when incinerator debris, ash and foundry sand have been disposed in an unlined landfill.

The impact of these contaminants is not expected to be significant due to the small size of disposal areas, the relatively small quantities of waste reportedly disposed, and the lack of groundwater use for the aquifer monitored on-site. Since most of the region is served by municipal water with its sources of Lake Erie and the Niagara River, the impact of this groundwater contamination is likely to be minimal.

HAZARD RANKING SYSTEM SCORE

In an attempt to quantify the risk associated with this site, the Hazard Ranking System (HRS) was applied. As currently used by the NYSDEC, the HRS is employed to aid the evaluation of inactive hazardous waste sites in New York State. This system takes into account the types of wastes at the site, receptors, and transport routes to calculate a numerical score for the site. As stated in 40 CFR Subpart H Section 300.81, the HRS was developed to be used in evaluating the relative potential of uncontrolled hazardous waste disposal facilities to cause health or safety problems or ecological or environmental damage. It is assumed by the EPA that a uniform application of the ranking system in each state will permit EPA to identify those releases of hazardous substances that pose the greatest hazard to humans or the environment.

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

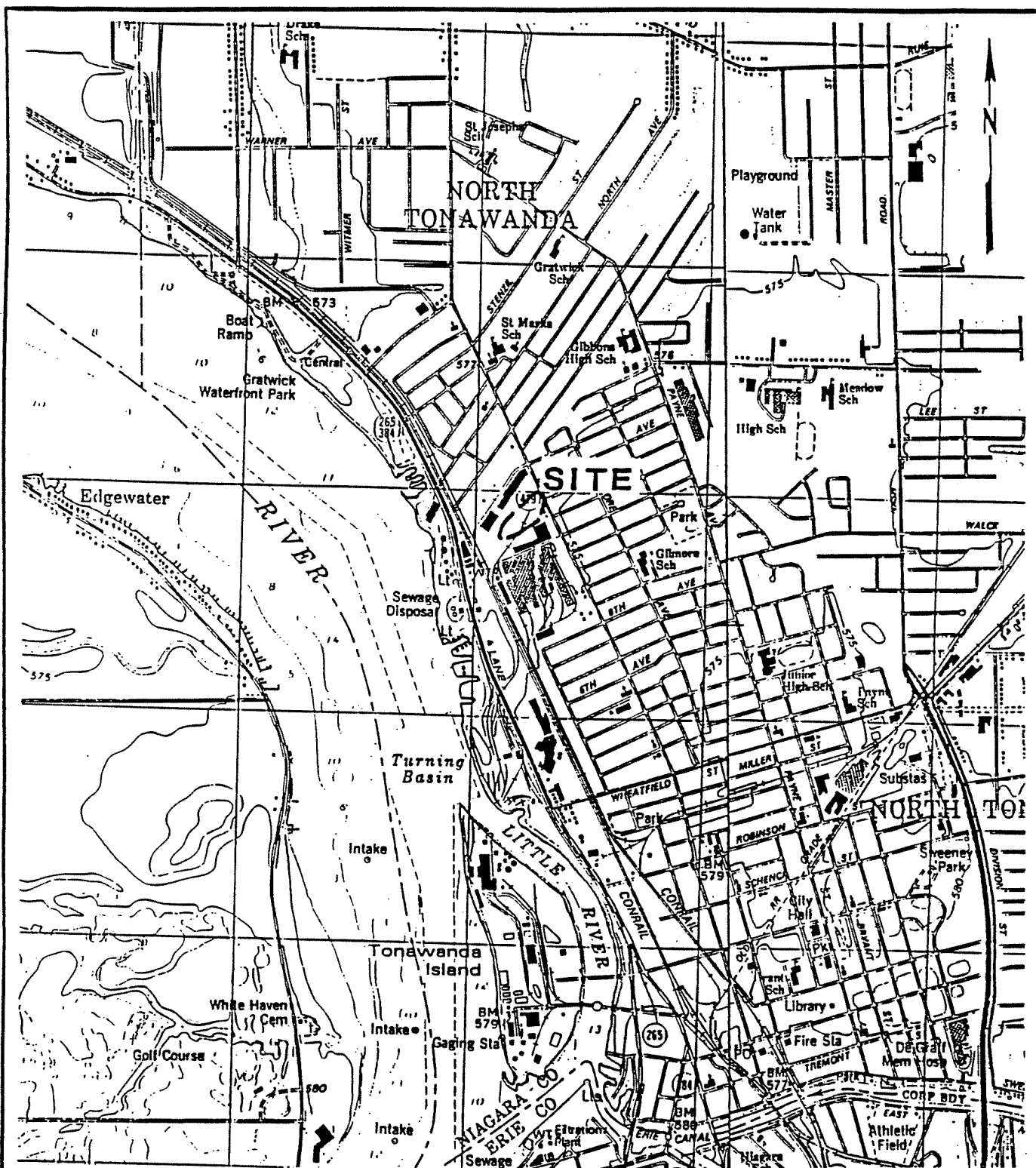
- S_M - reflects the potential for harm to humans or the environment by migration of a hazardous substance away from the facility by routes involving groundwater, surface water and air. It is a composite of separate scores for each of the three routes (S_{GW} = groundwater route score, S_{SW} = surface water route score, and S_A = air route score).
- S_{FE} - reflects the potential for harm from substances that can explode or cause fires.
- S_{DC} - reflects the potential for harm from direct contact with hazardous substances at the facility (i.e., no migration need be involved).

Based on the results of this and previous studies, the HRS scores for the Buffalo Pumps site have been calculated as follows:

S_M	=	3.86	S_{GW}	=	4.47
S_{FE}	=	0.00	S_{SW}	=	4.96
S_{DC}	=	0.00	S_A	=	0.00

RECOMMENDATIONS

Based on the site contamination assessment data, and the low HRS scores, this site does not appear to pose a significant threat to human health, and remediation of the site does not appear necessary for the protection of human health. However, the site has adversely impacted the shallow groundwater, based on data collected during the Phase II investigation. Resampling of the wells for volatiles may definitively determine whether benzene or other VOCs are present in the groundwater. Since the affected aquifer is not a principal regional aquifer, a corrective measure which warrants consideration at the Buffalo Pumps site would be to add clean, low permeability cover material to the fill areas to limit water infiltration and reduce direct contact with wastes exposed in those areas.



LATITUDE: 43°02'47"
LONGITUDE: 78°53'09"

SCALE

0 1000 2000 3000 4000 FEET

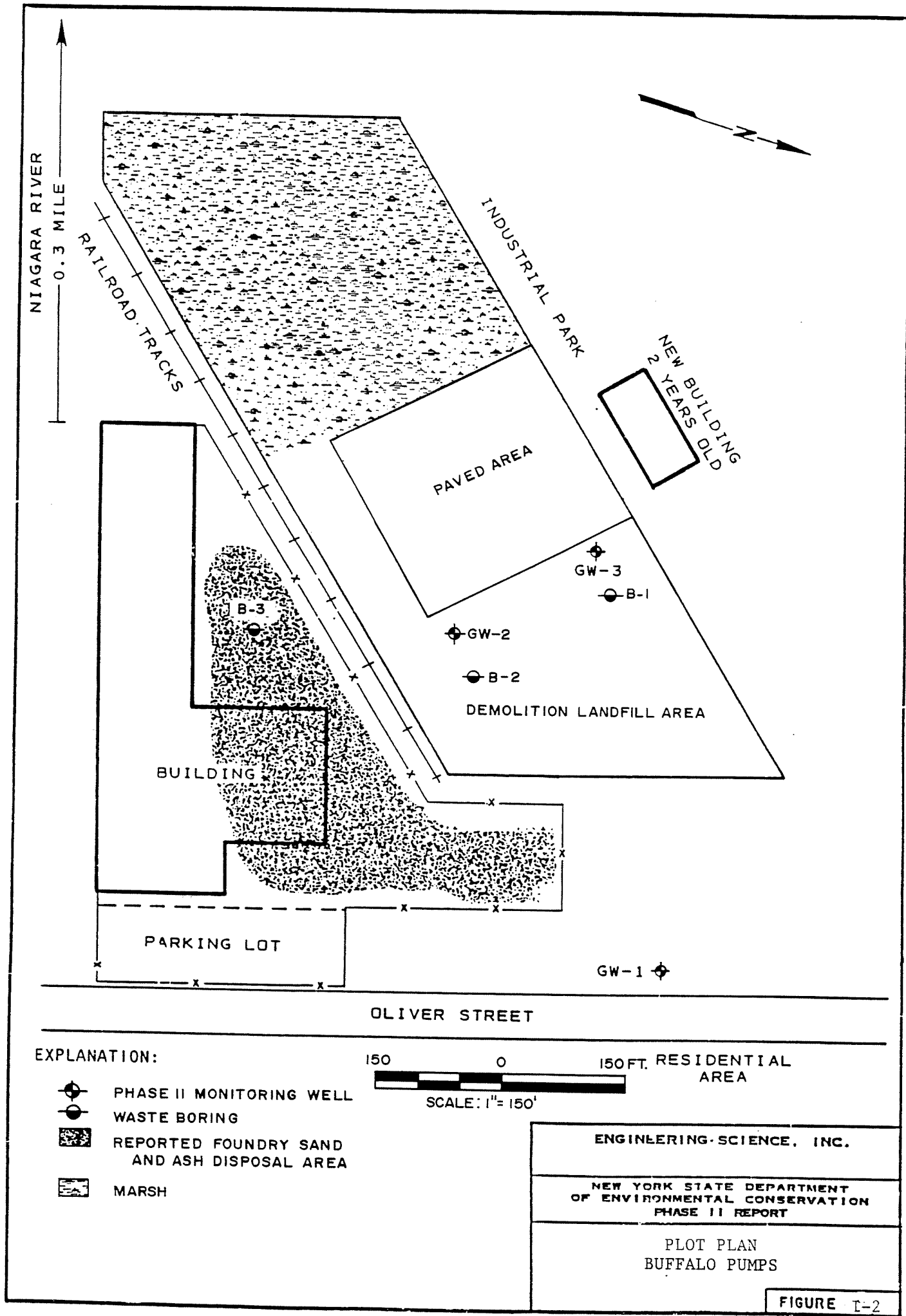
ENGINEERING-SCIENCE, INC.

NEW YORK STATE DEPARTMENT
OF ENVIRONMENTAL CONSERVATION
PHASE II REPORT

**SITE LOCATION MAP
BUFFALO PUMPS.**

REFERENCE: U.S.G.S. 7.5' Topographic Map
Tonawanda West, NY (1980) and Tonawanda
East, NY (1980) Quadrangles

FIGURE I-1



SECTION II

PURPOSE

The objective of a Phase II investigation is to determine if hazardous wastes have been disposed of in the site, if contaminants exist in the various mediums (air, groundwater, surface water or soils) and whether or not threats to human health or the environment exist. Information gathered relative to the above will allow the Department to reclassify the site or if warranted delist it.

The Buffalo pumps disposal areas, approximately 2-acres each, are adjacent to the Buffalo Pumps manufacturing facility at the intersection of East Avenue and Oliver Street in the City of North Tonawanda, Niagara County, New York. The Buffalo Pumps Division of Buffalo Forge Company has owned and operated the plant and the disposal areas from 1931 to present.

From 1900 to 1953, foundry sands were landfilled in the disposal site located adjacent to and beneath the plant building (Muench, 1985). From 1900 to 1971, boiler ash from the incineration of wood, paper, and paint wastes was also disposed in this area (NCHD, 1981). Soil cover was not placed over the fill area (Muench, 1985).

In 1978-79, debris from the demolition of a portion of the Buffalo Pumps manufacturing facility was disposed in the low-lying fill area north of the foundry sand disposal site. In approximately 1980, construction debris and earth fill from a sewer excavation on Oliver Street in North Tonawanda were disposed on top of the demolition debris. Presently, both disposal sites are inactive.

Groundwater samples collected from two monitoring wells located within the demolition landfill were found to have 0.04 and 0.15 mg/liter chromium, 0.3 and 3.4 mg/liter copper and 51 and 260 mg/liter iron respectively (USGS, 1985).

This Phase II investigation was designed to supplement information previously compiled for the site, assess the presence of hazardous substances, and assess the potential for off-site migration.

SECTION III

SCOPE OF WORK

INTRODUCTION

Field work for the Phase II investigation at the Buffalo Pumps site began and was completed in January, 1988. The Phase II Work Plan dated April 28, 1986 was approved by NYSDEC prior to commencing the field investigations. The Work Plan was later revised with NYSDEC approval, based on the preliminary findings of the field investigations.

The original Work Plan included a geophysical survey. This survey was not performed, due to delays in being allowed access to the site. The proposed surface water sample was not collected since the area to be sampled since been filled and paved. All field work was performed in accordance with a NYSDEC-approved project Quality Assurance/Quality Control Plan and site-specific Health and Safety Plan.

PHASE II SITE INVESTIGATION

The scope of the investigation is summarized in Table III-1 and is described below. All field work was performed or supervised by qualified (ES) staff. Field procedures are described in Appendix A.

Monitoring Well Installations

Three monitoring wells were installed around the perimeter of the demolition debris landfill site between January 8 and January 11, 1988 by Rochester Drilling Company, Inc.(Figure III-1). Wells were installed upgradient and downgradient of the demolition debris landfill area (Table III-2). The upgradient well (GW-2) monitors the perched water table. Downgradient wells GW-1 and GW-3 monitor the perched water table along the north end of the site boundary.

The wells were drilled and constructed in accordance with NYSDEC guidelines. Soil samples were generally collected at intervals of two feet throughout the depth of the well at each location. Selected soil samples were analyzed for grain-size characteristics and Atterberg Limits.

The monitoring wells were constructed with two-inch inside diameter threaded, flush-joint PVC pipe and slotted screen. A quartz sandpack was backfilled around the screen. A bentonite pellet seal was used to isolate the screened section. Water levels in the wells were measured on at least two dates following installation and well development. Well development generally consisted of removing water by air-lift, utilizing compressed air. The monitoring wells were capped with a vented PVC cap and a locking steel protective casing.

Field procedures for the monitoring well installations are presented in Appendix A. Boring logs, well schematics and geotechnical analyses results are included in Appendix B.

Waste Samples

Three waste samples were collected on January 11, 1988 from three borings conducted in the disposal areas as shown on Figure III-2. Sample B-3 was relocated to the south from its proposed location in the work plan due to accessibility limitations. Samples were collected with a split spoon sampler which was decontaminated between each sample. The waste samples were tested for Hazardous Substance List (HSL) organic compounds (volatiles, semivolatiles), metals and total organic halogens (TOX) by Nanco Labs, Inc. The locations were resampled on October 12, 1988 and those samples were analyzed for HSL pesticide/PCBs by York Laboratories. A trip blank and field (wash) blank were also analyzed for HSL volatiles. Analyses and reporting were performed utilizing applicable NYSDEC Superfund and Contract Laboratory protocols dated 6/86 and its latest amendments (NYSDEC CLP). The samples were generally composited over the top several feet of fill.

The field procedures utilized during the field investigation are presented in Appendix A, and the analytical results are discussed in Section IV and listed in Appendix C.

Groundwater Sampling and Analysis

Groundwater samples were collected from each of the three Phase II Monitoring wells on January 27 and 28, 1988. These samples were analyzed for HSL volatile and semivolatile organic compounds, metals and TOX by Nanco Labs, Inc. In addition, a trip blank and field blank were analyzed for HSL volatiles. On October 12, 1988 the wells were resampled and analyzed for HSL pesticide/PCBs by York Laboratories. Analyses and reporting were performed utilizing applicable NYSDEC CLP methods. Groundwater samples were collected with teflon bailers and dedicated polyethylene or polypropylene line.

Field procedures for the groundwater sampling are presented in Appendix A. Analytical results are discussed in Section IV and listed in Appendix C.

Air Survey

A Photovac Total Ionizables Present (TIP-II) photoionization detector was used to determine the presence of volatile organic compounds in the air. This monitoring was performed as a health and safety measure during on-site field work. Air in the breathing zone (4 to 5 feet above ground) was monitored during drilling and sampling activities. Soil samples were also screened, as was the headspace over each monitoring well, as a preliminary means of determining the presence of volatile organic compounds.

TABLE III -1
SUMMARY OF PHASE II TASKS
BUFFALO PUMPS SITE

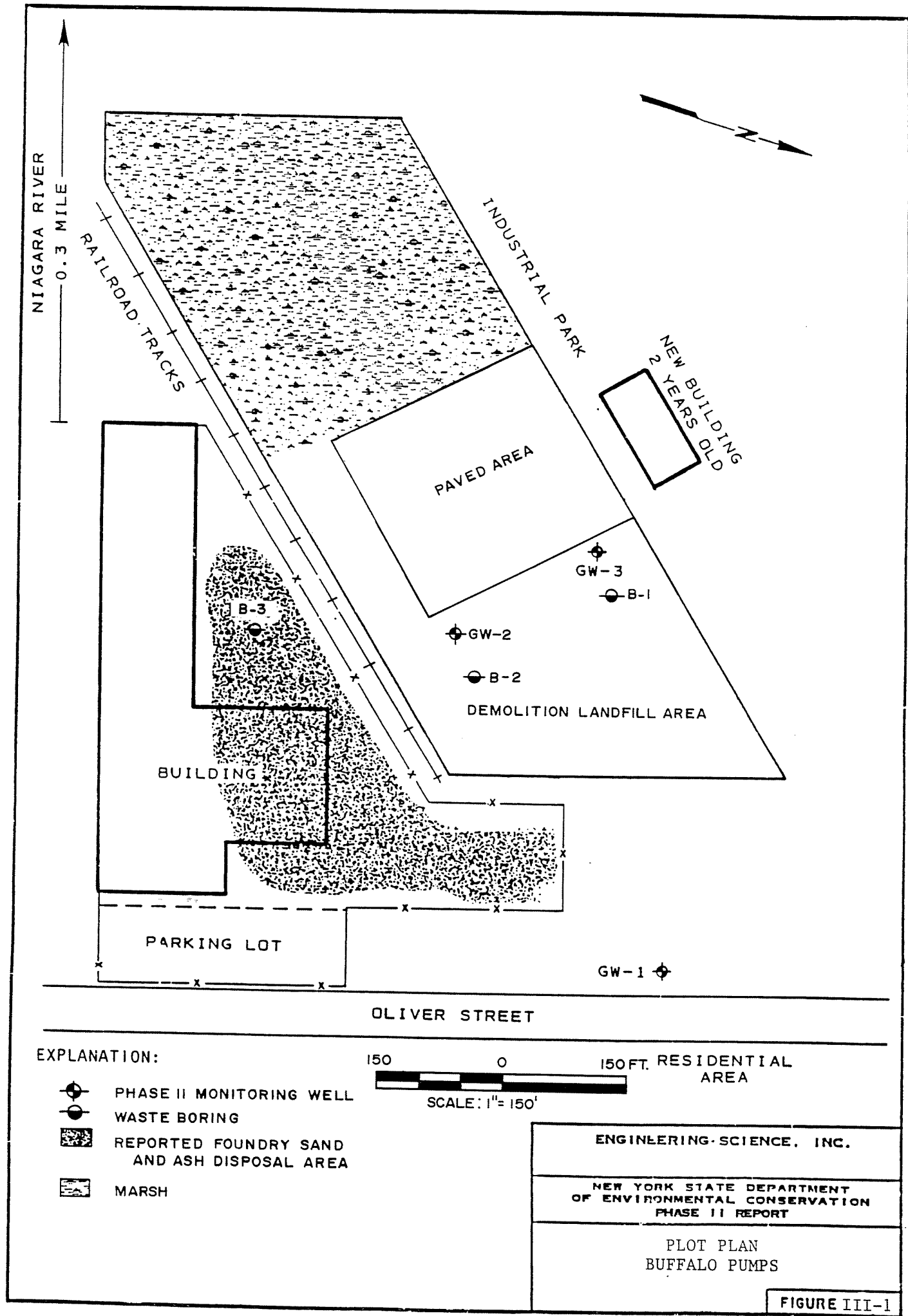
Task	Description of Task
Prepare and Update Work Plan	Reviewed the information in the Phase I report and supplemental data, conducted a site visit, examined available aerial photography and prepared the Phase II work plan.
Conduct Records Search/Data Compilation	Reviewed Phase I information and augmented it by contacting or visiting central and local offices of NYSDEC, NYSDOH, County DOH, etc.
Site Reconnaissance	Checked locations of monitoring wells, examined terrain for accessibility by drill rigs, examined suitability for geophysical surveys, and determined appropriate locations of sampling points.
Conduct Geophysical Studies	The geophysical survey was not performed due to delays in receiving permission to access the site.
Conduct Boring/Install Monitoring Wells	Installed three wells. The well borings were drilled to depths of 10 feet. Wells were constructed with 2-inch PVC pipe.
Soil Samples From Borings	Soil samples were collected at 2-foot intervals during drilling and at changes in subsurface lithology. Performed three grain size analyses and one Atterberg limits test.

TABLE III-1 CONTINUED

Task	Description of Task
Perform Sampling and Analysis	
Waste Samples	Three waste samples were collected and analyzed for HSL metals and organics and TOX.
Groundwater Samples	Three groundwater samples were collected and analyzed for HSL organics and metals and TOX (existing wells OW-1 and OW-2 were not found and could not be sampled).
Surface Water Samples	No samples were collected as the area has been filled and paved.
Air Samples	Using a Photovac TIP-II, the presence of volatile organic compounds was monitored during on-site activities.
Conduct Site Assessment	A preliminary site contamination assessment was conducted to complete the final HRS score and HRS documentation records.
Report Preparation	Prepared a final report containing significant Phase I information, additional field data, final HRS score, HRS documentation records, and site assessments.
Project Management	Project coordination, administration and reporting.

TABLE III-2
MONITORING WELL LOCATIONS AND SPECIFICATIONS
BUFFALO PUMPS SITE

Well Number	Unit Screened	Location	Depth (ft.)	Screened Interval (ft.)
GW-1	Silty Sand	Downgradient	10	5 - 10
GW-2	Fill/Silty Sand	Upgradient	10	5 - 10
GW-3	Silty Sand	Downgradient	10	5 - 10



SECTION IV

SECTION IV

SITE ASSESSMENT

SITE HISTORY

The Buffalo Pumps site is located in the City of North Tonawanda, New York (Figure IV-1). The history of the Buffalo Pumps site has been traced back to 1891, when the property was purchased by Voelker and Felthousen, who operated the Buffalo Steam Pump Company (IATFR, 1979). In 1931, the plant became the Buffalo Pumps Division, Buffalo Forge Company (NCHD, 1981). Buffalo Pumps manufactures centrifugal pumps.

The Buffalo Pumps site includes two fill areas (Figure IV-2). One site is located within the fenced area, and is less than two acres in size. From 1900 to 1953, foundry sands used in bronze and iron casting operations were reportedly disposed in this area (Muench, 1985). Until 1971, boiler ash from the incineration of plant wastes including wood, paper and paint sludge was reportedly disposed in one or both fill areas. Soil cover was not placed over the wastes at the time. A portion of the Buffalo Pumps building, which was constructed in the early 1980s, is now located over part of the fill area. At the time of the building addition, soil may have been placed over the fill in some locations.

During 1978 to 1979, debris and soil fill from the demolition of a portion of the Buffalo Pumps manufacturing facility were disposed in the low-lying 2-acre area north of the foundry sand disposal site. Construction debris and soil fill from a storm sewer excavation project on Oliver Street in North Tonawanda were disposed of on-site in 1979-80. This fill material was reportedly placed over the material disposed during the plant demolition project (ES and D&M, 1985).

The Buffalo Pumps Division of Buffalo Forge Company presently maintains an active manufacturing facility at the site. The two disposal areas have been inactive since the early 1980s.

In 1982, the United States Geological Survey (USGS) installed two wells at the site as part of an investigation of hazardous waste sites in the vicinity of the Niagara River. The 1982 USGS wells were not found at the site during the Phase II investigation; this is probably due to construction of the paved area at the site. In January, 1986 a final Phase I investigation report was prepared for the site, including a preliminary Hazard Ranking System (HRS) score.

REGIONAL SETTING

Regional Geology

The Buffalo Pumps site lies within the Erie-Ontario Lowlands physiographic province of New York State. In the vicinity of the site, this lowland plain is gently sloping to the west.

The bedrock in the site vicinity is mapped as the Silurian-aged Camillus shale, deposited 410 to 440 million years ago. It is gray, red or green, thinly bedded, with lenses of gypsum (EPA, 1985). The thickness of the unit is estimated at 400 feet, but decreases to the north near the contact with the Lockport dolomite.

The unconsolidated deposits in the site vicinity consist of glacial sediments deposited during the Pleistocene, and lacustrine sediments deposited in glacial lakes about 10,000 years ago (EPA, 1985). These lacustrine deposits are mapped as silts and very fine sands, and may be remnants of glacial Lake Tonawanda, which covered the area adjacent to Tonawanda Creek (USDA, 1972). Tonawanda Creek lies about 1.6 miles south of the Buffalo Pumps site. Low permeability clayey lacustrine deposits are sometimes found beneath the silt and fine sands. A thin layer of glacial till is often encountered immediately overlying bedrock.

Regional Hydrology

The Buffalo Pumps site lies within the Lake Erie-Niagara River drainage basin (NYSDEC, 1985). The Niagara River is a Class A (drinking supply) stream located 1600 feet west of the site. The Niagara River flows from Lake Erie northward into Lake Ontario. Flow from Lake Ontario is via the St. Lawrence Seaway to the Atlantic Ocean.

The groundwater hydrology of the region is characterized by a bedrock aquifer overlain by an aquifer within the unconsolidated deposits (EPA, 1985). Within the Camillus Shale bedrock, groundwater flows through joints, fractures and solution cavities. The transmissivity of the Camillus shale is estimated at 7,000 to 70,000 gallons/day/foot (LaSala, 1968). Regional groundwater flow in the Camillus Shale is to the north.

Groundwater within the unconsolidated deposits is influenced by the low permeability clays overlain by coarser silt and fine sand lacustrine sediments. The low permeability clays create a perched water table during periods of high precipitation (EPA, 1985). The perched water table may discharge to areas of low topography or nearby surface water bodies, such as Tonawanda Creek or the Niagara River. In close proximity to these surface water bodies, groundwater flow in the unconsolidated deposits may be parallel to the surface water flow.

SITE GEOGRAPHY

Topography

The Buffalo Pumps site is located in the City of North Tonawanda, Niagara County, New York (Figure IV-1). The population of North Tonawanda was 35,760 in 1980 (Rand McNally, 1981).

The site consists of two former disposal areas which occur on two parcels. The first is an approximate two-acre area immediately adjacent to the plant building. This parcel is bordered by East Avenue to the south, Oliver Street to the east and abandoned Conrail railroad tracks to the north and west.

The second parcel is to the north, and is also about two acres in size. It is separated from the rest of the Buffalo Pumps facility by the abandoned Conrail railroad tracks. This second parcel was formerly a low-lying, swampy area which has received approximately four feet of demolition debris and soil fill. This parcel is bordered to the north and west by commercial properties, and to the south and east by the Conrail tracks.

Both disposal sites are at an elevation of approximately 575 feet above mean sea level (NYSDOT, 1976). There is little preferred surface drainage. Previously drainage was via ditches into a swampy area to the west. A portion of this area has been filled and paved.

Soils

The site lies in an area with natural soils mapped as lake-deposited fine sands and silts (USDA, 1972). Soils of this type were encountered in the Phase II well borings at depths of 4.5 to 6.5 feet. Overlying the fine sands and silts is a layer of fill, consisting of clay to gravel-size soil material mixed with brick and concrete debris.

SITE HYDROGEOLOGY

This discussion of site hydrogeology is based on three Phase II and two USGS well borings conducted on-site, NYS Geological Survey Maps, and USGS and NYSDOT topographic maps. Boring logs, well schematics and geotechnical analyses results are presented in Appendix B of this report.

Geology

The Phase II well borings were conducted in both waste disposal parcels. Well GW-1 was originally presumed to be the upgradient location, and is located near the foundry sand and boiler ash disposal area just west of Oliver Street (Figure IV-2). Wells GW-2 and GW-3 were installed in the demolition fill area, north of the abandoned Conrail tracks.

Each well boring encountered 4.5 to 6.5 feet of fill at the surface (Table IV-1). The fill was thickest at GW-2. The general characterization of the fill was the same for both areas; gray to black silt and fine sand, with less than 10 percent fine gravel and brick fragments.

A fine sand and silt layer was encountered beneath the fill at each location, and is believed to be the lake-laid deposit mapped for the area in the soils survey (USDA, 1972). The grain size characteristics of the fine sand and silt layer are summarized in Table IV-2. This unit was saturated in all borings. In GW-1 and GW-3, the fine sand and silt unit was 4.5 feet thick, and underlain by a clayey-silt deposit. At GW-2, the fine sand and silt was at least 5.5 feet thick, and the clayey-silt deposit was not encountered before the boring was terminated at 12.0 feet. The clayey-silt deposit was not saturated in GW-1 and GW-3. These well borings were only advanced one foot into the deposit before being terminated at 10 feet.

The USGS installed two wells in the demolition fill area in 1982. The well borings have been designated USGS-1 and USGS-2 for the purposes of this report. The locations of the wells are shown on Figure IV-2; the stratigraphic information from the well borings is summarized on Table IV-1. The USGS characterized the site geology as glacial lacustrine clay overlying the Camillus shale bedrock (EPA, 1985). USGS-1 was drilled to a depth of 30.0 feet. Bedrock was encountered at 28.5 feet. A clay unit 22.3 feet thick was described as overlying bedrock. Fill was encountered at the ground surface to a depth of 6.2 feet. In well boring USGS-2, fill was not encountered. Beneath the surficial one foot of topsoil, alternating layers of sand and clay were encountered to the final depth of the boring at 6.2 feet.

Based on the two USGS well borings and the three Phase II well borings, it is apparent that the upper ten feet of the subsurface is highly variable in the occurrence and thickness of the fill, sand, and clay layers. These types of variations are typical of glaciolacustrine sediments.

The Phase II well borings did not encounter bedrock. The bedrock mapped for the site vicinity is the Camillus shale (LaSala, 1968). The characteristics of the Camillus shale are discussed in more detail in the subsection on regional geology.

Groundwater Hydrology

Three monitoring wells were installed in the two disposal areas, with screened sections in the lacustrine fine sand and silt unit. Well GW-2 was also partially screened in the fill. Table IV-3 contains a summary of the monitoring well data. Table IV-4 contains the water level data for two measurement dates.

The groundwater elevation data for the January 12, 1988 measurement date indicate northerly groundwater flow in the fine sand and silt unit. This is roughly parallel to the regional flow direction of the Niagara River. For the February 17, 1988 data, the groundwater flow is indicated to be toward the north. At this shallow depth, groundwater flow may be localized, and influenced by subsurface features such as utility lines, by recharge from precipitation, and by other factors.

For both dates, the most upgradient well is GW-2; GW-1 and GW-3 are the downgradient wells. Because of its location within the demolition fill area, and the screened section occurring within the fill, samples from GW-2 may not be truly representative of upgradient or background groundwater quality conditions.

Based on the limited depth of exploration, it is not known what effect the clayey-silt unit beneath the fine sand and silt has on groundwater flow. If the unit is sufficiently thick, as indicated at USGS-1, it may inhibit downward groundwater flow. It is not known whether hydraulic connection exists between the unconsolidated soil aquifer monitored and the bedrock aquifer.

SITE CONTAMINATION ASSESSMENT

Potential contamination of the environment within the site boundary was evaluated by a review of the character and quantity of wastes suspected at the site, chemical analysis of the groundwater and waste samples and air quality monitoring with a Tip-II photoionization detector. In addition to the results of the Phase II field investigations,, previous sampling and analyses conducted by the USGS were also considered in the site contamination assessment.

Waste Characterization

The Buffalo Pumps site includes two disposal areas; each are approximately two acres in size. During the period 1900 to 1953, foundry sands and boiler ash from the incineration of wood, paper, and paint wastes were reportedly disposed adjacent to the Buffalo Pumps manufacturing facility, in one or both disposal area (Figure IV-2). Boiler ash continued to be landfilled at the site until 1971 (Muench, 1985).

From 1978 to 1979, debris and excavated soil from the demolition of a portion of the Buffalo Pumps manufacturing facility were disposed in the low-lying area north of the foundry sand-boiler ash disposal area. From 1979 to 1980, additional construction debris and soil from a North Tonawanda sewer excavation project were reportedly disposed on top of the demolition debris.

In 1982, the USGS installed two monitoring wells in the demolition fill area and collected groundwater samples from each. A sediment sample from the swampy area was also collected. Based on observations made during the Phase II investigation, it appears as though a paved area covers most of the USGS sample locations (Figure IV-2).

The USGS samples were analyzed for chromium, copper, iron and organic compounds. However, the sediment sample was analyzed for organic compounds at detection limits of several mg/kg instead of ug/kg as required by the analytical method. The analytical results are summarized on Table IV-5.

No organic compounds were detected in any of the samples. The concentration of chromium, copper and iron in the sample from USGS-1 exceeded the USEPA criteria for drinking water and the New York State Class GA groundwater standards (EPA, 1985). The concentration of

iron in USGS-2 exceeded the USEPA criteria for drinking water and the New York State Class GA groundwater standard. The sediment sample contained a concentration of copper above the typical range for undisturbed soils from the Tonawanda area.

During the Phase I investigation in 1985, air monitoring was performed at the Buffalo Pumps site. HNu meter readings for volatile organic compounds in the vicinity of the demolition fill area averaged 5 to 7 ppm above background. A high reading of 9 ppm was noted in the northwestern end of that fill area. Air monitoring conducted during the Phase II investigation in January 1988 did not detect concentrations above background.

The following subsections provide a summary of the results of the Phase II investigation sampling and analysis tasks. Whenever possible, samples were collected upgradient of the site to establish ambient or background conditions. These levels were compared to those found on-site, or downgradient of the site. Concentrations downgradient of the site in excess of three times the upgradient concentrations may indicate releases from a contamination source located on-site. The value of three times is generally recognized by the USEPA and NYSDEC as constituting a "significantly higher" concentration for purposes of scoring an HRS observed release for a particular pathway. Therefore, reference is made to the number and types of analytes considered to be observed releases under each pathway, as discussed in the following subsections.

For the purposes of the groundwater contamination assessment, GW-2 is considered to be the most upgradient well located on-site. However, GW-2 may not be truly representative of upgradient groundwater quality, because GW-2 is partially screened in the fill zone.

The analytical results have also been compared to applicable New York State standards or guidance values. Standards and guidance values are provided for the Class GA groundwater classification. Standards that have been promulgated for groundwater appear in 6 NYCRR Part 703. These regulations also provide authority for the use of guidance values when a standard does not exist for a given water classification. For Class GA groundwater, the standards and guidance values cited are for sources of drinking water. Waste results have been compared to published naturally-occurring ranges in New York State or conterminous United States soils.

The analytical data were reviewed and validated for data usability. Included in the evaluation was a review of the results of "blank" sample analyses. In cases where blank (method, trip, or field) contamination was detected, the individual constituent concentrations were judged as follows: 1) If the sample value was less than 10 times the highest blank value, the sample value was rejected (flagged "R"); 2) If the sample value was between 10 and 20 times the highest blank value, the sample was considered an estimate (flagged "X"); 3) If the sample was greater than 20 times the highest blank value, it was accepted (unflagged). These criteria were used as guidance limits to help determine whether blank contamination was potentially responsible for the presence of these constituents in the field samples.

As part of the Phase II investigation, three borings were advanced into the suspected waste areas to collect samples for analysis of HSL organics, metals and TOX. Samples B-1 and B-2 were collected from the demolition fill and composited from 0 to 1 foot at B-1, and from 0 to 7

feet at B-2. Sample B-3 was collected in the foundry sand/boiler ash disposal area, and was composited by volume over 0 to 4 feet. These soils samples were collected on January 11, 1988 using a split spoon sampler and resampled on October 12, 1988 for pesticide and PCBs.

Sixteen HSL organic compounds were detected in the waste samples (Table IV-6). Methylene chloride, acetone and bis(2-ethylhexyl)phthalate were also detected in laboratory blank samples. The presence of these compounds is therefore attributed to laboratory contamination and the results have been rejected. Sample B-2 contained the greatest number of organic compounds, and at the highest concentrations. Most of the organic compounds detected in the waste samples were members of a class of compounds known as polynuclear aromatic hydrocarbons (PAHs). PAHs can be found in any hydrocarbon combustion process and may be released from oil spills (Sittig, 1985). The major sources are heat and power generation, refuse burning, industrial activity, etc. The PAH compounds could be related to the boiler ash which was reportedly dumped on-site from about 1900 to 1971. The total PAH concentration was highest in B-2. In addition to the PAHs, one type of polychlorinated biphenyl known as Aroclor 1254 was found at a low concentration in B-1.

Nineteen HSL metals were detected in the waste samples (Table IV-7). In general, the highest concentrations were found in Sample B-2. The waste results have been compared to published naturally-occurring ranges in soils for New York State and the conterminous United States. For cadmium and zinc, the concentrations in Sample B-1 exceeded the applicable published range. The concentration of cadmium in B-1 was more than double the published naturally-occurring range. The concentrations of manganese in samples B-2 and B-3 were in excess of the published range as well.

These waste sample results indicate concentrations of PAHs, cadmium, manganese and zinc above naturally-occurring ranges in soil.

Groundwater Contamination Assessment

Three groundwater samples were collected on January 27, 1988 from the Phase II monitoring wells in January, 1988 and analyzed for HSL organics, metals and TOX. Seven HSL organic compounds were detected in those samples (Table IV-8). The results for methylene chloride, acetone, carbon disulfide, benzene and bis(2-ethylhexyl)phthalate were rejected due to their presence in laboratory and field blank samples. Of the remaining compounds, no downgradient concentrations were in excess of three times the concentration reported for upgradient well GW-2. The presence of benzene (2.8 ug/l) in a trip blank (Appendix C) indicates an external source of sample contamination. It may be necessary to resample the wells for HSL volatiles to document the presence or absence of benzene and other VOCs in the groundwater.

Seventeen HSL metals were detected in the groundwater samples (Table IV-9). In general, the highest concentrations were found in GW-3. For eight elements, the concentration in GW-3 exceeded the concentration in GW-2 by three times or more. These elements are barium, beryllium, chromium, iron, lead, vanadium, nickel and zinc. The Class GA standard for arsenic was

exceeded in sample GW-2. The Class GA standards for manganese, iron, and lead and the guidance value for magnesium were exceeded in all three groundwater samples. Class GA standards or guidance values for barium, beryllium, and zinc were also exceeded in GW-3. In addition, the EPA ambient water quality criterion for nickel was exceeded in GW-2 and GW-3.

The concentrations of the eight elements in GW-3 which are in excess of three times the concentrations in GW-2 indicate that the site is releasing these elements into the groundwater. Two other points are noteworthy. Class GA standards and guidance values may not be applicable in this case, since the overburden aquifer monitored is not a likely drinking water supply source. The City of Tonawanda has a municipal water system with intakes on the Niagara River. Also, of the compounds previously noted at high concentrations in the waste samples, manganese and zinc were noted at significant levels in the groundwater samples. The other metal noted in the waste samples, cadmium, was not detected in the groundwater samples. Some of the other metals detected at high concentrations in GW-3, barium, lead, chromium and copper, were not detected at abnormally high concentrations in the waste samples indicating other source areas for these compounds may be present in the fill on-site. Despite the possibility that GW-2 may not be truly representative of upgradient groundwater quality, a comparison of the downgradient groundwater sample results with GW-2 indicate releases of eight metals is occurring which may be attributed to the site. The types and concentration of organic compounds and metals present in the waste and groundwater samples are consistent with the former use of the site. In particular, the PAHs and metals are likely to be present in an environment where incinerator debris, ash and foundry sand have been disposed in an unlined landfill, and in an area with a high water table.

Due to the small size of the disposal areas, the relatively minor quantities of wastes reportedly disposed there, and the lack of groundwater use for the aquifer monitored on-site, the impact of the observed contamination is not expected to be significant. Since the region is largely serviced by municipal water systems having sources in Lake Erie and the Niagara River, there is not likely to be any impact on human health from the groundwater contamination.

However, the groundwater contamination condition may require some action be undertaken. The affected aquifer is not a principal drinking water supply, and groundwater remediation does not appear warranted. However, covering the fill areas with clean, low permeability soil fill to limit water infiltration and reduce the potential for direct contact with wastes exposed in those areas may be warranted and should be considered.

TABLE IV-1

STRATIGRAPHY SUMMARY

PHASE II WELL BORINGS

BUFFALO PUMPS SITE

(Depth in Feet Below Ground Surface)

Stratigraphic Unit (Elevations*)	GW-1 (498.7)	GW-2 (501.7)	GW-3 (499.2)	USGS-1	USGS-2
Topsoil					0 - 1.0
Fill	0 - 4.5	0 - 6.5	0 - 4.5	0 - 6.2	
Lacustrine	4.5 - 9.0	6.5 - 12.0	4.5 - 9.0		3.0 - 5.0
Fine Sand and Silt					5.5 - 6.2
Lacustrine	9.0 - 10.0		9.0 - 10.0	6.2 - 28.5	1.0 - 3.0
Clayey-Silt					5.0 - 5.5
Bedrock				28.5 - 30.0	

* Elevation of ground surface in feet referenced to an assumed on-site datum.

NOTE: USGS boring information referenced from "Preliminary Evaluation of Chemical Migration to Groundwater and the Niagara River from Selected Waste Disposal Sites" USEPA, 1985.

TABLE IV-2
GRAIN-SIZE CHARACTERISTICS SUMMARY
BUFFALO PUMPS SITE

Boring Number	Sample Depth (ft.)	% Gravel	% Sand	% Silt	% Clay	Unified Soil Classification
GW-1	4 - 6	0.1	26.1	61.8	12.0	CL
GW-2	10 - 12	11.1	53.3	25.6	10.0	SM
GW-3	6 - 8	0.0	50.4	35.5	14.1	SM

TABLE IV-3
MONITORING WELL DATA
BUFFALO PUMPS SITE

Ground Surface Well I.D.	Elevation (Feet*)	Top of Well Screen Stratigraphic Unit Screened	Bottom of Well Screen Depth/Elevation (Feet/Feet*)	Depth/Elevation (Feet/Feet*)
GW-1	498.7	Fine Sand and Silt	5.0 / 493.7	10.0 / 488.7
GW-2	501.7	Fine Sand, Silt and Fill	5.0 / 496.7	10.0 / 491.7
GW-3	499.2	Fine Sand and Silt	5.0 / 494.2	10.0 / 489.2

* Referenced to an assumed on-site datum.

TABLE IV-4
WATER LEVEL DATA
BUFFALO PUMPS SITE

Well I.D.	Ground Surface Elevation (Feet*)	Top of PVC Well Pipe Elevation (Feet*)	Well Screen Interval Elevation (Feet*)	Water Level Data			
				Date 2/17/88 Depth to Water Level (Feet**)	Water Level Elevation (Feet*)	Date 1/12/88 Depth to Water Level (Feet**)	Water Level Elevation (Feet*)
GW-1	498.7	500.4	493.7 - 488.7	4.3	496.1	5.3	495.1
GW-2	501.7	504.1	496.7 - 491.7	6.2	497.9	5.8	498.3
GW-3	499.2	500.9	494.2 - 489.2	3.4	497.5	4.0	496.9

* Referenced to an assumed on-site datum.

** Water level depth from top of PVC.

TABLE IV-5
USGS SAMPLE RESULTS
BUFFALO PUMPS SITE

	Sample Number		
	<u>Groundwater (ug/L)</u>	<u>Sediment (ug/Kg)</u>	
	1	2	3
<u>Inorganic Constituents</u>			
Chromium	150*	40	--
Copper	3,400*	300	1,500,000**
Iron	260,000*	51,000*10,000,000	
<u>Organic Compounds</u>			
	--	--	***

NOTE: Analyses of groundwater and sediment samples from Buffalo Pumps Division, Site 6, North Tonawanda, New York, June 21, 1982. Dashes indicated that compound was not found.

* Exceeds USEPA criterion for maximum permissible concentration in drinking water or New York standard for maximum concentration in groundwater.

** Exceeds concentrations in samples from undisturbed soils in the Tonawanda area. Undisturbed soils not analyzed for iron.

*** Analyzed at detection limit above that required by the study. No compounds detected.

Source: EPA, 1985.

TABLE IV-6
BUFFALO PUMPS
WASTE RESULTS
HSL ORGANIC COMPOUNDS (ug/kg)(a)

COMPOUND (b)	Sample Location (c)		
	B-1	B-2	B-3
Methylene Chloride	— R	— R	— R
Acetone	—	—	— R
Phenanthrene *	300.0 J	5600.0	—
Di-n-Butylphthalate	230.0 J	—	—
Fluoranthene *	770.0	5700.0	750.0
bis(2-Ethylhexyl)Phthalate	— R	— R	— R
Chrysene *	580.0 J	2600.0	—
Benzo(b)fluoranthene *	720.0	1600.0	720.0
Benzo(a)Pyrene *	520.0 J	2100.0	—
Indeno(1,2,3-cd)Pyrene *	330.0 J	1200.0	—
Acenaphthene *	—	1000.0 X	—
Fluorene *	—	1100.0	—
Pyrene *	—	4900.0 X	770.0
Benzo(a)anthracene *	—	2600.0	—
Benzo(k)fluoranthene *	—	1900.0	—
Aroclor 1254	1700.0	—	—
Total PAH's	3220.0	30300.0	2240.0

FOOTNOTES:

- (a) See Appendix C for concentration/dilution factors.
- (b) Only HSL organic compounds that were detected are presented.
- (c) Samples collected by Engineering Science Inc. on January 11, 1988 and resampled on October 12, 1988 for pesticides and PCBs.
- * PAH - Polynuclear Aromatic Hydrocarbons

DATA QUALIFIERS:

- J: Indicates the presence of a compound that meets the identification criteria but the result is less than the specified detection limit but greater than zero.
- : Indicates that the compound was analyzed for but not detected. Refer to Appendix C for detection limit.
- R: Data validation recommends this value be rejected.
- X: Data validation recommends this value be considered an estimate.

TABLE IV-7
WASTE RESULTS
HSL METALS (mg/kg)
BUFFALO PUMPS

METAL (a)	NATURALLY OCCURRING RANGES IN NYS SOILS (b)	Sample Location (c)		
		B-1	B-2	B-3
Aluminum		8400.0 X	15100.0 X	3000.0 X
Arsenic	0.1-100	3.9 X	3.9 X	12.4 X
Barium	10-500	130.0	160.0	—
Beryllium	<1-15	[0.7]	[0.9]	—
Cadmium	0.01-7 (d)	14.9 X	— X	— X
Calcium		60400.0 X	127500.0 X	6200.0 X
Chromium	1-2000	21.0	19.3	—
Cobalt	<3-70	[10.5]	[14.1]	[11.7]
Copper	1-700	340.0	24.1	37.9
Iron		32400.0 X	20400.0 X	132800.0 X
Lead	<10-700	57.8 X	29.6 X	33.8 X
Magnesium		17800.0 X	32700.0 X	1400.0 X
Manganese	<2-700	650.0 X	960.0 X	760.0 X
Mercury	0.02-0.5	— R	— R	— R
Nickel	<5-7000	95.1	—	—
Potassium		— X	2100.0 X	— X
Sodium		—	[570.0]	—
Vanadium	20-500	[3.9]	[5.5]	[11.9]
Zinc	<5-3500	5100.0 X	190.0 X	56.2 X

FOOTNOTES:

- (a) Only HSL metals that were detected are presented. If the result is a value greater than or equal to the instrument detection limit but less than the contract-required limit the value is reported in bracket (i.e.; [10]).
- (b) USGS Professional Paper 1270 (1984): New York State Soils.
- (c) Samples collected by Engineering Science Inc. on January 11, 1988.
- (d) Booz, Allen & Hamilton, Inc. (1983): Range in U.S. Soils.

DATA QUALIFIERS:

- : Indicates that the metal was analyzed for but not detected. Refer to Appendix C for detection limit.
- X: Data validation recommends this value be considered an estimate.
- R: Data validation recommends this value be rejected.

TABLE IV-8
GROUNDWATER RESULTS
HSL ORGANIC COMPOUNDS (ug/L)
BUFFALO PUMES

COMPOUND (a)	NYS STANDARDS/ GUIDANCE VALUES (b)	Sample Location (d)		
		GW-2(c)	GW-1	GW-3
Methylene Chloride	50 G	R	R	R
Acetone		R	R	R
Carbon Disulfide		R	R	R
Benzene	ND (e)	R	R	R
bis(2-Ethylhexyl)Phthalate	4200			
Di-n-Octyl Phthalate	50 G	R	32.0 (f)	R
Di-n-Butylphthalate	770	52.0	—	54.0

FOOTNOTES:

- (a) Only HSL organic compounds that were detected are presented.
 (b) Referenced from: "Ambient Water Quality Standards and Guidance Values" for Class GA drinking supply waters, 6 NYCRR Part 703, NYSDEC, 9/1/78, as amended through 4/1/87. The value presented is the standard except where noted by "G", in which case it is the guidance value. All units are ug/L.
 (c) Upgradient location.
 (d) Samples collected by Engineering Science Inc. on January 27, 1988.
 (e) ND = not detectable; i.e., the standard is the lower limit of detectability as defined by the NYSDEC.
 (f) Concentration/dilution factor = 2.

DATA QUALIFIERS:

---: Indicates that the compound was analyzed for but not detected. Refer to Appendix C for detection limit.
 R: Data validation recommends this value be rejected.

TABLE IV-9
GROUNDWATER RESULTS
HSL METALS (ug/L)
BUFFALO PUMPS

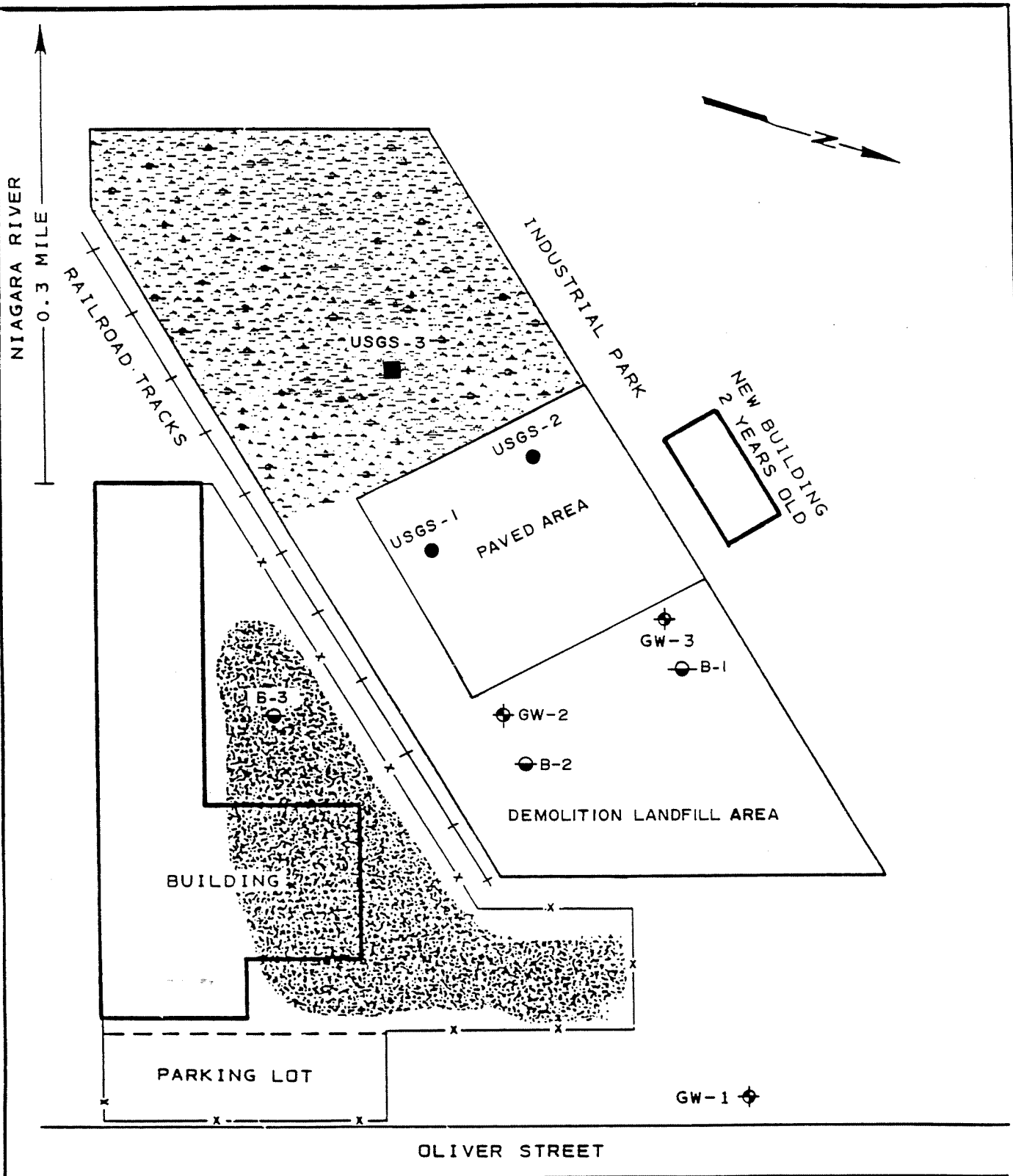
METAL (a)	NYS STANDARDS/ GUIDANCE VALUES (b)	Sample Location (d)		
		GW-2(c)	GW-1	GW-3
Aluminum		64000.0	29700.0	184800.0
Arsenic	25	49.0	15.0	18.0
Barium	1000	430.0	240.0	5500.0
Beryllium	3 G	[2.4]	[0.7]	9.0
Calcium		657900.0	500000.0	966900.0
Chromium		170.0	90.0	1600.0
Cobalt		96.0	[41.0]	260.0
Copper	1000	280.0	110.0	670.0
Iron	300	126600.0 X	53300.0 X	433600.0 X
Lead	25	56.0	51.0	5400.0
Magnesium	35000 G	184200.0 X	110700.0 X	248500.0 X
Manganese	300	12900.0	1300.0	13100.0
Nickel	13.4 Z	96.0	—	450.0
Potassium		7600.0	5000.0	17100.0
Sodium		52600.0	71400.0	70100.0
Vanadium		110.0	[19.0]	420.0
Zinc	5000	480.0	210.0	19800.0
TOX		—	86.0	—

FOOTNOTES:

- (a) Only HSL metals that were detected are presented. If the result is a value greater than or equal to the instrument detection limit but less than the contract-required limit the value is reported in brackets (i.e.; [10]).
- (b) Referenced from; "Ambient Water Quality Standards and Guidance Values" for Class GA drinking supply waters, 6 NYCRR Part 703, NYSED, 9/1/78, as amended 4/1/87. The value presented is the standard except where noted by "G", in which case it is the guidance value. For nickel (flagged "Z") the value presented is the ambient water quality criterion for human health, from; "Quality Criteria for Water, 1986", USEPA, 5/1/87. All units are ug/L.
- (c) Upgradient well location.
- (d) Samples collected by Engineering Science Inc. on January 27, 1988.

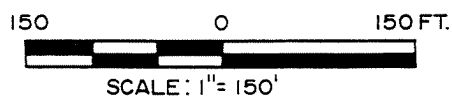
DATA QUALIFIERS:

- : Indicates that the metal was analyzed for but not detected. Refer to Appendix D for detection limit.
- X: Data validation recommends this value be considered an estimate.



EXPLANATION:

- PHASE II MONITORING WELL
- WASTE BORING
- REPORTED FOUNDRY SAND AND ASH DISPOSAL AREA
- FORMER LOCATION OF USGS MONITORING WELL
- USGS SEDIMENT SAMPLE LOCATION
- MARSH

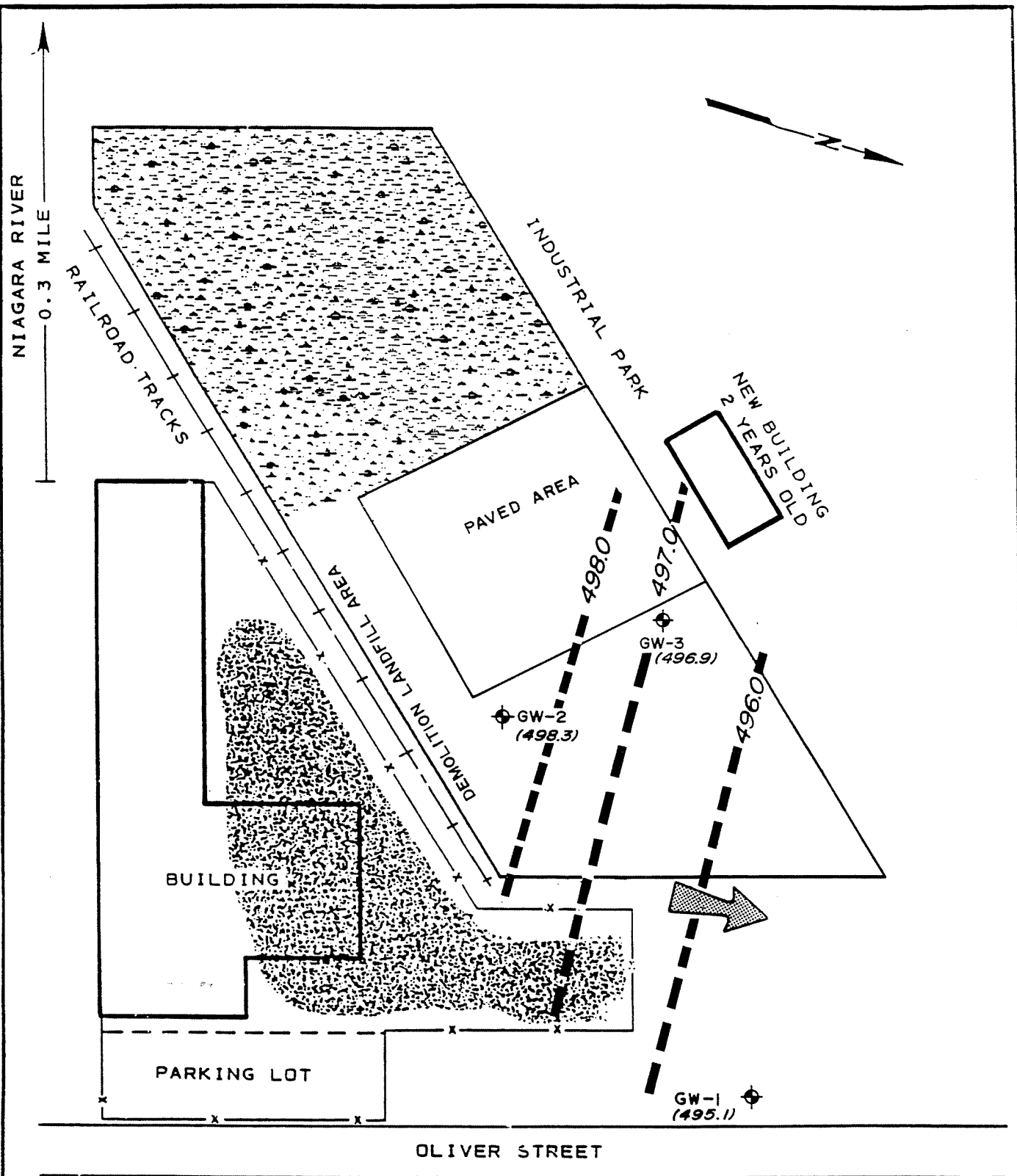


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PHASE II REPORT

PLOT PLAN
BUFFALO PUMPS

FIGURE IV-2



EXPLANATION:

- PHASE II MONITORING WELL
 - LINE OF EQUAL GROUNDWATER ELEVATION
 - REPORTED FOUNDRY SAND AND ASH DISPOSAL AREA
 - MARSH
 - DIRECTION OF GROUNDWATER FLOW
- (495.1) GROUNDWATER ELEVATION MEASURED ON 1/12/88 REFERENCED TO AN ASSUMED ON-SITE DATUM

150 0 150 FT. RESIDENTIAL AREA

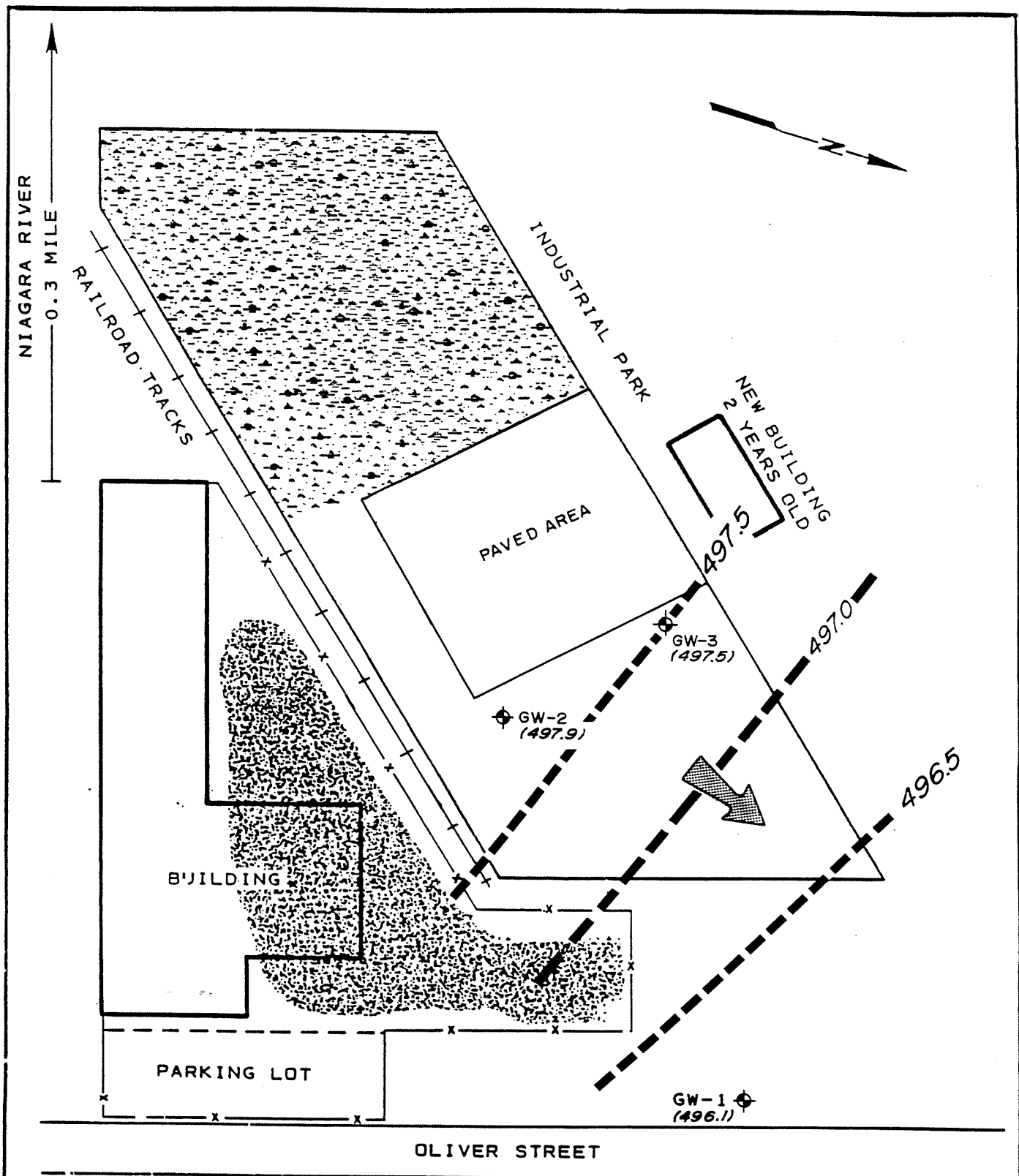
SCALE: 1" = 150'

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OF ENVIRONMENTAL CONSERVATION
PHASE II REPORT

GROUNDWATER ELEVATION
CONTOUR MAP 1/12/88
BUFFALO PUMPS

FIGURE IV-3



EXPLANATION:

- PHASE II MONITORING WELL
 - LINE OF EQUAL GROUNDWATER ELEVATION
 - REPORTED FOUNDRY SAND AND ASH DISPOSAL AREA
 - MARSH
 - DIRECTION OF GROUNDWATER FLOW
- (496.1) GROUNDWATER ELEVATION MEASURED ON 2/17/88 REFERENCED TO AN ASSUMED ON-SITE DATUM

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PHASE II REPORT

GROUNDWATER ELEVATION
CONTOUR MAP 2/17/88
BUFFALO PUMPS

FIGURE IV-4

SECTION V

SECTION V

FINAL APPLICATION OF HAZARD RANKING SYSTEM

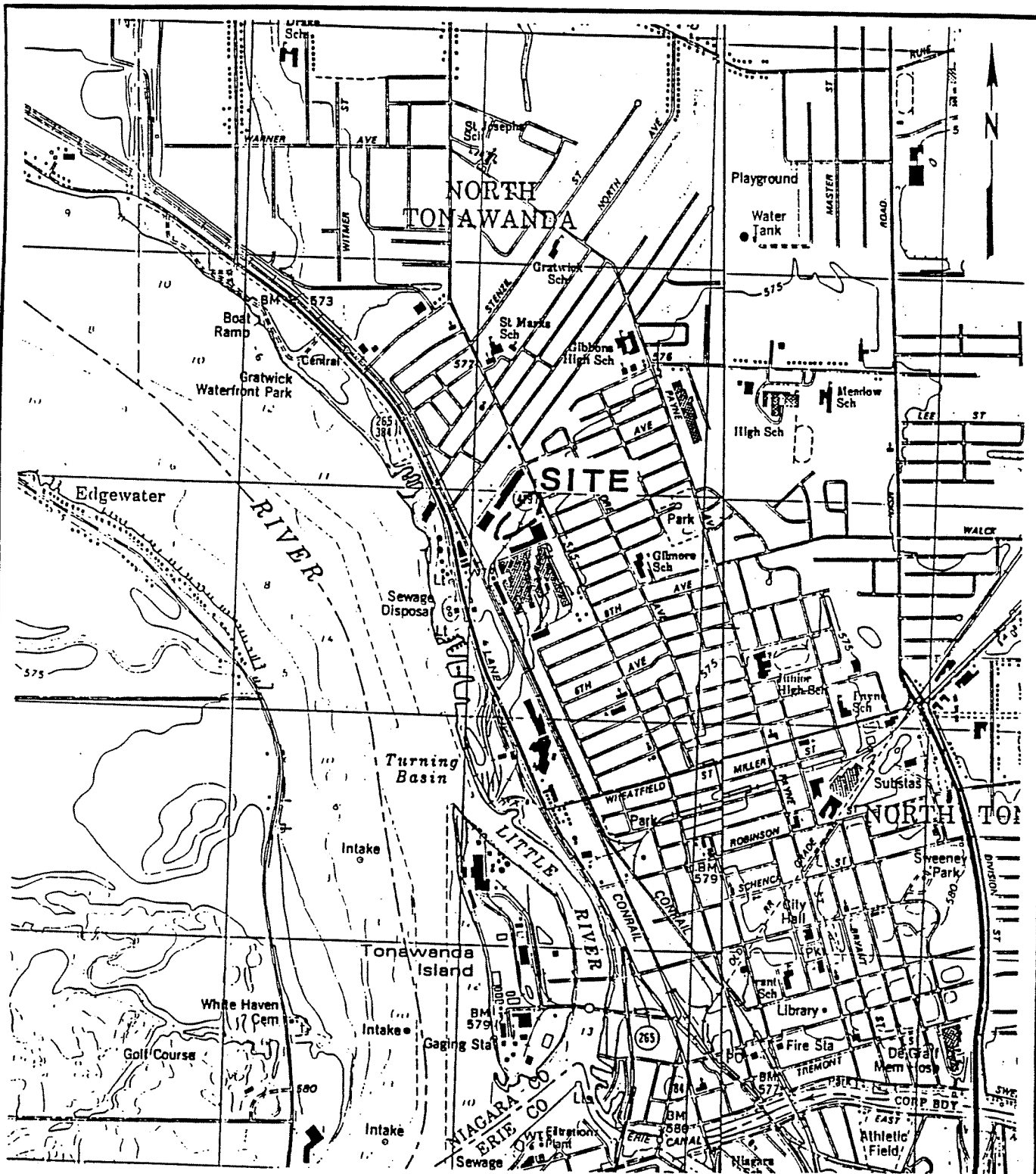
NARRATIVE SUMMARY

The Buffalo Pumps site is located on an eight-acre parcel located in the City of Tonawanda, Niagara County, New York. Since 1931, the Buffalo Pumps Division of Buffalo Forge Company has operated a pump manufacturing facility at the site. Two on-site areas have been used for waste disposal. A two-acre area located adjacent to and beneath a portion of the present facility building was used for disposal of foundry sands used in bronze and iron casting operations. The period of foundry sand disposal ended in approximately 1953. In this fill area, and in another two-acre area located to the north, boiler ash from the incineration of wood, paper and paint sludge was disposed. The disposal of boiler ash reportedly ended in 1971. Soil cover was apparently not placed over the wastes in either areas at the time of waste disposal. In the late 1970's and early 1980's, building demolition debris and soil fill were disposed in the northernmost fill areas. The plant facility is currently active; both fill areas are now inactive.

Sampling for the waste and groundwater at the site during the Phase II investigation detected the presence of compounds on the Hazardous Substance List. The waste sample results indicate the presence of polynuclear aromatic hydrocarbons (PAHs), cadmium and zinc at concentrations above naturally-occurring ranges. The groundwater sample results indicate downgradient concentrations of eight HSL metals exceed the upgradient concentrations by three times or more.

Groundwater in the site vicinity is not known to be used as a drinking water source. The city of Tonawanda is served by a public water system which has Lake Erie and the Niagara River as its sources. No surface water was present on-site during the Phase II investigation field work. The Niagara River is located approximately 1,600 feet west of the site.

LOCATION



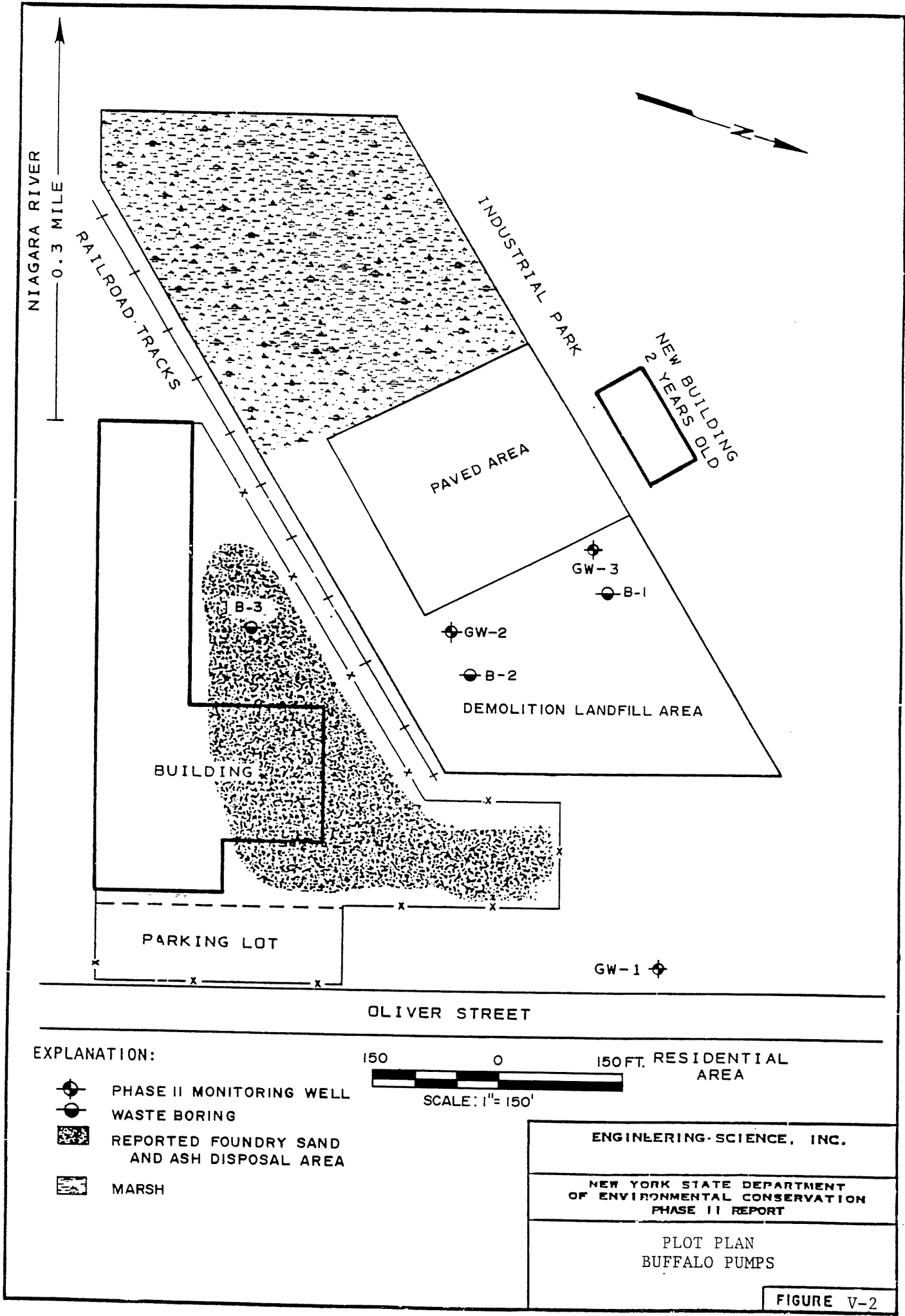
REFERENCE: U.S.G.S. 7.5' Topographic Map
 Tonawanda West, NY (1980) and Tonawanda
 East, NY (1980) Quadrangles

ENGINEERING-SCIENCE, INC.

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 PHASE II REPORT

SITE LOCATION MAP
 BUFFALO PUMPS

FIGURE V-1



Facility Name: Buffalo PumpsDate: 5/16/88

Ground Water Route Work Sheet						
Rating Factor	Assigned Value (Circle One)	Multi- plier	Score	Max. Score	Ref. (Section)	
1 Observed Release	0 (45)	1	45	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 to 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	2	3		
Physical State	0 (1) 2 3	1	1	3		
Total Route Characteristics Score			11	15		
3 Containment	0 1 2 (3)	1	3	3	3.3	
4 Waste Characteristics					3.4	
Toxicity/Persistence	0 3 6 9 12 15 (18)	1	18	18		
Hazardous Waste Quantity	0 (1) 2 3 4 5 6 7 8	1	1	8		
Total Waste Characteristics Score			19	26		
5 Targets					3.5	
Ground Water Use	0 (1) 2 3	3	3	9		
Distance to Nearest Well/Population Served	(0) 4 6 8 10 12 16 18 20 24 30 32 35 40	1	0	40		
Total Targets Score			3	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			2,565	57,330		
7 Divide line 6 by 57,330 and multiply by 100			$S_{gw} = 4.47$			

GROUND WATER ROUTE WORK SHEET

Facility Name: Buffalo PumpsDate: 5/16/88

Surface Water Route Work Sheet						
Rating Factor	Assigned Value (Circle One)	Multi- plier	Score	Max. Score	Ref. (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	0	3		
1-yr. 24-hr. Rainfall	0 1 (2) 3	1	2	3		
Distance to Nearest Surface Water	0 1 (2) 3	2	4	6		
Physical State	0 (1) 2 3	1	1	3		
Total Route Characteristics Score			7	15		
3 Containment	0 1 2 (3)	1	3	3	4.3	
4 Waste Characteristics					4.4	
Toxicity/Persistence	0 3 6 9 12 15 (18)	1	18	18		
Hazardous Waste Quantity	0 (1) 2 3 4 5 6 7 8	1	1	8		
Total Waste Characteristics Score			19	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	(0) 4 6 8 10	1	0	40		
Intake Downstream	12 16 18 20					
	24 30 32 35 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			3,192	64,350		
7 Divide line 6 by 64,350 and multiply by 100			$S_{sw} = 4.96$			

SURFACE WATER ROUTE WORK SHEET

Facility Name: Buffalo PumpsDate: 5/16/88

Air Route Work Sheet						
Rating Factor	Assigned Value (Circle One)	Multi-plier	Score	Max. Score	Ref. (Section)	
[1] Observed Release	(0) 45	1	0	45	5.1	
Date and Location: <u>January 8 & 11, 1988</u>						
Sampling Protocol: <u>Used Tip 2</u>						
If line [1] is 0, the $S_a = 0$. 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	0	9		
Hazardous Waste	(0) 1 2 3 4 5 6 7 8	1	0	8		
Total Waste Characteristics Score			0	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]			0	35,100		
[5] Divide line [4] by 35,100 and multiply by 100			$S_a = 0$			

AIR ROUTE WORK SHEET

Facility Name: Buffalo PumpsDate: 5/16/88

Fire and Explosion Work Sheet									
Rating Factor	Assigned Value (Circle One)			Multi- plier	Score	Max. Score	Ref. (Section)		
1 Containment	1	3		1	1	3	7.1		
2 Waste Characteristics							7.2		
Direct Evidence	0	3		1	0	3			
Ignitability	0	1 2 3		1	0	3			
Reactivity	0	1 2 3		1	0	3			
Incompatibility	0	1 2 3		1	0	3			
Hazardous Waste Quantity	0	1 2 3 4 5 6 7 8		1	0	8			
Total Waste Characteristics Score					0	20			
3 Targets							7.3		
Distance to Nearest Population	0 1 2 3 4	5	1		5	5			
Distance to Nearest Building	0 1 2	3	1		3	3			
Distance to Sensitive Environment	0	1 2 3	1		0	3			
Land Use	0 1 2	3	1		3	3			
Population Within 2-Mile Radius	0 1 2 3 4	5	1		5	5			
Buildings Within 2-Mile Radius	0 1 2 3 4	5	1		5	5			
Total Targets Score					21	24			
4 Multiply 1 x 2 x 3					0	1,440			
5 Divide line 4 by 1,440 and multiply by 100					$S_{FE} = 0$				

FIRE AND EXPLOSION WORK SHEET

Facility Name: Buffalo PumpsDate: 5/16/88

Direct Contact Work Sheet						
Rating Factor	Assigned Value (Circle One)	Multi- plier	Score	Max. Score	Ref. (Section)	
<u>1</u> Observed Incident	<u>0</u> 45	1	0	45	8.1	
If line <u>1</u> is 45, proceed to line <u>4</u> If line <u>1</u> is 0, proceed to line <u>2</u>						
<u>2</u> Accessibility	0 1 2 <u>3</u>	1	3	3	8.2	
<u>3</u> Containment	<u>0</u> 15	1	0		8.3	
<u>4</u> Waste Characteristics Toxicity	0 1 2 <u>3</u>	5	15	15	8.4	
<u>5</u> Targets					8.5	
Population Within 1-Mile Radius	0 1 2 3 <u>4</u> 5	4	16	20		
Distance to a Critical Habitat	<u>0</u> 1 2 3	4	0	12		
Total Targets Score			16	32		
<u>6</u> If line <u>1</u> is 45, multiply <u>1</u> x <u>4</u> x <u>5</u> If line <u>1</u> is 0, multiply <u>2</u> x <u>3</u> x <u>4</u> x <u>5</u>			0	21,600		
<u>7</u> Divide line <u>6</u> by 21,600 and multiply by 100			$S_{DC} = 0$			

DIRECT CONTACT WORK SHEET

Facility Name: Buffalo Pumps

Date: 5/16/88

Worksheet for Computing S_M

	S	S^2
Groundwater Route Score (S_{gw})	4.47	19.98
Surface Water Route Score (S_{sw})	4.96	24.60
Air Route Score (S_a)	0	0
$S_{gw}^2 + S_{sw}^2 + S_a^2$		44.58
$\sqrt{S_{gw}^2 + S_{sw}^2 + S_a^2}$		6.68
$\sqrt{S_{gw}^2 + S_{sw}^2 + S_a^2} / 1.73 = S_M =$		3.86

WORK SHEET FOR COMPUTING S_M

**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 = 4,230 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: Buffalo Pumps Division of Buffalo Forge Company Site

LOCATION: North Tonawanda, New York, Niagara County

GROUND WATER ROUTE

1. OBSERVED RELEASE

Assigned Value = 45

Contaminants detected (5 maximum):

Barium, beryllium, chromium, iron, lead (Nanco Labs, Inc. 1988).

Rationale for attributing the contaminants to the facility:

The concentrations of these metals in downgradient well GW-3 exceeded the upgradient concentrations in GW-2 by more than 3 times.

2. ROUTE CHARACTERISTICS

Depth to Aquifer of Concern

Assigned Value = 3

Name/description of aquifer(s) of concern:

Shallow aquifer in fill and silty-sand unit.

NOTE: This aquifer is monitored by 3 wells on-site (GW-1, GW-2, GW-3) (ES, 1988a).

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

1.7 feet in well GW-3 on 2/17/88 (ES, 1988b).

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

The lowest point of fill being encountered in the Phase II borings is 6.5 feet in GW-2 (ES, 1988a).

Net Precipitation

Assigned Value = 2

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

Mean annual precipitation in the site area is 34 inches (USDOC, 1979, Figure 5).

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

Mean annual lake evaporation in the site area is 27 inches (USDOC, 1979, Figure 4).

Net precipitation (subtract the above figures):

Net precipitation = 7 inches. (34 inches - 27 inches = 7 inches).

Permeability of Unsaturated Zone

Assigned Value = 2

Soil type in unsaturated zone:

Soils in the unsaturated zone consist of a 4.5- to 6.5-foot layer of sand, ash, and miscellaneous fill material overlying 5-6 feet of silty sand (ES, 1988a).

Permeability associated with soil type:

Permeability of granular fill is 1×10^{-3} cm/sec (Freeze and Cherry, 1979).

Physical State

Assigned Value = 1

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

Solids: demolition debris, excavation and fill materials, foundry sands, and boiler ash. Score = 1.
Solids, unconsolidated or unstabilized (Muench, 1985).

3. CONTAINMENT

Containment

Assigned Value = 3

Method(s) of waste or leachate containment evaluated:

Foundry wastes and demolition materials were placed in an unlined landfill with no leachate collection system (Muench, 1985 and NYSDEC, 1987).

Method with highest score:

Landfill, no liner, surface encourages ponding, no run-on control.

4. WASTE CHARACTERISTICS

Toxicity and Persistence

Assigned Value = 18

Compound(s) evaluated:

HSL metals detected in groundwater sample GW-3: barium, beryllium, iron, vanadium, nickel and zinc (Nanco Labs, Inc., 1988).

Compound with highest score:

With the exception of vanadium all have toxicity/persistence scores of 18.

Hazardous Waste Quantity

Assigned Value = 1

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):

The quantity of hazardous substances disposed at the facility are unknown, but hazardous substances were detected in the groundwater; therefore, it is estimated at 1-10 cubic yards (Nanco Labs, Inc., 1988).

Basis of estimating and/or computing waste quantity:

A volume of 1 to 10 cubic yards of hazardous waste was assumed as a minimum since hazardous substances were detected during the Phase II investigation.

5. TARGETS

Ground Water Use

Assigned Value = 1

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

Aquifer is not used, but potentially usable. Score = 1. There are no wells within a 3-mile radius of the facility which are drawing from the aquifer of concern (Hopkins, 1987 and Noll, 1987).

Distance to Nearest Well

Assigned Value = 0

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

There are no wells within 3 miles of the facility which are drawing from the aquifer of concern (Hopkins, 1987 and Noll, 1987).

Distance to above well or building:

There are no wells within 3 miles of the facility which are drawing from the aquifer of concern (Hopkins, 1987 and Noll, 1987).

Population Served by Ground Water 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:

None is served by wells within a 3-mile radius of the site (Hopkins, 1987, Noll, 1987 and NYSDOH, 1982).

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):

There are no wells drawing from the aquifer of concern within a 3-mile radius of the site (Hopkins, 1987 and Noll, 1987).

Total population served by ground water within a 3-mile radius:

Groundwater does not serve as a water supply source within a 3-mile radius of the site (Hopkins, 1987 and NYSDOH, 1982).

SURFACE WATER ROUTE

1. OBSERVED RELEASE

Assigned Value = 0

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

Surface waters were not sampled at the site.

Rationale for attributing the contaminants to the facility:

Surface waters were not sampled at the site.

2. ROUTE CHARACTERISTICS

Facility Slope and Intervening Terrain

Assigned Value = 0

Average slope of facility in percent:

<1% (USGS, 1980).

Name/description of nearest downslope surface water:

Surface runoff flows into ditches, which drain west into a small swampy area. In addition, storm sewers drain runoff west to the Niagara River (0.3 miles to river). (ES Field Investigations, 1988, and USGS, 1980).

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

0.7% (USGS, 1980).

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

No. The northernmost disposal area filled in a portion of the swamp along the western site border. However, no surface water was noted during the Phase II investigation field work in January, 1988 (Muench, 1988 and ES Field Investigations, 1988).

Is the facility completely surrounded by areas of higher elevation?

No (USGS, 1980).

1-Year 24-Hour Rainfall in Inches

Assigned Value = 2

2.1 inches (USDOC, 1963).

Distance to Nearest Downslope Surface Water

Assigned Value = 2

The Niagara River is approximately 1,600 feet west of the site (USGS, 1980).

Physical State of Waste

Assigned Value = 1

Solids, unconsolidated: demolition debris, excavation and fill materials, foundry sands, and boiler ash (Muench, 1985).

3. CONTAINMENT

Containment

Assigned Value = 3

Method(s) of waste or leachate containment evaluated:

Unlined landfill with no surface water drainage system (Muench, 1985, NYSDEC, 1987, ES Field Investigation, 1988).

Method with highest score:

Landfill not adequately covered and no diversion system present. Score = 3.

4. WASTE CHARACTERISTICS

Toxicity and Persistence

Assigned Value = 18

Compound(s) evaluated

HSL metals detected in waste sample B-1: cadmium and zinc were detected at concentrations exceeding published naturally occurring ranges (Nanco Labs, Inc., 1988, and Booz, Allen and Hamilton, 1983 and USGS, 1984).

Compound with highest score:

Cadmium and zinc both have scores of 18.

Hazardous Waste Quantity

Assigned Value = 1

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):

The quantity of hazardous substances at the facility are unknown, therefore, a quantity of 1-10 cubic yards was estimated based on the presence of hazardous substances in waste samples (Nanco Labs, Inc., 1988).

Basis of estimating and/or computing waste quantity:

Unknown quantities of contaminated soil are present on-site. For purposes of rating the site, the minimum volume of 1 to 10 cubic yards of hazardous waste was assumed since the hazardous substances were detected during the Phase II waste sampling and analysis.

5. TARGETS

Surface Water Use

Assigned Value = 2

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

The Niagara River is used for recreation and navigation within 3 miles downstream of the site (NCHD, 1981, NYSDOH, 1982).

Is there tidal influence?

No, the site is not near a coastal area (USGS, 1980).

Distance to a Sensitive Environment

Assigned Value = 1

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

There are none within 2 miles; western New York is not in a coastal area (USGS, 1980).

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

There is a 102-acre wetland located about 3,000 feet northeast of the site (Farquhar, 1987).

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

There are none within 1 mile (Ozard, 1988).

Population Served by Surface Water

Assigned Value = 0

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:

There are none within 3 miles downstream of the facility (NYSDOH, 1982).

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

No intakes within 3 miles of the site (NYSDOH, 1982).

Total population served:

Not applicable.

Name/description of nearest of above water bodies:

Surface waters within 3 miles downstream of the site are not used as water supplies (NYSDOH, 1982).

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

There are no intakes within 3 miles downstream of the site (NYSDOH, 1982).

AIR ROUTE

1. OBSERVED RELEASE

Assigned Value = 0

Contaminants detected:

No readings above background were noted during air monitoring with a Photovac Tip-II during the Phase II investigation.

Date and location of detection of contaminants:

Not applicable. None detected on January 8 or 11, 1988; Buffalo Pumps fill area.

Methods used to detect the contaminants:

Photovac Tip-II.

Rationale for attributing the contaminants to the site:

Not applicable.

2. WASTE CHARACTERISTICS

Reactivity and Incompatibility

Assigned Value = 0

Most reactive compound:

Reactive compounds with the potential to impact the air pathway are not known to exist on-site (ES Site Investigations, 1988).

Most incompatible pair of compounds:

Incompatible compounds with the potential to impact the air pathway are not known to exist on-site (ES Site Investigations, 1988).

Toxicity**Assigned Value = 0****Most toxic compound:**

Toxic compounds with the potential to impact the air pathway are not known to exist on-site (ES Site Investigations, 1988).

Hazardous Waste Quantity**Assigned Value = 0****Total quantity of hazardous waste:**

Hazardous waste with the potential to impact the air pathway is not known to exist on-site (ES Site Investigations, 1988).

Basis of estimating and/or computing waste quantity:

None estimated because no hazardous waste which could impact the air pathway is known to exist on-site.

3. TARGETS**Population Within 4-Mile Radius****Assigned Value = 21****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

40,212 people (1980 U.S. Census Bureau Data).

Distance to a Sensitive Environment**Assigned Value = 1****Distance to 5-acre (minimum) coastal wetland, if 2 miles or less:**

There is none within 2 miles; western New York is not in a coastal area (USGS, 1980).

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

There is a 102-acre wetland located approximately 3,000 feet northeast of the site (Farquhar, 1987).

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

There are none within 1 mile (Ozard, 1988).

Land Use

Assigned Value = 3

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

0.0 mile. The site is located in an industrial/residential area (USGS, 1980).

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

There is none within 2 miles (USGS, 1980).

Distance to residential area, if 2 miles or less:

A residential area is located 0.1 mile east of the site on Oliver Street (USGS, 1980).

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

There is none within 1 mile; the area is industrial (USGS, 1980).

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

There is none within 2 miles (USGS, 1980).

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

There is none within view of the site (USDOL, 1983 and Federal Register, 1983).

FIRE AND EXPLOSION

1. CONTAINMENT

Assigned Value = 1

Hazardous substances present:

No hazardous substances in a form with the potential to ignite or explode are known to exist on-site (ES Site Investigations, 1988).

Type of containment, if applicable:

Not applicable. Score = 1.

2. WASTE CHARACTERISTICS

Direct Evidence

Assigned Value = 0

Type of instrument and measurements:

Measurements taken on-site with an explosimeter indicated no readings above background (ES Site Investigations, 1988).

Ignitability

Assigned Value = 0

Compound used:

No ignitable compounds are known to exist on-site (ES Site Investigations, 1988).

Reactivity

Assigned Value = 0

Most reactive compound:

No reactive compounds are known to exist on-site (ES Site Investigations, 1988).

Incompatibility

Assigned Value = 0

Most incompatible pair of compounds:

No incompatible compounds are known to exist on-site (ES Site Investigations, 1988).

Hazardous Waste Quantity**Assigned Value = 0****Total quantity of hazardous substances at the facility:**

No hazardous substances in a form which are ignitable or explosive are known to exist on-site (ES Site Investigations, 1988).

Basis of estimating and/or computing waste quantity:**Assigned Value = 0**

Not applicable.

3. TARGETS**Distance to Nearest Population****Assigned Value = 5**

Approximately 50 feet south is the Buffalo Pumps facility (ES Site Investigations, 1988).

Distance to Nearest Building**Assigned Value = 3**

Approximately 50 feet south is the Buffalo Pumps facility (ES Site Investigations, 1988).

Distance to Sensitive Environment**Assigned Value = 0****Distance to wetlands:**

There is a 102-acre wetland located 3,000 feet northeast of the site (Farquhar, 1987).

Distance to critical habitat:

There are none within 1 mile (Ozard, 1988).

Land Use**Assigned Value = 3****Distance to commercial/industrial area, if 1 mile or less:**

0.0 mile. The site is located in an industrial/residential area (USGS, 1980).

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

There is none within 2 miles (USGS, 1980).

Distance to residential area, if 2 miles or less:

A residential area is located 0.1 mile east of the site on Oliver Street (USGS, 1980).

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

There is none within 1 mile; the area is industrial/residential (USGS, 1980).

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

There is none within 1 mile; the area is industrial/residential (USGS, 1980).

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

No (USDOL, 1983 and Federal Register, 1985).

Population Within 2-Mile Radius

Assigned Value = 5

28,263 people (1980 U.S. Census Bureau Data).

Buildings Within 2-Mile Radius

Assigned Value = 5

7,438 - Estimated by dividing people within a 2-mile radius by 3.8.

DIRECT CONTACT

1. OBSERVED INCIDENT

Assigned Value = 0

Date, location, and pertinent details of incident:

No incidents are known to have occurred on-site (ES Site Investigations, 1988).

2. ACCESSIBILITY

Assigned Value = 3

Describe type of barrier(s):

The site is not completely surrounded by fencing (ES Site Investigations, 1987-1988).

3. CONTAINMENT

Assigned Value = 0

Type of containment, if applicable:

Landfill covered with 2-3 feet of soil fill material (NCHD, 1981, ES Site Investigations 1987-1988).

4. WASTE CHARACTERISTICS

Toxicity

Assigned Value = 3

Compounds evaluated:

HSL compounds in waste samples: Cadmium and Zinc (Nanco Labs, Inc. 1988).

Compound with highest score:

Cadmium has a score of 3 (Sax, 1984).

5. TARGETS

Population within one-mile radius

Assigned Value = 4

9,456 people (1980 U.S. Census Bureau Data).

Distance to critical habitat (of endangered species)

Assigned Value = 0

There are none within 1 mile of the site (Ozard, 1988).



Site Inspection Report

BUFFALO PUMPS DIVISION



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

I. IDENTIFICATION
01 STATE NY 02 SITE NUMBER D002127199

II. SITE NAME AND LOCATION

01 SITE NAME (Legal, common, or descriptive name of site) Buffalo Pumps Division		02 STREET, ROUTE NO., OR SPECIFIC LOCATION IDENTIFIER 874 Oliver Street			
03 CITY North Tonawanda	04 STATE NY	05 ZIP CODE 14120	06 COUNTY Niagara	07 COUNTY CODE 063	08 CONG DIST 36
09 COORDINATES LATITUDE 43° 02' 47" LONGITUDE 78° 53' 09"		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 3 / 20 / 85 MONTH DAY YEAR	02 SITE STATUS ☐ ACTIVE ☒ INACTIVE	03 YEARS OF OPERATION 1900 1980 UNKNOWN BEGINNING YEAR ENDING YEAR			
04 AGENCY PERFORMING INSPECTION (Check all that apply) ☐ A. EPA ☐ B. EPA CONTRACTOR <u>Engineering-Science</u> ☐ C. MUNICIPAL ☐ D. MUNICIPAL CONTRACTOR ☐ E. STATE ☐ F. STATE CONTRACTOR <u>Dames & Moore</u> ☐ G. OTHER (Name of firm) (Specify)					
05 CHIEF INSPECTOR S. Robert Steele I	06 TITLE		07 ORGANIZATION ES	08 TELEPHONE NO. (703) 591-7575	
09 OTHER INSPECTORS Eileen Gilligan	10 TITLE Geologist		11 ORGANIZATION D & M	12 TELEPHONE NO. ()	
				()	
				()	
				()	
				()	
				()	
13 SITE REPRESENTATIVES INTERVIEWED Mr. Muench	14 TITLE plant manager	15 ADDRESS 870 Oliver Street Niagara, NY 14120		16 TELEPHONE NO. (716) 693-1850	
Mr. Richard Soos	maintenance department	-same as above-		(716) 693-1850	
				()	
				()	
				()	
				()	
				()	
17 ACCESS GAINED BY (Check one) ☒ PERMISSION ☐ WARRANT	18 TIME OF INSPECTION 8:30 AM	19 WEATHER CONDITIONS Cool 40° sunny			
IV. INFORMATION AVAILABLE FROM					
01 CONTACT George Moreau	02 OF (Agency/Organization) Engineering-Science(ES)			03 TELEPHONE NO. (615) 451-9560	
04 PERSON RESPONSIBLE FOR SITE INSPECTION FORM S. Robert Steele II	05 AGENCY	06 ORGANIZATION ES	07 TELEPHONE NO. 703-591-7575	08 DATE 3 / 20 / 85 MONTH DAY YEAR	



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

I. IDENTIFICATION

01 STATE 02 SITE NUMBER
NY 0002107199

II. WASTE STATES, QUANTITIES, AND CHARACTERISTICS

01 PHYSICAL STATES (Check all that apply)

- ☒ A. SOLID
☒ B. POWDER, FINES
☐ C. SLUDGE
☐ D. OTHER _____
(Specify)
- ☐ E. SLURRY
☐ F. LIQUID
☐ G. GAS

02 WASTE QUANTITY AT SITE

(Measure of waste quantities
must be independent)

TONS _____

CUBIC YARDS _____

NO. OF DRUMS _____

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			
ACD	ACIDS			
BAS	BASES			
MES	HEAVY METALS			

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	chromium	7440-47-3	unknown	0.150	mg/kg
MES	copper	7440-50-8	unknown	1500	mg/kg
	boiler ash from incineration of wood paper and paint wastes was also disposed on site				
MES	arsenic	7440-38-2	groundwater samples	49	mg/L
MES	beryllium	7440-41-7	groundwater samples	9	mg/L
MES	iron	7439-89-6	groundwater samples	433,600	mg/L
MES	lead	7439-92-1	groundwater samples	5,400	mg/L
MES	nickel	7440-02-0	groundwater samples	450	mg/L
OCC	fluoranthene	206-44-0	landfill	5,700	mg/kg
OCC	fluorene	86-73-7	landfill	1,100	mg/kg
OCC	pyrene	129-00-0	landfill	4,900	mg/kg
OCC	Aroclor 1260	11096-82-5	landfill	835	mg/kg

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)

1. USGS site investigation, draft, study report
2. ES and D&M site investigations, 3/20/85
3. Niagara County Health Department, site investigation, 2/22/84
4. Nanco Laboratories, Inc. 1988



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

I. IDENTIFICATION
01 STATE 02 SITE NUMBER
NY D00212799

II. HAZARDOUS CONDITIONS AND INCIDENTS

01 ☒ A. GROUNDWATER CONTAMINATION 02 ☒ OBSERVED (DATE: 2/88) ☐ POTENTIAL ☐ ALLEGED
03 POPULATION POTENTIALLY AFFECTED: 0 04 NARRATIVE DESCRIPTION

The following were detected in downgradient wells, beryllium (9mg/L), iron (433,600 mg/L), lead (5,400 mg/L), and nickel (450 mg/L).

01 ☒ B. SURFACE WATER CONTAMINATION 02 ☐ OBSERVED (DATE:) ☒ POTENTIAL ☐ ALLEGED
03 POPULATION POTENTIALLY AFFECTED: 04 NARRATIVE DESCRIPTION

Due to runoff (via storm sewers) from improperly contained wastes.

01 ☐ C. CONTAMINATION OF AIR 02 ☐ OBSERVED (DATE:) ☐ POTENTIAL ☐ ALLEGED
03 POPULATION POTENTIALLY AFFECTED: 04 NARRATIVE DESCRIPTION

No

01 ☐ D. FIRE/EXPLOSIVE CONDITIONS 02 ☐ OBSERVED (DATE:) ☐ POTENTIAL ☐ ALLEGED
03 POPULATION POTENTIALLY AFFECTED: 04 NARRATIVE DESCRIPTION

No

01 ☐ E. DIRECT CONTACT 02 ☐ OBSERVED (DATE:) ☐ POTENTIAL ☐ ALLEGED
03 POPULATION POTENTIALLY AFFECTED: 04 NARRATIVE DESCRIPTION

Unknown

01 ☒ F. CONTAMINATION OF SOIL 02 ☐ OBSERVED (DATE: 2/88) ☒ POTENTIAL ☐ ALLEGED
03 AREA POTENTIALLY AFFECTED: 2 04 NARRATIVE DESCRIPTION
(Acres)

Calcium and zinc detected in wastes which are in direct contact with the soil. Concentrations were above published naturally occurring ranges.

01 ☐ G. DRINKING WATER CONTAMINATION 02 ☐ OBSERVED (DATE:) ☐ POTENTIAL ☐ ALLEGED
03 POPULATION POTENTIALLY AFFECTED: 04 NARRATIVE DESCRIPTION

No

01 ☐ H. WORKER EXPOSURE/INJURY 02 ☐ OBSERVED (DATE:) ☐ POTENTIAL ☐ ALLEGED
03 WORKERS POTENTIALLY AFFECTED: 04 NARRATIVE DESCRIPTION

No

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

Unknown



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

I. IDENTIFICATION

01 STATE 02 SITE NUMBER
NY 0002127199

II. HAZARDOUS CONDITIONS AND INCIDENTS (Continued)

01 ☒ J. DAMAGE TO FLORA
04 NARRATIVE DESCRIPTION

02 ☐ OBSERVED (DATE: _____)

☒ POTENTIAL

☐ ALLEGED

Not observed

01 ☒ K. DAMAGE TO FAUNA
04 NARRATIVE DESCRIPTION (include name(s) of species)

02 ☐ OBSERVED (DATE: _____)

☒ POTENTIAL

☐ ALLEGED

Not observed

01 ☒ L. CONTAMINATION OF FOOD CHAIN
04 NARRATIVE DESCRIPTION

02 ☐ OBSERVED (DATE: _____)

☒ POTENTIAL

☐ ALLEGED

Not observed

01 ☒ M. UNSTABLE CONTAINMENT OF WASTES
(Spills/Runoff/Standing liquids, Leaking drums)

02 ☒ OBSERVED (DATE: 1985)

☐ POTENTIAL

☐ ALLEGED

03 POPULATION POTENTIALLY AFFECTED: _____ 04 NARRATIVE DESCRIPTION

unlined landfill. Inadequate cover

01 ☐ N. DAMAGE TO OFFSITE PROPERTY
04 NARRATIVE DESCRIPTION

02 ☐ OBSERVED (DATE: _____)

☐ POTENTIAL

☐ ALLEGED

No

01 ☐ O. CONTAMINATION OF SEWERS, STORM DRAINS, WWTPs
04 NARRATIVE DESCRIPTION

02 ☐ OBSERVED (DATE: _____)

☐ POTENTIAL

☐ ALLEGED

No

01 ☒ P. ILLEGAL/UNAUTHORIZED DUMPING
04 NARRATIVE DESCRIPTION

02 ☐ OBSERVED (DATE: _____)

☒ POTENTIAL

☐ ALLEGED

Possible midnight dumping- nonsecure area

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

III. TOTAL POPULATION POTENTIALLY AFFECTED: _____

IV. COMMENTS

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

ES site visit, 1985, 1988

Nanco Laboratories, Inc. 1988. Analytical data for waste samples.



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

I. IDENTIFICATION
01 STATE | 02 SITE NUMBER
NY | D002127199

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				
☐ E. RCRA INTERIM STATUS				
☐ F. SPCC PLAN				
☐ G. STATE (Specify)				
☐ H. LOCAL (Specify)				
☐ I. OTHER (Specify)				
☐ J. NONE				

III. SITE DESCRIPTION

01 STORAGE/DISPOSAL (Check all that apply)	02 AMOUNT	03 UNIT OF MEASURE	04 TREATMENT (Check all that apply)	05 OTHER
☐ A. SURFACE IMPOUNDMENT			☐ A. INCENERATION	☐ A. BUILDINGS ON SITE
☐ B. PILES			☐ B. UNDERGROUND INJECTION	
☐ C. DRUMS, ABOVE GROUND			☐ C. CHEMICAL/PHYSICAL	
☐ D. TANK, ABOVE GROUND			☐ D. BIOLOGICAL	
☐ E. TANK, BELOW GROUND			☐ E. WASTE OIL PROCESSING	
☐ F. LANDFILL			☐ F. SOLVENT RECOVERY	
☐ G. LANDFARM			☐ G. OTHER RECYCLING/RECOVERY	
☒ H. OPEN DUMP	unknown		☐ H. OTHER (Specify)	06 AREA OF SITE approx. 4 (Acres)
☐ I. OTHER (Specify)				

07 COMMENTS

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.

The waste material (ie, boiler ash) was disposed directly on the ground. The inactive disposal area was covered by an estimated three(3) feet of soil fill.

V. ACCESSIBILITY

01 WASTE EASILY ACCESSIBLE: ☐ YES ☒ NO

02 COMMENTS

The landfill on the northern end of the property is covered with soil fill. There is n fence to prevent unauthorized entry.

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

Niagara County Health Department, Site Profile Report, 1981
Muench, 1985



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

I. IDENTIFICATION

01 STATE NY 02 SITE NUMBER D002127199

II. DRINKING WATER SUPPLY

01 TYPE OF DRINKING SUPPLY (Check as applicable)	02 STATUS	03 DISTANCE TO SITE															
<table><tr><td>SURFACE</td><td>WELL</td></tr><tr><td>COMMUNITY A. ☒</td><td>B. ☐</td></tr><tr><td>NON-COMMUNITY C. ☐</td><td>D. ☐</td></tr></table>	SURFACE	WELL	COMMUNITY A. ☒	B. ☐	NON-COMMUNITY C. ☐	D. ☐	<table><tr><td>ENDANGERED</td><td>AFFECTED</td><td>MONITORED</td></tr><tr><td>A. ☐</td><td>B. ☐</td><td>C. ☐</td></tr><tr><td>D. ☐</td><td>E. ☐</td><td>F. ☐</td></tr></table>	ENDANGERED	AFFECTED	MONITORED	A. ☐	B. ☐	C. ☐	D. ☐	E. ☐	F. ☐	more than A. <u>3.0</u> (mi) B. _____ (mi)
SURFACE	WELL																
COMMUNITY A. ☒	B. ☐																
NON-COMMUNITY C. ☐	D. ☐																
ENDANGERED	AFFECTED	MONITORED															
A. ☐	B. ☐	C. ☐															
D. ☐	E. ☐	F. ☐															

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 <u>0</u>	03 DISTANCE TO NEAREST DRINKING WATER WELL <u>more than 3.0</u> (mi)			
04 DEPTH TO GROUNDWATER <u>1-2</u> (ft)	05 DIRECTION OF GROUNDWATER FLOW <u>North</u>	06 DEPTH TO AQUIFER OF CONCERN <u>1-2</u> (ft)	07 POTENTIAL YIELD OF AQUIFER <u>unknown</u> (gpd)	08 SOLE SOURCE AQUIFER ☐ YES ☒ NO

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

Three industrial wells at Hooker-Durez Div., located 1.5 miles east of site, however, they have not been used for 15-20 years.

10 RECHARGE AREA ☐ YES ☐ NO	COMMENTS	11 DISCHARGE AREA ☐ YES ☐ NO	COMMENTS
--	----------	---	----------

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
<u>Niagara River</u>	☐	<u>0.3</u> (mi)
_____	☐	_____ (mi)
_____	☐	_____ (mi)

V. DEMOGRAPHIC AND PROPERTY INFORMATION

01 TOTAL POPULATION WITHIN	02 DISTANCE TO NEAREST POPULATION						
<table><tr><td>ONE (1) MILE OF SITE</td><td>TWO (2) MILES OF SITE</td><td>THREE (3) MILES OF SITE</td></tr><tr><td>A. <u>9,456</u> NO. OF PERSONS</td><td>B. <u>28,263</u> NO. OF PERSONS</td><td>C. <u>37,746</u> NO. OF PERSONS</td></tr></table>	ONE (1) MILE OF SITE	TWO (2) MILES OF SITE	THREE (3) MILES OF SITE	A. <u>9,456</u> NO. OF PERSONS	B. <u>28,263</u> NO. OF PERSONS	C. <u>37,746</u> NO. OF PERSONS	<u>0.01</u> (mi)
ONE (1) MILE OF SITE	TWO (2) MILES OF SITE	THREE (3) MILES OF SITE					
A. <u>9,456</u> NO. OF PERSONS	B. <u>28,263</u> NO. OF PERSONS	C. <u>37,746</u> NO. OF PERSONS					

03 NUMBER OF BUILDINGS WITHIN TWO (2) MILES OF SITE <u>7,438</u>	04 DISTANCE TO NEAREST OFF-SITE BUILDING <u>0.0</u> (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)

Site is located in a densely populated residential/industrial area

1980
population
encus



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

I. IDENTIFICATION

01 STATE NY 02 SITE NUMBER D00212799

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

30 (ft)

04 DEPTH OF CONTAMINATED SOIL ZONE

6.5 (ft)

05 SOIL pH

06 NET PRECIPITATION

9 (in)

07 ONE YEAR 24 HOUR RAINFALL

2.1 (in)

08 SLOPE
SITE SLOPE

less than 0.5 %

DIRECTION OF SITE SLOPE

TERRAIN AVERAGE SLOPE

0.7 %

09 FLOOD POTENTIAL

more than
SITE IS IN 100 YEAR FLOODPLAIN

10

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

11 DISTANCE TO WETLANDS (5 acre minimum)

ESTUARINE
more than

A. 2.0 (mi)

OTHER

B. 0.6 (mi)

12 DISTANCE TO CRITICAL HABITAT (of endangered species)

there are no more than 3
federally-designated critical habitats in NYS

ENDANGERED SPECIES: _____

13 LAND USE IN VICINITY

DISTANCE TO:

COMMERCIAL/INDUSTRIAL

RESIDENTIAL AREAS; NATIONAL/STATE PARKS,
FORESTS, OR WILDLIFE RESERVES

AGRICULTURAL LANDS
PRIME AG LAND AG LAND

A. 0.0 (mi)

B. 0.01 (mi)

C. more than 2 (mi) D. more than 1 (mi)

14 DESCRIPTION OF SITE IN RELATION TO SURROUNDING TOPOGRAPHY

Site is level filled area adjacent to a former lower-lying swamp. Surface runoff from the site and adjacent buildings to the North and South drains into the swamp.

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

Farquar, J., 1987. Letter to L. Dobson of ES, 9/2/87
Ozard, 1988. Letter to W. Bradford of ES, 4/14/88
USDOC Technical paper No. 40
USDOC Climatic Atlas of the United States
NYS Atlas of Community Water System Sources, 1982



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

I. IDENTIFICATION

01 STATE 02 SITE NUMBER
NY D002127199

II. SAMPLES TAKEN

SAMPLE TYPE	01 NUMBER OF SAMPLES TAKEN	02 SAMPLES SENT TO	03 ESTIMATED DATE RESULTS AVAILABLE
GROUNDWATER	3	Nanco Laboratories, Inc.	Now
SURFACE WATER			
WASTE	3	Nanco Laboratories, Inc.	Now
AIR			
RUNOFF			
SPILL			
SOIL			
VEGETATION			
OTHER			

III. FIELD MEASUREMENTS TAKEN

01 TYPE	02 COMMENTS
HNU Meter	HNU readings were 5-7 ppm(at a distance of 5-6" above ground)
	over the fill area. The highest readings were found in the north-
	-western end of the landfill(9ppm). Background readings at the site
	were 1-2 ppm. Subsequent readings during Phase II investigation
	were not above background.

IV. PHOTOGRAPHS AND MAPS

01 TYPE ☐ GROUND ☐ AERIAL	02 IN CUSTODY OF _____ (Name of organization or individual)
03 MAPS ☒ YES ☐ NO	04 LOCATION OF MAPS site map was updated during site inspection

V. OTHER FIELD DATA COLLECTED (Provide narrative description)

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

ES and Dames and Moore site inspection, 3/20/85, January 1988.
Nanco Laboratories, Inc. 1988.



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

I. IDENTIFICATION

01 STATE 02 SITE NUMBER
NY D002127199

II. CURRENT OWNER(S)					PARENT COMPANY (If applicable)				
01 NAME Buffalo Pumps Division			02 D+B NUMBER		08 NAME Buffalo Forge Company			09 D+B NUMBER	
03 STREET ADDRESS (P.O. Box, RFD #, etc.) 874 Oliver Street			04 SIC CODE		10 STREET ADDRESS (P.O. Box, RFD #, etc.) 490 Broadway Avenue			11 SIC CODE	
05 CITY North Tonawanda		06 STATE NY	07 ZIP CODE 14120		12 CITY North Tonawanda		13 STATE NY	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	
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) (Last most recent first)					IV. REALTY OWNER(S) (If applicable; last most recent first)				
01 NAME Voelker and Felthousen			02 D+B NUMBER		01 NAME			02 D+B NUMBER	
03 STREET ADDRESS (P.O. Box, RFD #, etc.) 874 Oliver Street			04 SIC CODE		03 STREET ADDRESS (P.O. Box, RFD #, etc.)			04 SIC CODE	
05 CITY North Tonawanda		06 STATE NY	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)									
ES and D&M site inspection, 3/20/85									



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

I. IDENTIFICATION

01 STATE 02 SITE NUMBER
NY D002127199

II. CURRENT OPERATOR (Provide if different from owner)				OPERATOR'S PARENT COMPANY (if applicable)			
01 NAME Buffalo Pumps Division		02 D+B NUMBER		10 NAME Buffalo Forge Company		11 D+B NUMBER	
03 STREET ADDRESS (P.O. Box, RFD #, etc.) 874 Oliver Street		04 SIC CODE		12 STREET ADDRESS (P.O. Box, RFD #, etc.) 490 Broadway Avenue		13 SIC CODE	
05 CITY North Tonawanda		06 STATE	07 ZIP CODE	14 CITY Buffalo		15 STATE NY	16 ZIP CODE 14204
08 YEARS OF OPERATION 1931-present		09 NAME OF OWNER					
III. PREVIOUS OPERATOR(S) (List most recent first; provide only if different from owner)				PREVIOUS OPERATORS' PARENT COMPANIES (if applicable)			
01 NAME Buffalo Steam Pump Co.		02 D+B NUMBER		10 NAME		11 D+B NUMBER	
03 STREET ADDRESS (P.O. Box, RFD #, etc.) 874 Oliver Street		04 SIC CODE		12 STREET ADDRESS (P.O. Box, RFD #, etc.)		13 SIC CODE	
05 CITY North Tonawanda		06 STATE	07 ZIP CODE	14 CITY		15 STATE	16 ZIP CODE
08 YEARS OF OPERATION 1891-1931		09 NAME OF OWNER DURING THIS PERIOD same					
01 NAME		02 D+B NUMBER		10 NAME		11 D+B NUMBER	
03 STREET ADDRESS (P.O. Box, RFD #, etc.)		04 SIC CODE		12 STREET ADDRESS (P.O. Box, RFD #, etc.)		13 SIC CODE	
05 CITY		06 STATE	07 ZIP CODE	14 CITY		15 STATE	16 ZIP CODE
08 YEARS OF OPERATION		09 NAME OF OWNER DURING THIS PERIOD					
01 NAME		02 D+B NUMBER		10 NAME		11 D+B NUMBER	
03 STREET ADDRESS (P.O. Box, RFD #, etc.)		04 SIC CODE		12 STREET ADDRESS (P.O. Box, RFD #, etc.)		13 SIC CODE	
05 CITY		06 STATE	07 ZIP CODE	14 CITY		15 STATE	16 ZIP CODE
08 YEARS OF OPERATION		09 NAME OF OWNER DURING THIS PERIOD					
01 NAME		02 D+B NUMBER		10 NAME		11 D+B NUMBER	
03 STREET ADDRESS (P.O. Box, RFD #, etc.)		04 SIC CODE		12 STREET ADDRESS (P.O. Box, RFD #, etc.)		13 SIC CODE	
05 CITY		06 STATE	07 ZIP CODE	14 CITY		15 STATE	16 ZIP CODE
08 YEARS OF OPERATION		09 NAME OF OWNER DURING THIS PERIOD					
IV. SOURCES OF INFORMATION (Cite specific references, e.g., state files, sample analysis, reports)							

Niagara County Health Department, Site Profile Report



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

I. IDENTIFICATION
01 STATE 02 SITE NUMBER
NY D002127199

II. ON-SITE GENERATOR

01 NAME none	02 D+B NUMBER
03 STREET ADDRESS (P.O. Box, RFD #, etc.)	04 SIC CODE
05 CITY	06 STATE 07 ZIP CODE

III. OFF-SITE GENERATOR(S)

01 NAME unknown	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 not applicable	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 fees, sample analysis, reports)



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

I. IDENTIFICATION

01 STATE 02 SITE NUMBER
NY 0002127199

II. PAST RESPONSE ACTIVITIES

01 ☐ A. WATER SUPPLY CLOSED 04 DESCRIPTION no	02 DATE _____	03 AGENCY _____
01 ☐ B. TEMPORARY WATER SUPPLY PROVIDED 04 DESCRIPTION no	02 DATE _____	03 AGENCY _____
01 ☐ C. PERMANENT WATER SUPPLY PROVIDED 04 DESCRIPTION no	02 DATE _____	03 AGENCY _____
01 ☐ D. SPILLED MATERIAL REMOVED 04 DESCRIPTION no	02 DATE _____	03 AGENCY _____
01 ☐ E. CONTAMINATED SOIL REMOVED 04 DESCRIPTION no	02 DATE _____	03 AGENCY _____
01 ☐ F. WASTE REPACKAGED 04 DESCRIPTION no	02 DATE _____	03 AGENCY _____
01 ☐ G. WASTE DISPOSED ELSEWHERE 04 DESCRIPTION no	02 DATE _____	03 AGENCY _____
01 ☐ H. ON SITE BURIAL 04 DESCRIPTION no	02 DATE _____	03 AGENCY _____
01 ☐ I. IN SITU CHEMICAL TREATMENT 04 DESCRIPTION no	02 DATE _____	03 AGENCY _____
01 ☐ J. IN SITU BIOLOGICAL TREATMENT 04 DESCRIPTION no	02 DATE _____	03 AGENCY _____
01 ☐ K. IN SITU PHYSICAL TREATMENT 04 DESCRIPTION no	02 DATE _____	03 AGENCY _____
01 ☐ L. ENCAPSULATION 04 DESCRIPTION no	02 DATE _____	03 AGENCY _____
01 ☐ M. EMERGENCY WASTE TREATMENT 04 DESCRIPTION no	02 DATE _____	03 AGENCY _____
01 ☐ N. CUTOFF WALLS 04 DESCRIPTION no	02 DATE _____	03 AGENCY _____
01 ☐ O. EMERGENCY DIKING/SURFACE WATER DIVERSION 04 DESCRIPTION no	02 DATE _____	03 AGENCY _____
01 ☐ P. CUTOFF TRENCHES/SUMP 04 DESCRIPTION no	02 DATE _____	03 AGENCY _____
01 ☐ Q. SUBSURFACE CUTOFF WALL 04 DESCRIPTION no	02 DATE _____	03 AGENCY _____



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

I. IDENTIFICATION
01 STATE 02 SITE NUMBER
NY D002127199

II PAST RESPONSE ACTIVITIES (Continued)

01 ☐ R. BARRIER WALLS CONSTRUCTED

02 DATE _____

03 AGENCY _____

04 DESCRIPTION

no

01 ☒ S. CAPPING/COVERING

02 DATE _____

03 AGENCY _____

04 DESCRIPTION

construction debris fill covers site (3-4 feet)

01 ☐ T. BULK TANKAGE REPAIRED

02 DATE _____

03 AGENCY _____

04 DESCRIPTION

no

01 ☐ U. GROUT CURTAIN CONSTRUCTED

02 DATE _____

03 AGENCY _____

04 DESCRIPTION

no

01 ☐ V. BOTTOM SEALED

02 DATE _____

03 AGENCY _____

04 DESCRIPTION

no

01 ☐ W. GAS CONTROL

02 DATE _____

03 AGENCY _____

04 DESCRIPTION

no

01 ☐ X. FIRE CONTROL

02 DATE _____

03 AGENCY _____

04 DESCRIPTION

no

01 ☐ Y. LEACHATE TREATMENT

02 DATE _____

03 AGENCY _____

04 DESCRIPTION

no

01 ☐ Z. AREA EVACUATED

02 DATE _____

03 AGENCY _____

04 DESCRIPTION

no

01 ☐ 1. ACCESS TO SITE RESTRICTED

02 DATE _____

03 AGENCY _____

04 DESCRIPTION

no

01 ☐ 2. POPULATION RELOCATED

02 DATE _____

03 AGENCY _____

04 DESCRIPTION

no

01 ☐ 3. OTHER REMEDIAL ACTIVITIES

02 DATE _____

03 AGENCY _____

04 DESCRIPTION

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

ES and D&M site inspection, 3/20/85



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

I. IDENTIFICATION

01 STATE	02 SITE NUMBER
NY	0002127199

II. ENFORCEMENT INFORMATION

01 PAST REGULATORY/ENFORCEMENT ACTION ☐ YES ☒ NO

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

none

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

Letter from Vance Bryant (NYSDEC Division Environmental Enforcement) to M. Anatra
(ES)-7/7/87

HRS REFERENCES*

BUFFALO PUMPS SITE

1. Nanco Labs, Inc., 1988. Analytical results for Buffalo Pumps site.
2. Engineering-Science, Inc., 1988a. Boring logs for monitoring wells at Buffalo Pumps site.
3. Engineering-Science, Inc., 1988b. Phase II report for Buffalo Pumps site, Table IV-4.
4. U.S. Department of Commerce, National Climatic Center, Ashville, N.C. 1979. Climatic atlas of the United States.
5. Freeze and Cherry, 1979. Groundwater, Table 2.2, Prentice-Hall, Englewood Cliff, New Jersey.
6. Muench, Plant Manager, Buffalo Pumps, 1985. Interviews dated March 20, 1985 and April 10, 1985. Telephone conversation dated October 10, 1985.
7. NYSDEC, 1987. Inactive Hazardous Waste Disposal Report, Buffalo Pumps site.
8. Hopkins, 1987. Niagara County Health Department (Assistant Public Health Engineer), telephone interview, October 8, 1987.
9. Noll, 1987. Hooker Chemical - Durez Division, telephone interview, October 12, 1987.
10. NYSDOH, 1982. New York State Department of Health, New York State Atlas of Community Water System Sources, 1982.
11. USGS, 1980. 7.5 minute Topographic Maps, Tonawanda West and Tonawanda East Quadrangles, New York.
12. USDOC, 1963. U.S. Department of Commerce Technical Paper No. 40.
13. Booz, Allen and Hamilton, 1983. An Overview of the Contaminants of Concern in the Disposal and Utilization of Municipal Sewage Sludge, updated on April 15, 1983.
14. USGS, 1984. Element Concentrations in Soils and Other Surficial Materials of the Conterminous United States, Professional Paper 1270.
15. NCHD, 1981. Niagara County Health Department, Site Report for Buffalo Pumps Site.
16. Farquhar, 1987. NYSDEC Fish and Wildlife Division, Letter to Elizabeth Dobson, (Engineering-Science, Inc.), September 2, 1987.

*All these references were used for HRS Documentation, while some of them were also used as general references.

17. Ozard, 1988. NYSDEC Wildlife Resources Center, telephone interview dated April 14, 1988.
18. U.S. Census Bureau Data, 1980.
19. USDOI, 1983. U.S. Department of the Interior, National Park Service National Register of Historic Places dated July, 1983.
20. Federal Register, 1983. Part III Department of the Interior National Registry of Natural Landmarks dated March 1, 1983.
21. Sax, 1984. Dangerous Properties of Industrial Materials, Sixth Edition, Van Nostrand Reinhold Company, New York.

GENERAL REFERENCES**

BUFFALO PUMPS SITE

22. ES and Dames and Moore, 1985; Site Inspection, March/April, 1985.
23. IATFR, 1979; Inter-Agency Task Force Report, Buffalo Pumps Site. (copy not provided)
24. LaSala, 1968; Groundwater Resources of the Erie-Niagara Basin, New York, Basin Planning Report ENB-3.
25. NYSDEC, 1985; NYSDEC Water Bulletin, August 1985. (copy not provided)
26. NYSDOT, 1976; New York State Department of Transportation 7.5 Minute Series Planimetric Map, Tonawanda West Quadrangle, Second Edition.
27. Rand McNally, 1981; Worldmaster World Atlas New Census Edition, Rand McNally and Company, New York.
28. Sittig, 1985; Handbook of Toxic and Hazardous Chemicals and Carcinogens, Second Edition, Noyes Publications, Park Ridge, New Jersey.
29. USDA, 1972; United States Department of Agriculture. Soil Survey of Niagara County, issued October 1972.
30. USEPA, 1985; Preliminary Evaluation of Chemical Migration to Groundwater and the Niagara River from Selected Waste Disposal Sites.
31. USGS, 1985; United States Geological Survey, Draft Report of Preliminary Evaluation of Chemical Migrations.

**These references were not used for HRS Documentation. See also "HRS References" above.

INORGANIC ANALYSIS DATA SHEET
FORM I

0000004...

①

SMPL NO. : GW-2.18

Lab Name : NANCO LABORATORIES, INC.

Customer Name: Engineering Science

SOW NO. N/A

Lab Receipt Date : 01/30/88

Lab Sample ID: 88-EW-5342

Date Reported: 2/22/88

Location ID: Buffalo Pumps

ELEMENTS IDENTIFIED AND MEASURED

CONCENTRATION : LOW ☒ MEDIUM ☐

MATRIX : WATER ☒ SOIL ☐ SLUDGE ☐ OTHER ☐

UG/L OR MG/KG DRY WEIGHT (CIRCLE ONE)

1. ALUMINUM	64000.0 P <i>N</i>	13. MAGNESIUM	184200.0 P
2. ANTIMONY	50.0 UP	14. MANGANESE	12900.0 P <i>E</i> (1:10)
3. ARSENIC	49.0 SF	15. MERCURY	0.2 U C.V.
4. BARIUM	430.0 P	16. NICKEL	96.0 P
5. BERYLLIUM	[2.4] P	17. POTASSIUM	7600.0 P
6. CADMIUM	4.0 UP <i>N</i>	18. SELENIUM	30.0 UF <i>N</i> (1:10)
7. CALCIUM	657900.0 P (1:10)	19. SILVER	10.0 UP
8. CHROMIUM	170.0 P	20. SODIUM	52600.0 P
9. COBALT	96.0 P	21. THALLIUM	2.0 UF <i>N</i>
10. COPPER	280.0 P	22. VANADIUM	110.0 P
11. IRON	126600.0 P <i>E</i>	23. ZINC	480.0 P
12. LEAD	56.0 F <i>N</i> (1:2)	PERCENT SOLIDS (%)	N/A
CYANIDE	NR		

FOOTNOTES : FOR REPORTING RESULTS STANDARD RESULT QUALIFIERS ARE USED AS DEFINED ON PAGE 2.

COMMENTS : This sample was a brown liquid that was colorless after ICP digestion procedures and colorless after furnace digestion procedures. Pb was analyzed at a 1:2 dilution. Ca, Mn, and Se were analyzed at a 1:10 dilution.

Angand
LAB MANAGER

17. Ozard, 1988. NYSDEC Wildlife Resources Center, telephone interview dated April 14, 1988.
18. U.S. Census Bureau Data, 1980.
19. USDOI, 1983. U.S. Department of the Interior, National Park Service National Register of Historic Places dated July, 1983.
20. Federal Register, 1983. Part III Department of the Interior National Registry of Natural Landmarks dated March 1, 1983.
21. Sax, 1984. Dangerous Properties of Industrial Materials, Sixth Edition, Van Nostrand Reinhold Company, New York.

INORGANIC ANALYSIS DATA SHEET
FORM I

0000005

1

SMPL NO. : GW-3.18

Lab Name : NANCO LABORATORIES, INC.

Customer Name: Engineering Science

SOW NO. N/A

Lab Receipt Date : 01/30/88

Lab Sample ID: 88-EW-5343

Date Reported: 2/22/88

Location ID: Buffalo Pumps

ELEMENTS IDENTIFIED AND MEASURED

CONCENTRATION : LOW X MEDIUM _____

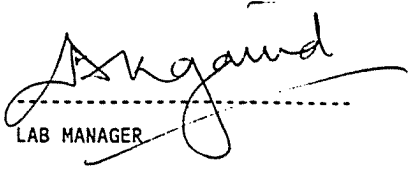
MATRIX : WATER X SOIL _____ SLUDGE _____ OTHER _____

UG/L OR MG/KG DRY WEIGHT (CIRCLE ONE)

1. ALUMINUM	184800.0 P _N	13. MAGNESIUM	248500.0 P
2. ANTIMONY	50.0 UP	14. MANGANESE	13100.0 P _E (1:10)
3. ARSENIC	18.0 F (1:5)	15. MERCURY	0.2 U C.V.
4. BARIUM	5500.0 P	16. NICKEL	450.0 P
5. BERYLLIUM	9.0 P	17. POTASSIUM	17100.0 P
6. CADMIUM	4.0 UP _N	18. SELENIUM	30.0 UF _N (1:10)
7. CALCIUM	966900.0 P (1:10)	19. SILVER	10.0 UP
8. CHROMIUM	1600.0 P	20. SODIUM	70100.0 P
9. COBALT	260.0 P	21. THALLIUM	2.0 UF _N
10. COPPER	670.0 P	22. VANADIUM	420.0 P
11. IRON	433600.0 P _E	23. ZINC	19800.0 P (1:10)
12. LEAD	5400.0 P	PERCENT SOLIDS (%)	N/A
CYANIDE	NR		

FOOTNOTES : FOR REPORTING RESULTS STANDARD RESULT QUALIFIERS ARE USED AS DEFINED ON PAGE 2.

COMMENTS : This sample was a brown liquid that was colorless after ICP digestion procedures and colorless after furnace digestion procedures. As was analyzed at a 1:5 dilution. Ca, Mn, Se and Zn were analyzed at a 1:10 dilution.


LAB MANAGER

INORGANIC ANALYSIS DATA SHEET
FORM I

0000003

SMPL NO.: B-1.18

1

Lab Name : NANCO LABORATORIES, INC.

Customer Name: ENGINEERING SCIENCE

SOW NO. : N/A

Lab Receipt Date : 1/12/88

Lab Sample ID: 87-ES-5069

Date Reported: 2/3/88

Location ID: Buffalo Pumps

ELEMENTS IDENTIFIED AND MEASURED

CONCENTRATION : LOW X MEDIUM
MATRIX : WATER SOIL X SLUDGE OTHER

UG/L OR MG/KG DRY WEIGHT (CIRCLE ONE)

1. ALUMINUM	8400.0 P * E	←	13. MAGNESIUM	17800.0 P * E
2. ANTIMONY	12.2 UP N		14. MANGANESE	650.0 P E
3. ARSENIC	3.9 F N		15. MERCURY	0.8 CV * ←
4. BARIUM	130.0 P		16. NICKEL	95.1 P
5. BERYLLIUM	[0.7] P		17. POTASSIUM	1200.0 UP *
6. CADMIUM	14.9 P N		18. SELENIUM	7.3 UF (1:10) N
7. CALCIUM	60400.0 P E		19. SILVER	2.4 UP N
8. CHROMIUM	21.0 P	←	20. SODIUM	140.0 UP
9. COBALT	[10.5] P		21. THALLIUM	0.5 UF
10. COPPER	340.0 P		22. VANADIUM	[3.9] P
11. IRON	32400.0 P * E		23. ZINC	5100.0 P (1:10) N * E
12. LEAD	57.8 F (1:10) N *		PERCENT SOLIDS (%)	82.0
CYANIDE	NR			
PHENOL	NR			

FOOTNOTES : FOR REPORTING RESULTS STANDARD RESULT QUALIFIERS ARE USED AS DEFINED ON PAGE 2.

COMMENTS : This sample was a brown/black liquid that became light yellow after ICP and furnace digestion procedures. Lead, Zinc, and Selenium were analyzed at a (1:10) dilution

[Signature]

LAB MANAGER

DRILLING CONTRACTOR: Driller: <u>M. Legare</u> Inspector: <u>W. Filley</u> Rig Type: <u>Mobile 61</u> Drilling Method: <u>4 1/4" ID HSA</u>	ENGINEERING-SCIENCE DRILLING RECORD	BORING NO. <u>GW-1</u> Sheet <u>1</u> of <u>1</u> Location <u>Parking lot on</u> <u>Oliver St.</u>
PROJECT NAME <u>DEC Phase II Buffalo Pump</u> PROJECT NO. <u>5401218</u>		

GROUND WATER OBSERVATIONS Water Level: <table border="1" style="width:100%; height: 40px;"><tr><td>Time</td><td></td><td></td></tr><tr><td>Date</td><td></td><td></td></tr></table> Casing Depth: <table border="1" style="width:100%; height: 40px;"><tr><td></td><td></td><td></td></tr><tr><td></td><td></td><td></td></tr></table>	Time			Date									Weather <u>Fair</u> Date/Time Start <u>1/8/88 1:00 pm</u> Date/Time Finish <u>1/8/88 3:00 pm</u>	Plot Plan <u>Oliver St</u>
Time														
Date														

Photovac Reading	SAMPLE DEPTHS	SAMPLE I.D.	SPT	FIELD IDENTIFICATION OF MATERIAL	WELL SCHEMATIC	Comments
0.0	0-2	S-1	21	Gray Brown Silt, some sand, Trace Clay & Fine gravel (Fill)	Grout	2.6'
	SS		11			
	Rec 18"		10			
			14			
0.0	2-4	S-2	9	Black Silt and Fine Sand (Fill)	Bentonite Pellets	4.0'
	SS		7			
	Rec 8"		6			
			8	4.5 Dark Gray Silt and Fine Sand (Fill)	2" PVC Riser	
0.0	4-6	S-3	3			
	SS		3			
	Rec 2"		5			
			7	Brown medium Fine sand + Silt (wet to Saturated)	Sand	10'
			2			
			2			
			2			
0.0	6-8	S-4	15	9.0	2" PVC Screen	
	SS		4			
	Rec 3"		2			
			2	10.0		
0.0	8-10	S-5	7			
	SS		15			
			19	Brown Silt, little Clay and Fine Sand (moist)		
	Rec 10"		18			
				Boring terminated at 10'		

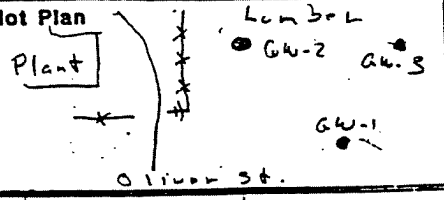
SPT- STANDARD PENETRATION TEST

D - DRY W - WASHED C - CORED
 U - UNDISTURBED SS - SPLIT SPOON
 P - PIT A - AUGER CUTTINGS

Soil Stratigraphy Summary Fill to 4.5' over Brown

Medium Fine Sand to 9.0 over Brown
 Clayey Silt to 10.

DRILLING CONTRACTOR: Driller: <u>M. Legare</u> Inspector: <u>W. Lilley</u> Rig Type: <u>Mobile 61</u> Drilling Method: <u>4 1/4" ID HSA</u>	ENGINEERING-SCIENCE DRILLING RECORD	BORING NO. <u>GW-2</u> Sheet <u>1</u> of <u>1</u> Location <u>Near Fence</u>
PROJECT NAME <u>DEC Phase II - Buffalo Pump</u> PROJECT NO. <u>SY01218</u>		

GROUND WATER OBSERVATIONS Water Level: <u>4.3</u> Time: <u>19:00</u> Date: <u>1/8</u> Casing Depth: <u>10'</u>	Weather: <u>Fair</u> Date/Time Start: <u>1/8/88 7:00 am</u> Date/Time Finish: <u>1/8/88 9:30 am</u>	Plot Plan 
---	---	--

Photoac Reading	SAMPLE DEPTHS	SAMPLE I.D.	SPT	FIELD IDENTIFICATION OF MATERIAL	WELL SCHEMATIC	Comments
0.0	0-2	S-1	60	Black to Gray Silt, Sand and Gravel Trace of Brick (Fill) (Frozen)	Grout	2.0
	SS 1		78/5"			
	Rec 9"					
0.0	2-4	S-2	5	Dark Gray Silt, Fine Sand Traces of Gravel (Fill) (moist)	Bentonite Pellets	4.0
	SS 1		6			
	Rec 12"		6			
0.0	4-6	S-3	3	Black to Brown Silt, Fine Sand Trace Gravel (Fill) (moist)	2" PVC Screen	10'
	SS 1		2			
	Rec 8"		2			
0.0	6-8	S-4	5	6.5' Brown to Gray medium Fine Sand little Silt (wet)	Sand	
	SS 1		15			
	Rec 18"		20			
0.2	8-10	S-5	13			
	SS 1		13			
	Rec 4"		14			
0.0	10-12	S-6	5			
	SS 1		12			
	Rec 6"		11			
			10	Boring terminated at 12'		

SPT-STANDARD PENETRATION TEST D = DRY W = WASHED C = CORED U = UNDISTURBED SS = SPLIT SPOON P = PIT A = AUGER CUTTINGS	Soil Stratigraphy Summary <u>Fill to 6.5' over Brown to Gray medium Fine Sand to 12'</u>
--	--

Soil Stratigraphy Summary Fill to 4.5' over Brown-Gray
medium Fine Sand to 9.0' over Gray Brown
Clayey Silt to 10'

TABLE IV-4

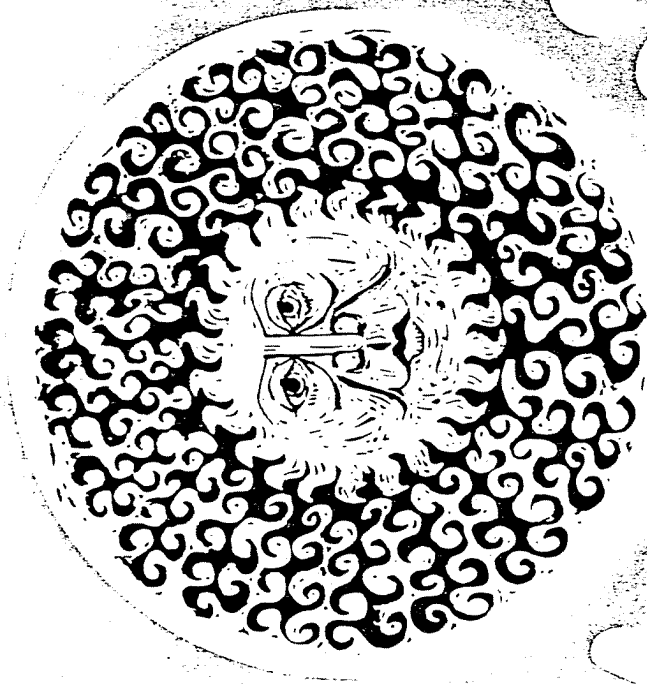
WATER LEVEL DATA

BUFFALO PUMPS SITE

Well I.D.	Ground Surface Elevation (Feet*)	Top of PVC Well Pipe Elevation (Feet*)	Well Screen Interval Elevation (Feet*)	Water Level Data			
				Date 2/17/88		Date 1/12/88	
				Depth to Water Level (Feet**)	Water Level Elevation (Feet*)	Depth to Water Level (Feet*)	Water Level Elevation (Feet*)
GW-1	498.7	500.4	493.7 - 488.7	4.3	496.1	5.3	495.1
GW-2	501.7	504.1	496.7 - 491.7	6.2	497.9	5.8	498.3
GW-3	499.2	500.9	494.2 - 489.2	3.4	497.5	4.0	496.9

* Referenced to an assumed on-site datum.

** Water level depth from top of PVC.



CLIMATIC ATLAS OF THE UNITED STATES

U.S. DEPARTMENT OF COMMERCE

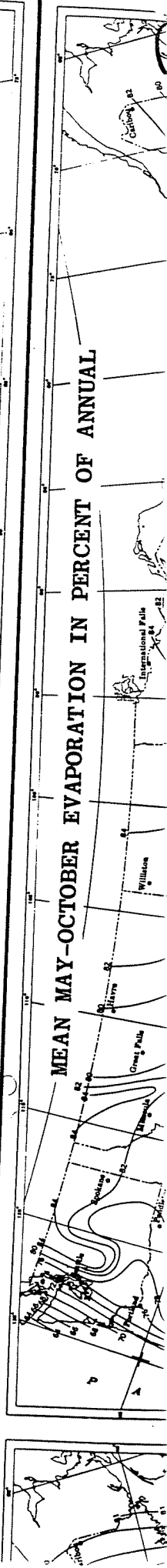
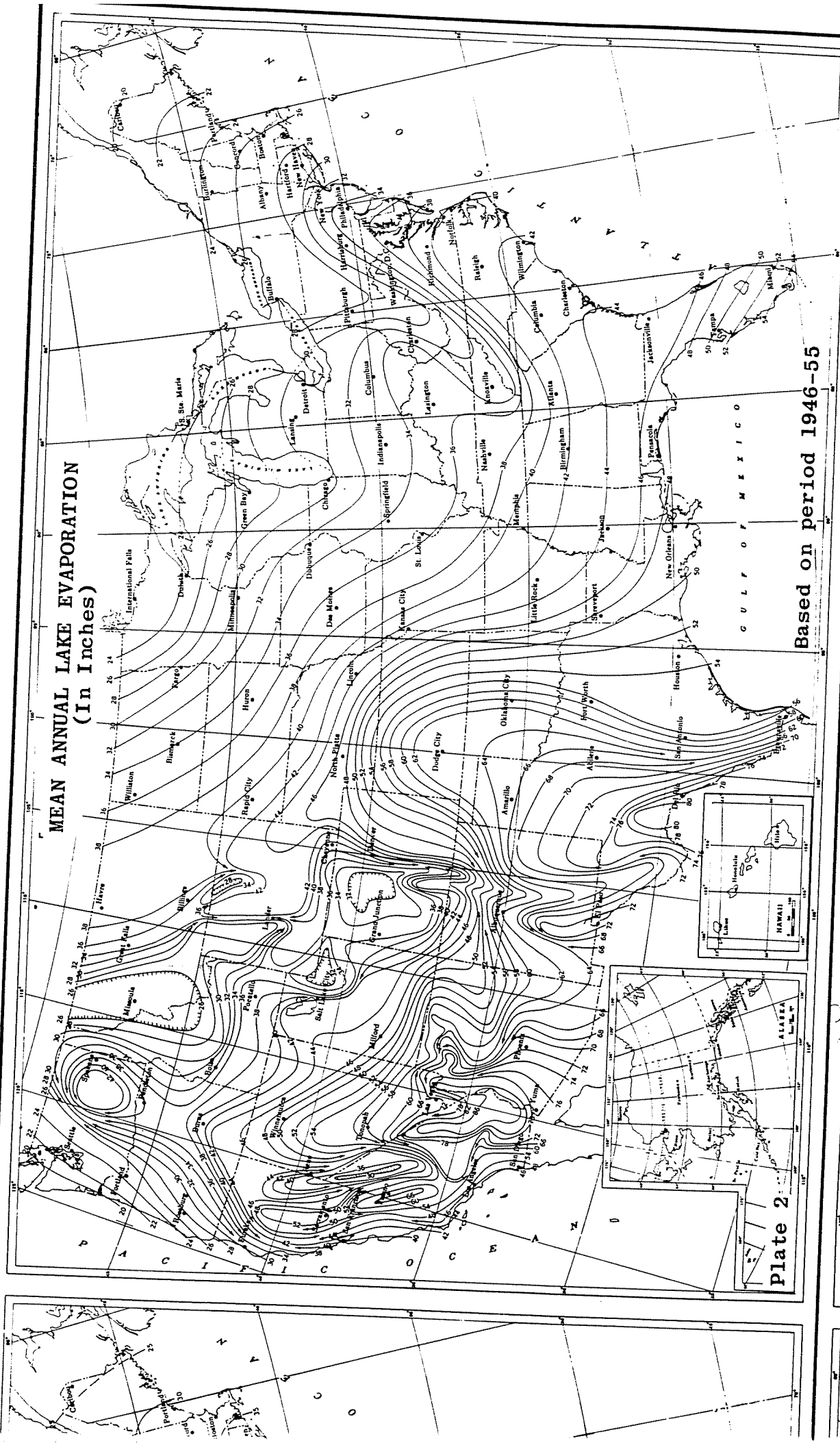
• Environmental Science Services Administration •

Environmental Data Service

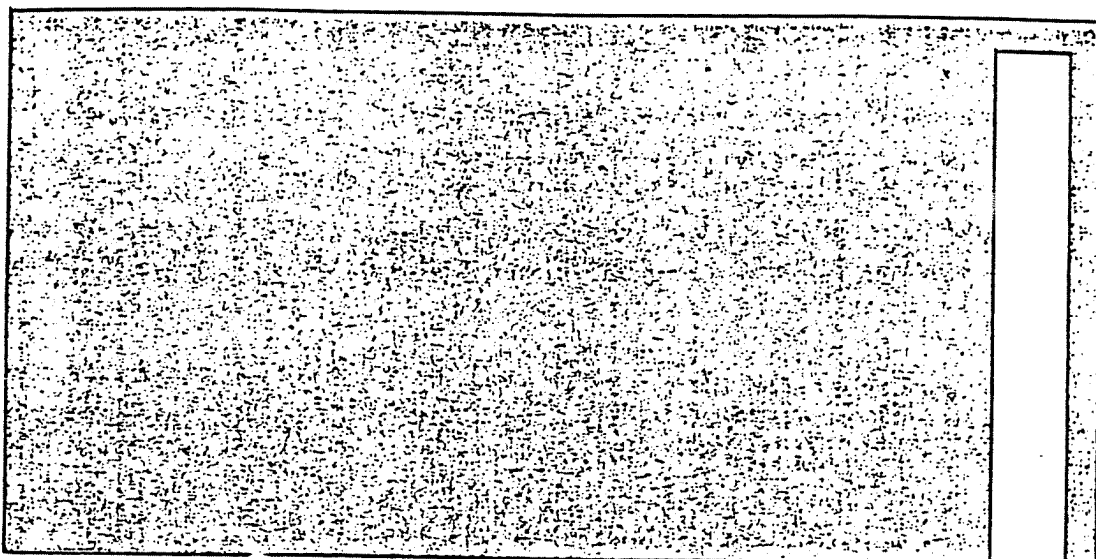
(4)

EXERCISES

AN AND LAKE EVAPORATION



5 F



R. Allan Freeze

Department of Geological Sciences
University of British Columbia
Vancouver, British Columbia

John A. Cherry

Department of Earth Sciences
University of Waterloo
Waterloo, Ontario

GROUNDWATER

Prentice-Hall, Inc.
Englewood Cliffs, New Jersey 07632

Table 2.2 Range of Values of Hydraulic Conductivity and Permeability

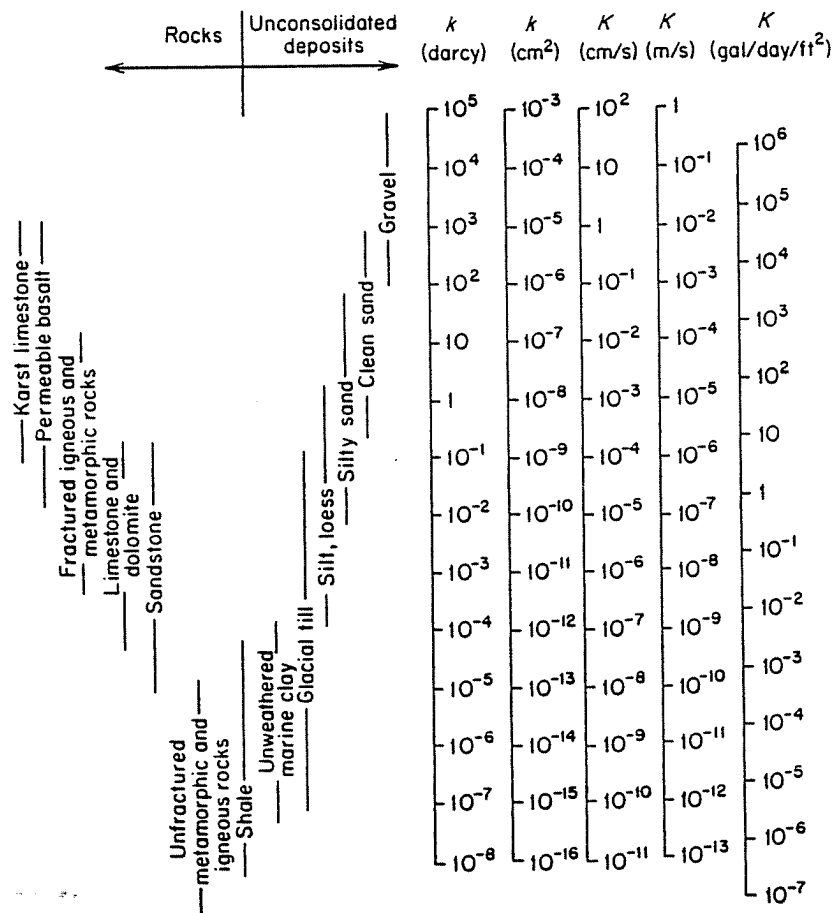


Table 2.3 Conversion Factors for Permeability and Hydraulic Conductivity Units

	Permeability, k^*			Hydraulic conductivity, K		
	cm²	ft²	darcy	m/s	ft/s	gal/day/ft²
cm²	1	1.08×10^{-3}	1.01×10^8	9.80×10^2	3.22×10^3	1.85×10^9
ft²	9.29×10^2	1	9.42×10^{10}	9.11×10^3	2.99×10^6	1.71×10^{12}
darcy	9.87×10^{-9}	1.06×10^{-11}	1	9.66×10^{-6}	3.17×10^{-5}	1.82×10^1
m/s	1.02×10^{-3}	1.10×10^{-6}	1.04×10^5	1	3.28	2.12×10^6
ft/s	3.11×10^{-4}	3.35×10^{-7}	3.15×10^4	3.05×10^{-1}	1	5.74×10^5
gal/day/ft²	5.42×10^{-10}	5.83×10^{-13}	5.49×10^{-2}	4.72×10^{-7}	1.74×10^{-6}	1

*To obtain k in ft², multiply k in cm² by 1.08×10^{-3} .

6

INTERVIEW FORM

INTERVIEWEE/CODE Mr. Muench
TITLE - POSITION plant manager / Buffalo Pumps
ADDRESS 875 Oliver St.
CITY North Tonawanda STATE NY ZIP 14120
PHONE (716) 693-1850 RESIDENCE PERIOD _____ TO _____
LOCATION Site inspection interview INTERVIEWER Bob Steele / John Botts
DATE/TIME 3/20/85 and 4/10/85
SUBJECT: onsite waste disposal / Phase I Investigation

REMARKS: In the period 1900 to 1953 foundry sands used in
bronze and iron casting were disposed adjacent to the
manufacturing plant. In addition, during the same period
through to 1971, boiler ash was disposed in this
area. No soil cover has been applied to the site
In 1977 to 1978, construction debris and
earthen material from the excavation
of a storm sewer on Oliver Street was landfilled
in an area north of an Erie Railroad easement.
In 1979 to 1980, construction debris and earthen material
from the demolition of an onsite building was added
to the fill. The USGS has two monitoring wells in
the fill area. One well may have been destroyed by
construction activity conducted by a neighboring business.

I AGREE WITH THE ABOVE SUMMARY OF THE INTERVIEW:

SIGNATURE:

COMMENTS:

INTERVIEW FORM

RECEIVED

FILE

FILED

INCOMING

COPIES TO

CIRCULATE TO

INTERVIEWEE/CODE Mr. Munch

TITLE - POSITION Buffalo Pump Plant Manager

ADDRESS 205 Oliver St

CITY Buffalo, Pennsylvania

STATE NY

ZIP 14202

PHONE (716) 23-1350

RESIDENCE PERIOD TO

LOCATION near telephone

INTERVIEWER John Ryan

DATE/TIME 10/10/85 @ 11:15

SUBJECT: Buffalo Pump Plant I Investigation

REMARKS: see Munch's classified information concerning the location of waste dumping and the type of materials dumped. From 1900 to 1933 foundation sands were dumped adjacent to the plant building and until 1971 boiler ash was also dumped. These materials were dumped over the entire fenced in area of the plant including the area subsequently covered by a pond addition (on the side of building). No soil cover was ever added to this area.

A second disposal area is located to the NW of the abandoned railroad tracks. This area received construction debris and was later covered with ^{clayey} materials from the excavation of a stream sewer on Oliver St. In this area landfilling occurred in low lying drainage area, and the survey was moved back to its present location.

I AGREE WITH THE ABOVE SUMMARY OF THE INTERVIEW:

SIGNATURE

Michael J Munch

COMMENTS:

Construction debris as noted consisted of no more than 15 cubic yards of brick only.

NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION
DIVISION OF HAZARDOUS WASTE REMEDIATION
INACTIVE HAZARDOUS WASTE DISPOSAL REPORT

7

CLASSIFICATION CODE: 2a

REGION: 9

SITE CODE: 932044

EPA ID: NYD002127199

NAME OF SITE : Buffalo Pumps Div-Buf. Forge Comp

STREET ADDRESS: 874 Oliver Street

TOWN/CITY:

North Tonawanda

COUNTY:

Niagara

ZIP:

SITE TYPE: Open Dump-X Structure- Lagoon- Landfill- Treatment Pond-
ESTIMATED SIZE: 4 Acres

SITE OWNER/OPERATOR INFORMATION:

CURRENT OWNER NAME....: Buffalo Pumps Div.- Buffalo Forg

CURRENT OWNER ADDRESS.: 490 Broadway, Buffalo, NY

OWNER(S) DURING USE....: Buf Pumps Div-Buf. Forge Company

OPERATOR DURING USE....: Buffalo Pumps Div. Buffalo Forge

OPERATOR ADDRESS.....: 490 Broadway, Buffalo, NY

PERIOD ASSOCIATED WITH HAZARDOUS WASTE: From Unknown To 1970

SITE DESCRIPTION:

Buffalo Pumps used coal fired boilers until 1970 and the boiler ash was disposed of in an area adjacent to the north side of the plant. It has been reported that no material other than ash was disposed at this site. Currently the principal wastes generated by the plant include wood, paper, waste oil and paint sludge. They are hauled off-site for disposal, incineration or re-cycling according to a Niagara County Site Profile report of March 1982, or re-cycling according to a Niagara County Site Profile report of March 1982. USGS collected groundwater and surface water-sediment samples in June 1982. No organic compounds were detected. Iron and copper were found to be in high concentration. State Superfund Phase I investigation Report was completed in May 1985. The report recommends additional investigations. A Phase II investigation has been scheduled.

HAZARDOUS WASTE DISPOSED: Confirmed-
TYPE

Suspected-X
QUANTITY (units)

Boiler Ash

Unknown

8

INTERVIEW FORM

INTERVIEWEE/CODE Mr. Mike Hopkins - Niagara County Dept. of Health
 TITLE - POSITION Assistant Public Health Engineer
 ADDRESS Main Post Office Box 428, 10th & East Falls St.
 CITY Niagara Falls STATE NY ZIP 14302
 PHONE (716) 284-3124 RESIDENCE PERIOD NO
 LOCATION Niagara Falls INTERVIEWER alg Bobson
 DATE/TIME October 8, 1987 / 1000 AM
 SUBJECT: Groundwater use in vicinity of Phase II sites: Nash Road, Chisholm Ryder and Buffalo Pumps.

REMARKS: During our telephone conversation, Mr. Hopkins related the following information:

Buffalo Pumps - drinking source is public water supply water. There are no residential wells within a 3 mile radius of site City of N. Tonawanda and Town of Wheatfield receive drinking water from Niagara River. There are no industrial or agricultural wells in the vicinity of the site.

Chisholm Ryder - four family homes located on Pennsylvania Ave (Town of Niagara) and Delaware Ave near Rte. 31 have shallow dug wells as their drinking water supply. These families are in the process of being hooked up to public water supply lines.

? should be confirmed with Town of Niagara Water District

Analyses of wells showed high bacterial content and some low volatile concentrations. Wells are probably upgradient of Chisholm Ryder site. Also in Town of Niagara Water District is a

foot of Pennsylvania Ave

Junkyard (location?) which has a well that is not used for drinking, but is used as 'wash water' 2 wells which exist on Bellvader Ave. are now abandoned. No industrial wells

or Agricultural wells exist within vicinity of Chisholm Ryder Site

(8)

INTERVIEW FORMINTERVIEWEE/CODE Mr. Mike Hopkins - Niagara County Health Dept.TITLE - POSITION Assistant Public Health EngineerADDRESS Main Post Office Box 428, 10th & East St.CITY Niagra Falls STATE NY ZIP 14302PHONE (916) 284-3124 RESIDENCE PERIOD 10LOCATION Niagra Falls INTERVIEWER zig DobsonDATE/TIME Oct. 08, 1987 / 10:00 AMSUBJECT: Groundwater Use in vicinity of Phase II sites: Nash Road, Chisholm Ryder and Buffalo Pumps.

REMARKS:

Nash Road - ^{City}~~Town~~ of North Tonawanda is on public water supply, no private drinking wells.

Doesn't think Town of Wheatfield has any private drinking / municipal wells, this must be checked with Town of Wheatfield Water Authority

Other information: General Bedrock info for N. Tonawanda: Camillus Shale, approx 30 feet to top of bedrock. Overlain by Till, overlain by clay.

as corrected 10/15/87

[Signature]

JOB NO. 84012.18 - Buffalo Pump
FILE DESIGNATION External Correspondence
DATE 10/12/87 TIME 11:15 Background info.

PHONE CALL FROM Liz Johnson PHONE NO. (315) 451-9560
PHONE CALL TO Hooker Chemical - Durez Division PHONE NO. (716) 696-6000
CONFERENCE WITH _____ Chuck Noll 696-6034
PLACE telephone In charge of Environmental

SUBJECT existence of industrial wells & construction.

10/12/87 - called Chuck Noll @ 11:20 - Not in office.

Chuck Noll
10/14/87 - Called back 3 industrial wells have not been
used for 15-20 years - wells are not capped
however - There are no wells on site which are
used for 'water usage' - lots of monitoring
wells - Dunn Geoscience did a report here, we
may be able to get well logs and geologic
cross-sections from report

New York State Atlas of Community Water System Sources 1982

NEW YORK STATE
DEPARTMENT OF HEALTH

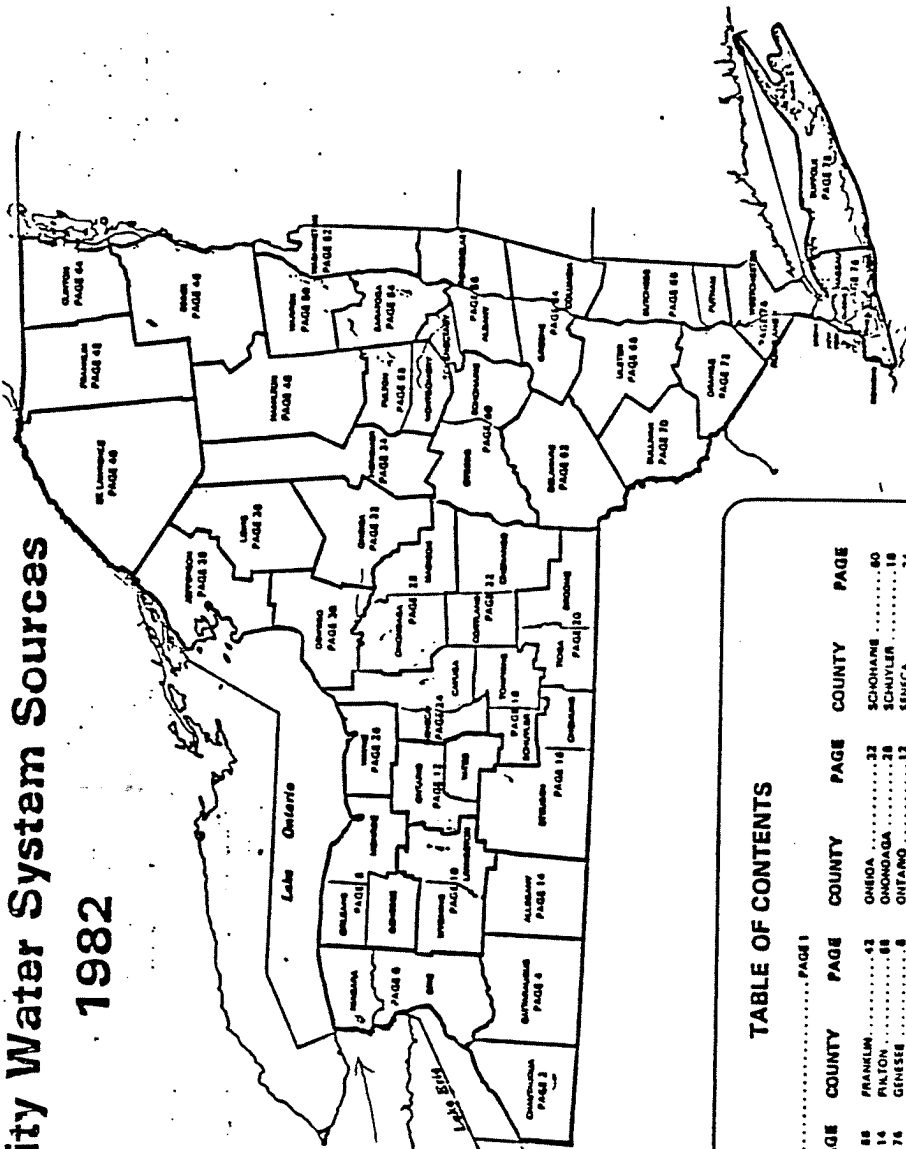


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LEGEND

BOUNDARIES AND PLACES

International	-----
State	-----
County	-----
Town	-----
Indian Reservation	-----
City	-----
Unincorporated Place	-----
Build-up Area (Over 15,000 population including any surrounding city or village)	-----
Village	-----
Federal Reservation	-----

CLASSIFICATION OF POPULATED PLACES

100,000 or more	YONKERS
50,000 to 100,000	Levittown
12,500 to 50,000	Poughkeepsie
2,500 to 12,500	Hempstead
250 to 2,500	
250 or less	

TRANSPORTATION

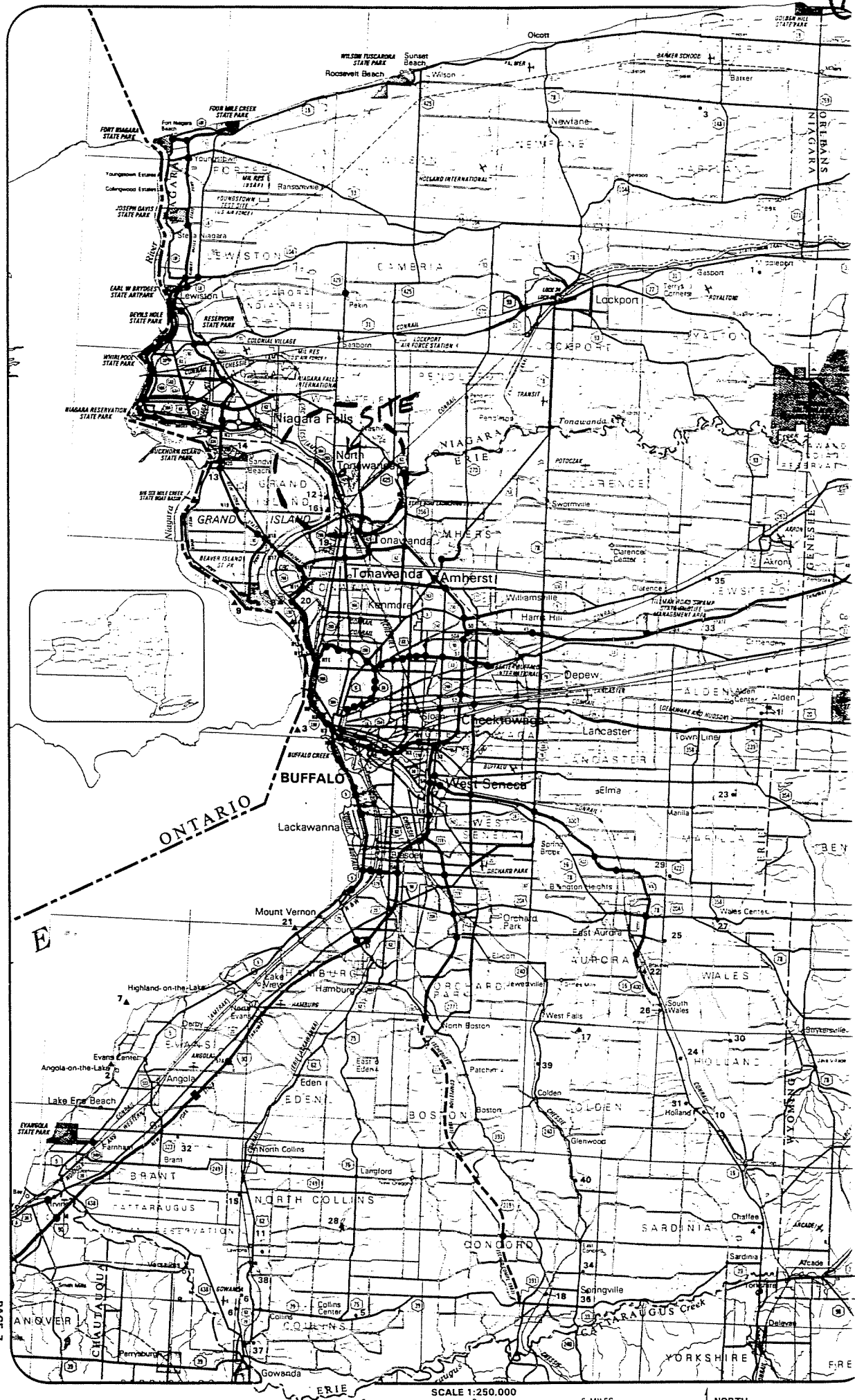
Highways	-----
Divided Highway	-----
Full Control of Access	-----
Partial or No Control of Access	-----
Unimproved Highway	-----
Interchanges	-----
Touring Route (State U.S. Interstate)	-----
State U.S. Interstate	-----
Touring Route Markers	-----
State U.S. Interstate	-----
Railroads	-----
Operating Line	-----
Service Discontinued	-----
Owner (If Other than Operator)	-----
Company Having Trackage Rights	-----
Airports (Open to the Public, Military)	-----
Runway under 4000'	-----
Runway over 4000'	-----
Feed, Gas, Fuel Station	-----
Gas, Fuel Station	-----
Parking Only	-----

RECREATION FACILITIES

State or National Recreation Area	-----
State Campground	-----
State Boat Launching Site	-----
State Game Park	-----
State Fish Hatchery	-----
Other State Recreation Site	-----

10

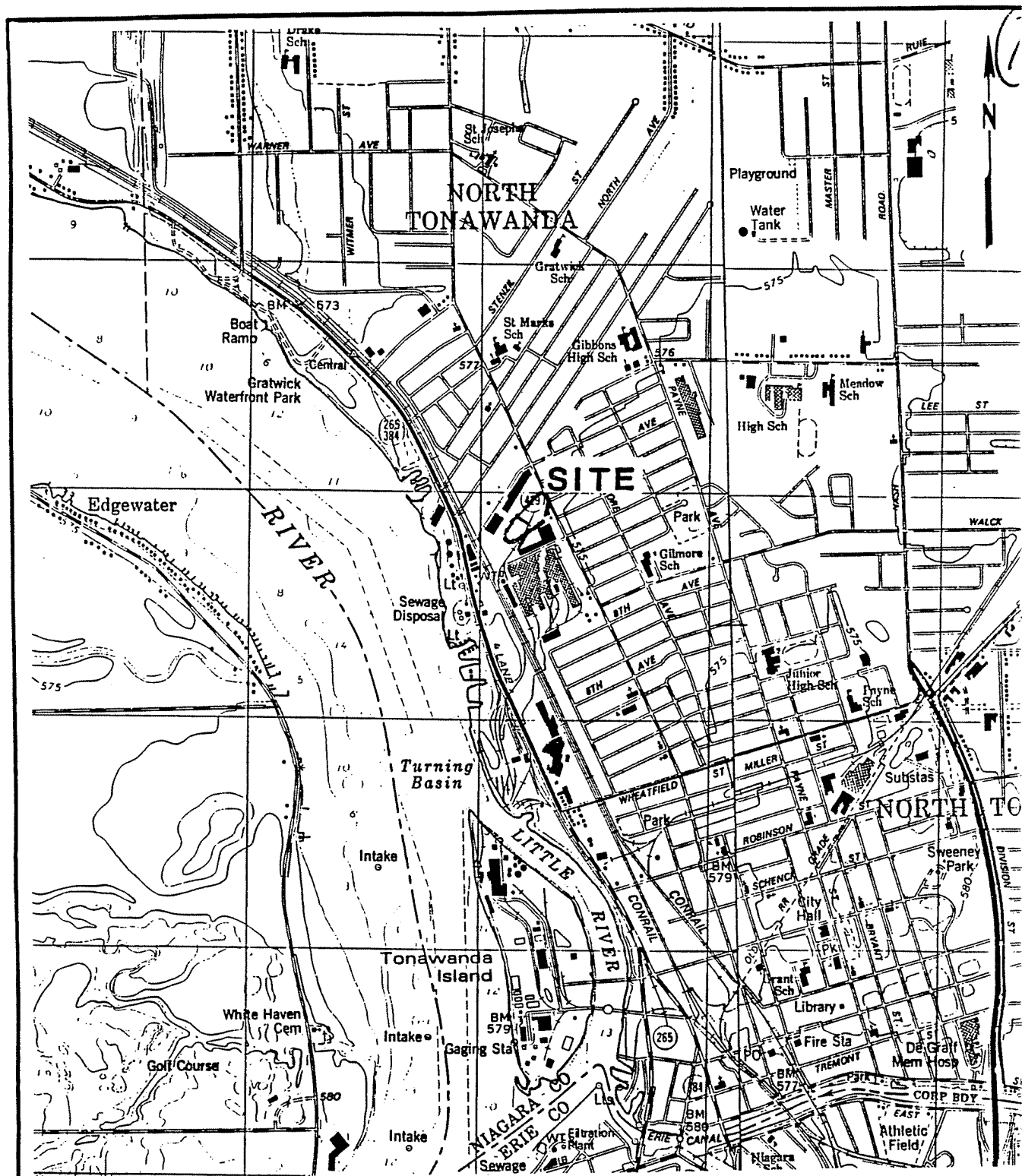
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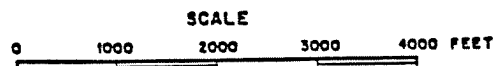
10

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	Coffee 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	Taylor's Grove Trailer Park.	39.	.Wells
39	Valley View Mobile Court.	42.	.Wells
40	Villager Apartments.	NA.	.Wells



LATITUDE: 43°02'47"
LONGITUDE: 78°53'09"



REFERENCE: U.S.G.S. 7.5' Topographic Map
Tonawanda West, NY (1980) and Tonawanda
East, NY (1980) Quadrangles

ENGINEERING-SCIENCE, INC.
IN ASSOCIATION WITH
DAMES & MOORE
NEW YORK STATE DEPARTMENT
OF ENVIRONMENTAL CONSERVATION
PHASE I REPORT

SITE LOCATION MAP
BUFFALO PUMPS

FIGURE I



Source: Rainfall Frequency Atlas of the United States, Technical Paper No. 40, U.S. Department of Commerce, U.S. Government Printing Office, Washington, D.C., 1963.

FIGURE 8
1-YEAR 24-HOUR RAINFALL
(INCHES)



13

**AN OVERVIEW OF THE CONTAMINANTS OF
CONCERN IN THE DISPOSAL AND UTILIZATION
OF MUNICIPAL SEWAGE SLUDGE**

REVISED DRAFT

FEBRUARY 11, 1983

Updated

April 15, 1983

FOR

ENVIRONMENTAL PROTECTION AGENCY

SLUDGE TASK FORCE

WASHINGTON, D.C.

BOOZ ALLEN & HAMILTON INC.

(4) Cadmium (Cd)

Cadmium concentrations in natural soils are quite low; they range from 0.01 to 7 ppm with 0.06 ppm considered normal (3). Given that the range of Cd concentrations in sludges is between 1 to 3,410 ppm, with the median at 13 ppm, modest applications of sludge containing a few ppm of Cd would enrich the soil to levels beyond those typically observed (4, 7). The chemistry of cadmium in soils appears to be influenced by soil organic matter, clay content and type, hydrous oxide content, soil pH, and redox potential. The solubility and plant availability of Cd, as with other cationic heavy metals, decreases with increasing pH. Soil cation exchange capacity (CEC) is also correlated to the availability of cadmium in the soil.

Crops differ widely in Cd uptake characteristics. Cadmium tends to accumulate in the foliar, or leafy portions of plants rather than in the grain, fruit or roots, and can be phytotoxic to some plant species at varying tissue concentrations. However, in terms of the potential for animal and human health concerns, crops may contain undesirable concentrations of cadmium in their tissues without showing visible symptoms of toxicity. Clearly, the food chain is not protected from excessive Cd concentrations by a soil-plant barrier (4).

Chronic exposure to Cd may result in the accumulation of tissue concentrations in man and animals which cause serious health effects, including renal tubular dysfunction manifested in proteinuria and other kidney function abnormalities (glucosuria, aminoaciduria, phosphaturia, etc.). Kjellstrom, Nordberg, and Friberg have developed sophisticated metabolic models for Cd ingestion in humans, which predict the probability of proteinuria for populations at various rates of Cd intake (8). Other potential carcinogenic, mutagenic, and teratogenic effects of cadmium are currently under investigation.

As with most other heavy metals, risks of groundwater contamination due to application of sludge borne cadmium are quite small. Cadmium is held strongly in the soil in most situations (a pH-dependent mechanism), and does not move readily from surface soils through the soil profile to groundwater. Surface drainage from sludge applications sites may contribute to cadmium contamination of surface waters, but this is also unlikely.

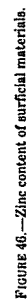
Cadmium is currently the heavy metal of greatest concern as a public health risk in the land application of sludge, and in some cases, as a potential, but as yet

Element Concentrations in Soils and Other Surficial Materials of the Conterminous United States

U.S. GEOLOGICAL SURVEY PROFESSIONAL PAPER 1270



MOREAU



NAME

BUFFALO PUMPS DIVISION (DEC #932044)

LOCATION

The disposal area is located north of the Buffalo Pumps Plant at 874 Oliver Street, North Tonawanda, NY. This area is a 1.3 acre lot between the plant fence line and a property line running roughly parallel to and 200 feet south of Industrial Drive. The lot measures approximately 200 feet by 300 feet.

A site sketch is attached.

OWNERSHIP

The property is owned by Buffalo Pumps Division, Buffalo Forge Company. Contact can be made through Mr. Kibbe at the North Tonawanda Plant.

HISTORY

According to the Inter-Agency Task Force Report (1979) the plant was purchased in 1891 by Voelker and Felthousen and operated as the Buffalo Steam Pump Company until 1931. In 1931, the plant became the Buffalo Pump Division, Buffalo Forge Company. Buffalo Pumps manufactures centrifugal pumps.

Buffalo Pumps used coal fired boilers until 1970 when gas/oil burners were installed. Prior to 1971, boiler ash was disposed of in an area adjacent to the north side of the plant yard. After 1970 ash was not generated. The total volume of ash disposed of is not known.

An inspection of the inactive disposal area was made by this department in December, 1981. The area has recently received up to three feet of clean fill as part of an expansion by Buffalo Pumps. Because of this fill material, a visual inspection of waste material was not possible. According to Mr. Kibbe of Buffalo Pumps, no material other than ash was disposed of here. The lot has been vacant for many years previous to this writing.

Currently the principal wastes generated by Buffalo Pumps are wood, paper, waste oil and paint sludge. The wastes generated while the site was active are expected to be the same with the addition of boiler ash. Wood, paper and general refuse are hauled off-site by Rapid Disposal. Waste oils are removed by Booth Oil. Paint sludge and scraped metals are transported to the Cheektowaga Plant of Buffalo Forge where they are incinerated, recycled or hauled off-site for disposal.

A review of USGS maps (Tonawanda west - 7 $\frac{1}{2}$ ') and USDA aerial photos (ARE 3V-75, 1958) provided no additional information.

RESULTS OF PREVIOUS SAMPLING AND ANALYSIS

There is no record of any prior sampling. Mr. Kibbe of Buffalo Forge was unaware of any previous sampling.

SOILS/GEOLOGY

The exact composition of the original soils is unknown. A detailed soil survey for this area is unavailable. Data from nearby areas indicates that the soils are likely to contain a large percentage of clay and exhibit a low permeability in one or more levels.

The structural fill being deposited here was found to contain a variety of soil types including coarse components such as gravel and bricks. The properties of this material are unknown.

If this site is built upon as planned, the buildings and the adjacent pavement should render the surface impermeable and provide for drainage of runoff.

The bedrock is expected to be Lockport Dolomite although this has not been documented. The thickness of the Dolomite and the depth to water bearing zones is not known.

GROUNDWATER

The depth to groundwater has not been determined. The direction of flow is expected to be generally toward the Niagara River(west).

There are no known drinking water wells within three miles of this site. Public water is available throughout this area. There are no industrial or other users of groundwater in the area. There are no monitoring wells near the site.

SURFACE WATER

The nearest surface water body is the Niagara River, 1500 feet away. Direct entry of runoff to the River is not possible, but storm sewers draining this area do enter the river. Groundwater beneath this site is expected to enter the Niagara River.

The Niagara River is used for industrial and drinking water, recreation, navigation and other uses. The City of Niagara Falls water intakes are located four miles downstream. The site is not subject to flooding and there are no wetlands within one mile.

AIR

There have been no complaints of odors or other air quality problems received regarding this site. Due to the nature of the wastes present, none are expected.

The nearest residence is less than 400 feet away. 3000 to 10,000 people live within one mile of the site. Commercial and industrial areas adjoin the former disposal area. The property is entirely within the City Limits of North Tonawanda.

FIRE AND EXPLOSION

The potential for fire or explosion is very small, due to the nature of the wastes present.

Several thousand buildings and over 10,000 people are located within 2 miles. The nearest off-site building is less than 200 feet away.

DIRECT CONTACT

Although physical access is not restricted, all wastes are or will be covered to prevent direct contact. When the expansion is complete access will presumably be restricted and standard plant security measures used.

CONCLUSIONS

This site is believed to be a disposal area for coal-boiler ash. There is no indication that other materials have been disposed of here. Future construction on this site should eliminate the infiltration through the wastes.

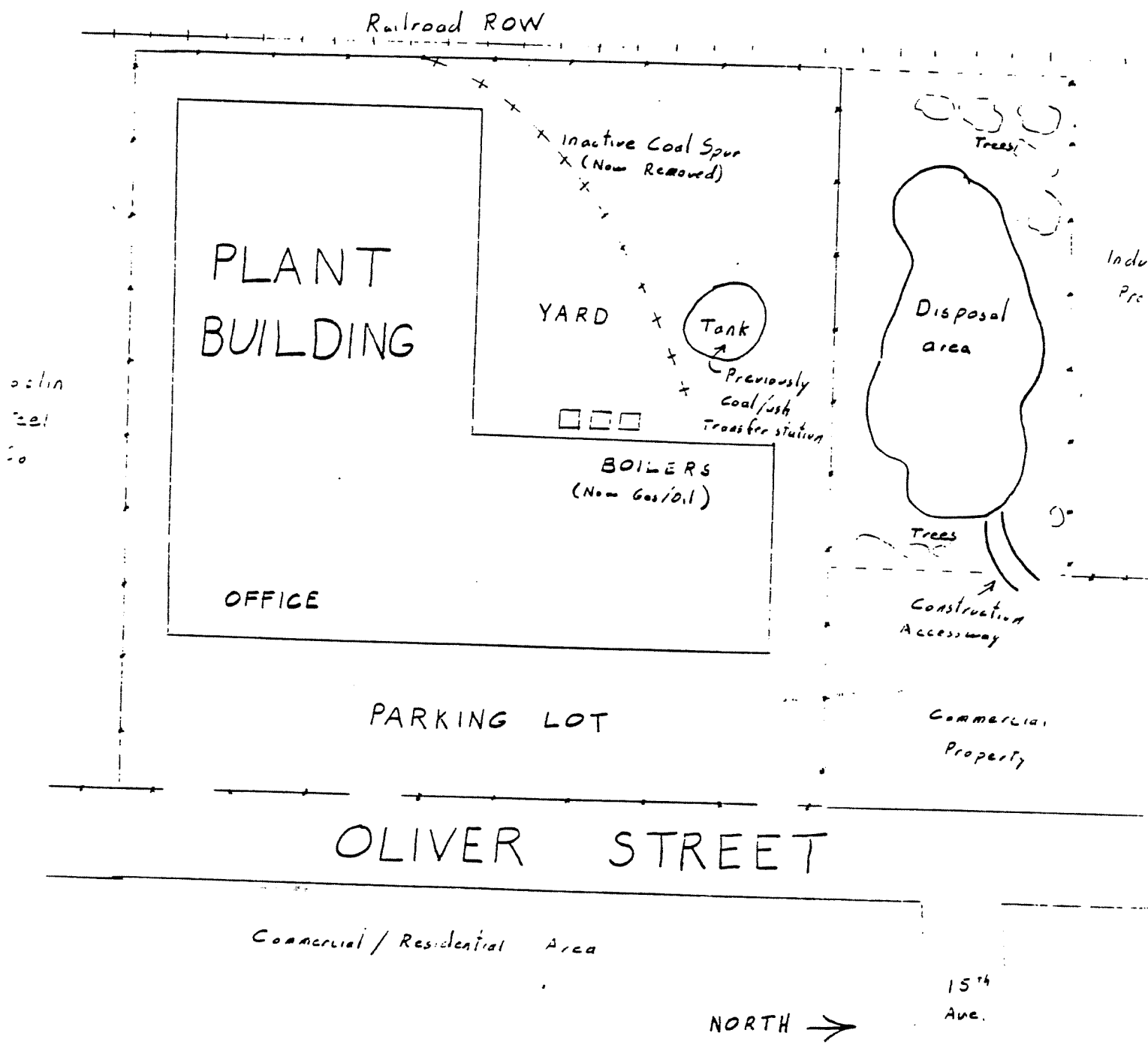
Samples of the waste materials could be obtained from augered holes if construction activities do not prevent access to the soil (for example by pouring concrete slabs, etc.) Groundwater and soil samples could be obtained from holes around the perimeter of the site. The western boundary of the property is expected to be the downgradient side. If borings or wells are placed, additional geotechnical and hydrological data could be obtained.

Further inspections are not recommended as the condition of the wastes is not detectable from the surface.

BUFFALO PUMPS DIV.; BUFFALO FORGE CO.

DEC # 932044

(15)¹⁰



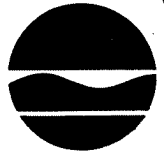
NOT TO SCALE

Michael Hopkins
NCHD
12/16/81

Buffalo Pumps

(16)

New York State Department of Environmental Conservation
FISH AND WILDLIFE DIVISION - REGION 9
600 Delaware Avenue, Buffalo, New York 14202-1073
(716) 847-4550



Thomas C. Jorling
Commissioner

September 2, 1987

Ms. Elizabeth M. Dobson
Engineering-Science
290 Elwood Davis Road
Liverpool, New York 13088

Dear Ms. Dobson:

This letter will serve as verification that I traced NYS designated wetland boundaries on the accompanying maps. The boundaries shown are from official Department of Environmental Conservation Maps promulgated on September 10, 1986 (Erie County) and December 5, 1984 (Niagara County).

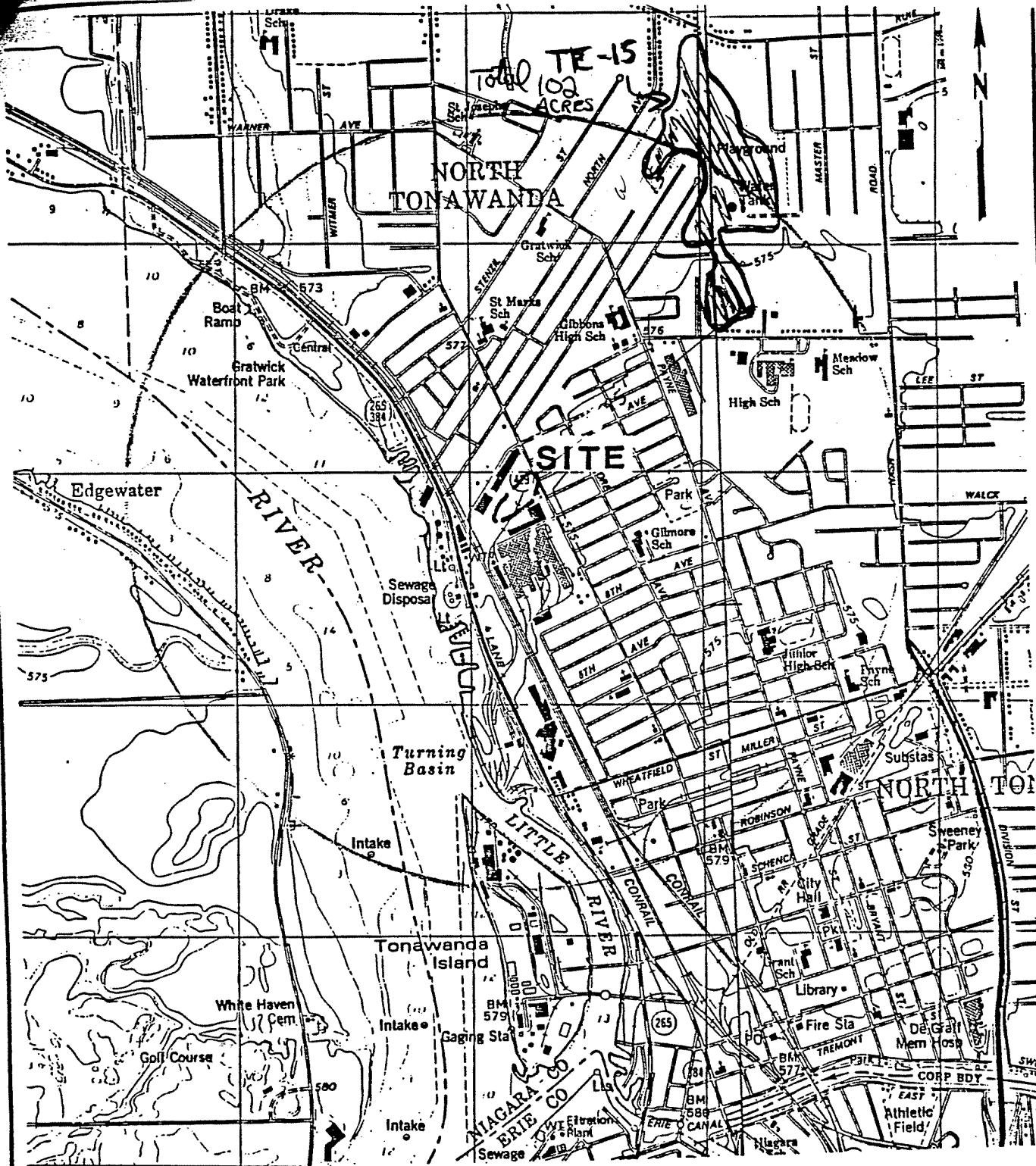
Very truly yours,

James F. Farquhar III
Fish and Wildlife Division

JFF:slm

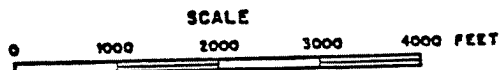
cc: Mr. Gordon R. Batcheller

Enclosures



LATITUDE: 43°02'47"
LONGITUDE: 78°53'09"

Niagra County



REFERENCE: U.S.G.S. 7.5' Topographic Map
Tonawanda West, NY (1980) and Tonawanda
East, NY (1980) Quadrangles

ENGINEERING-SCIENCE, INC.
IN ASSOCIATION WITH
DAMES & MOORE
NEW YORK STATE DEPARTMENT
OF ENVIRONMENTAL CONSERVATION
PHASE I REPORT

SITE LOCATION MAP
BUFFALO PUMPS

FIGURE iv-1

INTERVIEW FORM

INTERVIEWEE/CODE John W. Ozard /
TITLE - POSITION Senior Wildlife Biologist
ADDRESS WRC New York State DEC
CITY Delmar STATE NY ZIP 12054
PHONE (518) 439-7488 RESIDENCE PERIOD _____ TO _____
LOCATION phone conversation INTERVIEWER W. Bradford
DATE/TIME 4/4/88 / 11:00 AM
SUBJECT: Critical habitats in New York state.

REMARKS: There are no federally designated
critical habitats of endangered species
located within New York state.

I AGREE WITH THE ABOVE SUMMARY OF THE INTERVIEW:

John W. Ozard

SIGNATURE: John W. OZARD

COMMENTS:

US CENSUS DATA, 1980

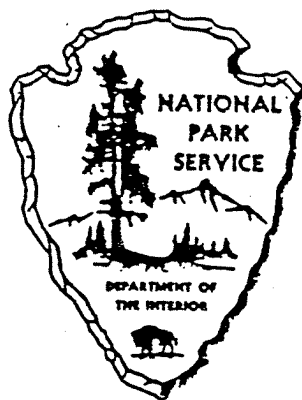
US Census Data used in the HRS scoring was obtained from various County Planning Offices. This data was not obtained from a report. The raw census data combined with County Planning Maps was used to estimate the population within 1, 2, 3, and 4 miles of the Phase I site being investigated. Because of the voluminous amount of data used, the data is not provided in this Appendix.

19

NATIONAL REGISTER OF HISTORIC PLACES

ANNUAL LISTING OF PROPERTIES

JANUARY 1979 THROUGH DECEMBER 1982



U.S. DEPARTMENT OF THE INTERIOR
NATIONAL PARK SERVICE

JULY 1983

FM 2070-13

SECTION VI

Tuesday
March 1, 1983

Forest
Land
Records

Part III

Department of the Interior

National Park Service

National Registry of Natural Landmarks

(21)

Dangerous Properties of Industrial Materials

Sixth Edition

N. IRVING SAX

Assisted by:

Benjamin Feiner/Joseph J. Fitzgerald/Thomas J. Haley/Elizabeth K. Weisburger



VAN NOSTRAND REINHOLD COMPANY
New York

CADMIUM COMPOUNDS

NIOSH #: EV 0260000

TOXICITY DATA: 3
ihl-hmn TCLo: 1500 ug/m³/14Y-
I: CARC

CODEN:
ANYAA9 271,273,76

Toxicology Review: STEVA8 2(4),341,74. Occupational Exposure to Cadmium recm std: Air: TWA 40 ug/m³; CL 200 ug/m³/15M NTIS**.

THR: An exper CARC. The oral toxicity of Cd and its compounds is HIGH. However, when these materials are ingested, the irr and emetic action is so violent that little of the Cd is absorbed and fatal poisoning does not as a rule ensue. Cases of human Cd poisoning have been reported from ingestion of food or beverages prepared or stored in Cd-plated containers. The inhal of fumes or dusts of Cd primarily affects the respiratory tract; the kidneys may also be affected. Even brief exposure to high conc may result in pulmonary edema and death. Usually the edema is not massive, with little pleural effusion. In fatal cases, fatty degeneration of the liver and acute inflammatory changes in the kidneys have been noted. Ingestion of Cd results in a gastrointestinal type of poisoning resembling food poisoning in its symptoms. Inhal of dust or fumes may cause dryness of the throat, cough, headache, a sense of constriction in the chest, shortness of breath (dyspnea) and vomiting. More severe exposure results in marked lung changes, with persistent cough, pain in the chest, severe dyspnea and prostration which may terminate fatally. X-ray changes are usually similar to those seen in broncho-pneumonia. The urine is frequently dark. These symptoms are usually delayed for some hours after exposure, and fatal conc may be breathed without sufficient discomfort to warn the workman to leave the exposure. There is some evidence of teratogenicity. Ingestion of Cd results in sudden nausea, salivation, vomiting and diarrhea and abdominal pain and discomfort. Symptoms begin almost immediately after ingestion. A yellow discoloration of the teeth has been reported in workers exposed to Cd. Cadmium oxide fumes can cause metal fume fever resembling that caused by zinc oxide fumes.

CADMIUM DIAMIDE

mf: CdH₄N₂; mw: 144.45

Incomp: Self-explodes (water).

CADMIUM DIAZIDE

mf: CdN₆; mw: 196.44

Incomp: Explodes violently.

CADMIUM DICYANIDE

mf: C₂CdN₂; mw: 164.44

Incomp: Magnesium.

CADMIUM (II) EDTA COMPLEX

CAS RN: 15954913

NIOSH #: AH 4060000

SYN: (ETHYLENEDINITRIL)TETRAACETIC ACID CADMIUM (II) COMPLEX

TOXICITY DATA: 3 CODEN:
ipr-mus LD50: 7800 ug(Cd)/kg PABIAQ 11,853,63

Occupational Exposure to Cadmium recm std: Air: TWA 40 ug/m³; CL 200 ug/m³/15M NTIS**.

THR: HIGH ipr. See also cadmium compounds.

Disaster Hazard: When heated to decomp it emits tox fumes of NO_x and Cd.

CADMIUM FLUOBORATE

CAS RN: 14486192 NIOSH #: EV 0525000
mf: B₂CdF₈; mw: 286.02

SYN: FLUOROBORATE

TOXICITY DATA: 3 CODEN:
orl-rat LDLo: 250 mg/kg NCNSA6 5,27,53
ihl-mus LCLo: 650 mg/m³/10M NDRC** No.9-4-1-19,44

Occupational Exposure to Cadmium recm std: Air: TWA 40 ug/m³; CL 200 ug/m³/15M NTIS**. Reported in EPA TSCA Inventory, 1980.

THR: HIGH orl. MOD ihl. See fluoroborates.

Disaster Hazard: When heated to decomp it emits very tox fumes of Cd and F⁻.

For further information see Fluoroborate Vol. 2, No. 3 of DPIM Report.

CADMIUM FLUORIDE

CAS RN: 7790796 NIOSH #: EV 0700000
mf: CdF₂; mw: 150.40

Cubic white crystals. mp: 1100°, bp: 1758°, d: 6.64, vap. press: 1 mm @ 1112°.

SYN: CADMIUM FLUORURE (FRENCH)

TOXICITY DATA: 3 CODEN:
scu-frg LDLo: 280 mg/kg CRSBAW 124,133,37

Toxicology Review: AMSSAQ 400,5,63. OSHA Standard: Air: TWA 200 ug(Cd)/m³; CL 600 (SCP-W) FEREAC 39,23540,74. Occupational Exposure to Cadmium recm std: Air: TWA 40 ug/m³; CL 200 ug/m³/15M NTIS**. Reported in EPA TSCA Inventory, 1980.

THR: HIGH via scu route. Violent reaction with K. See fluorides and cadmium compounds.

Disaster Hazard: When heated to decomp it emits very tox fumes of Cd and F⁻.

CADMIUM FLUOSILICATE

CAS RN: 17010218 NIOSH #: EV 0875000
mf: CdF₆Si; mw: 254.49

Hexagonal, colorless crystals.

SYN: TL 1070

TOXICITY DATA: 3 CODEN:
orl-rat LDLo: 100 mg/kg NCNSA6 5,27,53
ihl-mus LCLo: 670 mg/m³/10M NDRC** No.9-4-1-19,44

Occupational Exposure to Cadmium recm std: Air: TWA 40 ug/m³; CL 200 ug/m³/15M NTIS**.



POTENTIAL HAZARDOUS WASTE SITE
PRELIMINARY ASSESSMENT
PART 1 - SITE INFORMATION AND ASSESSMENT

I. IDENTIFICATION
01 STATE NY 02 SITE NUMBER 0002127199

(2)

II. SITE NAME AND LOCATION

01 SITE NAME (Legal, common, or descriptive name of site) <u>Buffalo Pumps Division</u>		02 STREET, ROUTE NO., OR SPECIFIC LOCATION IDENTIFIER <u>874 OLIVER STREET</u>			
03 CITY <u>North Tonawanda</u>	04 STATE <u>NY</u>	05 ZIP CODE <u>14120</u>	06 COUNTY <u>NIAGARA</u>	07 COUNTY CODE <u>063</u>	08 CONG DIST <u>36</u>
09 COORDINATES LATITUDE <u>43° 02' 42"</u>		LONGITUDE <u>78° 53' 29"</u>			

10 DIRECTIONS TO SITE (Starting from nearest public road)
The site is located on the northern end of the Buffalo Pumps property at the intersections of East Avenue and Oliver Street.

III. RESPONSIBLE PARTIES

01 OWNER (If known) <u>Buffalo Forge Company</u>		02 STREET (Business, mailing, residential) <u>490 Broadway Avenue</u>			
03 CITY <u>Buffalo</u>	04 STATE <u>NY</u>	05 ZIP CODE <u>14204</u>	06 TELEPHONE NUMBER <u>(716) 847-5121</u>		
07 OPERATOR (If known and different from owner) <u>Buffalo Pumps Division</u>		08 STREET (Business, mailing, residential) <u>874 OLIVER STREET</u>			
09 CITY <u>North Tonawanda</u>	10 STATE <u>NY</u>	11 ZIP CODE	12 TELEPHONE NUMBER <u>(716) 693-1850</u>		
13 TYPE OF OWNERSHIP (Check one) ☒ A. PRIVATE ☐ B. FEDERAL: _____ (Agency name) ☐ C. STATE ☐ D. COUNTY ☐ E. MUNICIPAL ☐ F. OTHER: _____ (Specify) ☐ G. UNKNOWN					

14 OWNER/OPERATOR NOTIFICATION ON FILE (Check all that apply)
☐ A. RCRA 3001 DATE RECEIVED: _____ MONTH DAY YEAR ☐ B. UNCONTROLLED WASTE SITE (RCRA 103 d) DATE RECEIVED: _____ MONTH DAY YEAR ☒ C. NONE

IV. CHARACTERIZATION OF POTENTIAL HAZARD

01 ON SITE INSPECTION ☒ YES DATE <u>11 17 81</u> MONTH DAY YEAR ☐ NO		BY (Check all that apply) ☒ A. EPA ☐ B. EPA CONTRACTOR ☐ C. STATE ☐ D. OTHER CONTRACTOR ☐ E. LOCAL HEALTH OFFICIAL ☐ F. OTHER: _____ (Specify) CONTRACTOR NAME(S): _____			
02 SITE STATUS (Check one) ☐ A. ACTIVE ☒ B. INACTIVE ☐ C. UNKNOWN		03 YEARS OF OPERATION <u>1900</u> <u>1978</u> BEGINNING YEAR ENDING YEAR ☐ UNKNOWN			

04 DESCRIPTION OF SUBSTANCES POSSIBLY PRESENT, KNOWN, OR ALLEGED
Boiler ash and foundry sand were landfilled within fenced property north of the facility. Construction debris, excavated fill, and suspected foundry sands were disposed of in a swamp area at the northern boundary of the property.

05 DESCRIPTION OF POTENTIAL HAZARD TO ENVIRONMENT AND/OR POPULATION
Suspected metals from incineration of paint wastes and suspected phenolic-based foundry sands pose a potential source of contamination of groundwaters entering Niagara River. Volatile organic gases were detected by HNU meter (5-9 ppm).

V. PRIORITY ASSESSMENT

01 PRIORITY FOR INSPECTION (Check one. If high or medium is checked, complete Part 2 - Waste Information and Part 3 - Description of Hazardous Conditions and Incidents)
☐ A. HIGH (Inspection required promptly) ☐ B. MEDIUM (Inspection required) ☒ C. LOW (Inspect on time available basis) ☐ D. NONE (No further action needed, complete current disposition form)

VI. INFORMATION AVAILABLE FROM

01 CONTACT <u>S. Robert STEELE, II</u>		02 OF (Agency/Organization) <u>Engineering - Science (ES)</u>		03 TELEPHONE NUMBER <u>(703) 591-7575</u>	
04 PERSON RESPONSIBLE FOR ASSESSMENT <u>S. Robert STEELE, II</u>		05 AGENCY <u>—</u>	06 ORGANIZATION <u>ES</u>	07 TELEPHONE NUMBER <u>(703) 591-7575</u>	08 DATE <u>11 18 85</u> MONTH DAY YEAR



POTENTIAL HAZARDOUS WASTE SITE PRELIMINARY ASSESSMENT PART 2 - WASTE INFORMATION

I. IDENTIFICATION

01 STATE	02 SITE NUMBER
----------	----------------

NY 100-2127199

II. WASTE STATES, QUANTITIES, AND CHARACTERISTICS

01 PHYSICAL STATES (Check all that apply)

- ☒ A. SOLID ☐ E. SLURRY
☒ B. POWDER, FINES ☐ F. LIQUID
☐ C. SLUDGE ☐ G. GAS
☐ D. OTHER _____ (Specify)

02 WASTE QUANTITY AT SITE

(Measures of waste quantities must be independent)

TONS _____

CUBIC YARDS _____

NO. OF DRUMS _____

03 WASTE CHARACTERISTICS (Check all that apply)

- [illegible]

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	Suspected		phenols in foundry sand
IOC	INORGANIC CHEMICALS			
ACD	ACIDS			Chromium, copper, and Iron
BAS	BASES			in groundwater sample
MES	HEAVY METALS	1500	mg/kg	Copper in surface water sediment

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

[illegible]

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)

1. USGS site investigation, Draft Study report, 1983
2. ES and D₁M site investigation, 3/20/85.
3. Niagara County Health Department, site investigation, 2/22/84



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

I. IDENTIFICATION
01 STATE NY 02 SITE NUMBER 000212799

II. HAZARDOUS CONDITIONS AND INCIDENTS

01 ☒ A. GROUNDWATER CONTAMINATION 02 ☐ OBSERVED (DATE: 1983) ☐ POTENTIAL ☐ ALLEGED
03 POPULATION POTENTIALLY AFFECTED: _____ 04 NARRATIVE DESCRIPTION

Metal contamination detected in USGS sampling wells

01 ☒ B. SURFACE WATER CONTAMINATION 02 ☐ OBSERVED (DATE: 1983) ☐ POTENTIAL ☐ ALLEGED
03 POPULATION POTENTIALLY AFFECTED: _____ 04 NARRATIVE DESCRIPTION

Swamp sediment (adjacent & downgradient from disposal area) contained metal contamination

01 ☒ C. CONTAMINATION OF AIR 02 ☒ OBSERVED (DATE: 1985) ☐ POTENTIAL ☐ ALLEGED
03 POPULATION POTENTIALLY AFFECTED: _____ 04 NARRATIVE DESCRIPTION

Organic vapors detected near ground surface during HIVE meter survey

01 ☐ D. FIRE/EXPLOSIVE CONDITIONS 02 ☐ OBSERVED (DATE: _____) ☐ POTENTIAL ☐ ALLEGED
03 POPULATION POTENTIALLY AFFECTED: _____ 04 NARRATIVE DESCRIPTION

No

01 ☒ E. DIRECT CONTACT 02 ☐ OBSERVED (DATE: _____) ☒ POTENTIAL ☐ ALLEGED
03 POPULATION POTENTIALLY AFFECTED: unknown 04 NARRATIVE DESCRIPTION

01 ☒ F. CONTAMINATION OF SOIL 02 ☐ OBSERVED (DATE: _____) ☒ POTENTIAL ☐ ALLEGED
03 AREA POTENTIALLY AFFECTED: _____ (Acres) 04 NARRATIVE DESCRIPTION

1) Soil placed on site from sewer excavation may have contained contaminants
2) Contaminants may migrate with groundwater

01 ☐ G. DRINKING WATER CONTAMINATION 02 ☐ OBSERVED (DATE: _____) ☐ POTENTIAL ☐ ALLEGED
03 POPULATION POTENTIALLY AFFECTED: _____ 04 NARRATIVE DESCRIPTION

No

01 ☐ H. WORKER EXPOSURE/INJURY 02 ☐ OBSERVED (DATE: _____) ☐ POTENTIAL ☐ ALLEGED
03 WORKERS POTENTIALLY AFFECTED: _____ 04 NARRATIVE DESCRIPTION

No

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

unknown



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

I. IDENTIFICATION

01 STATE 02 SITE NUMBER
NY 0002127140

II. HAZARDOUS CONDITIONS AND INCIDENTS (Continued)

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

unknown

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

unknown

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

unknown

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

unleaked facility

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

No

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

No

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

Possible midnight dumping - non secure area

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

III. TOTAL POPULATION POTENTIALLY AFFECTED: _____

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

*Site visit, 1985
USGS, 1983*

GROUND-WATER RESOURCES OF THE ERIE-NIAGARA BASIN, NEW YORK



1689714

Prepared for the
Erie-Niagara Basin Regional Water Resources
Planning Board

by

A. M. La Sala, Jr.

UNITED STATES DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY

in cooperation with

THE NEW YORK STATE CONSERVATION DEPARTMENT
DIVISION OF WATER RESOURCES

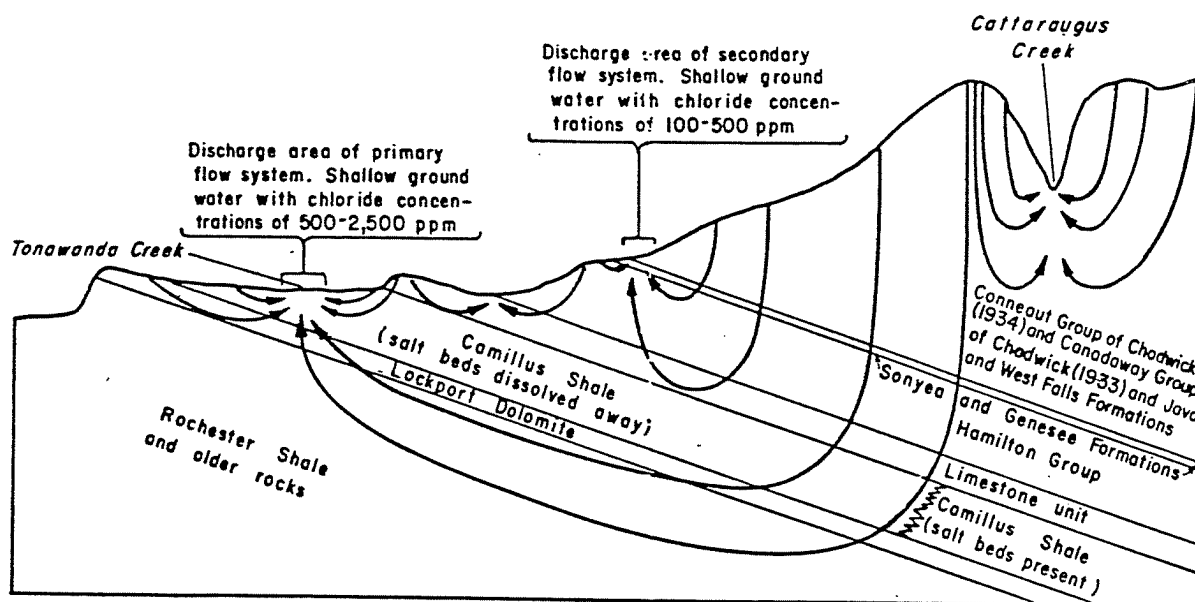
STATE OF NEW YORK
CONSERVATION DEPARTMENT
WATER RESOURCES COMMISSION

Basin Planning Report ENB-3

1968

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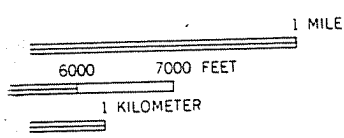
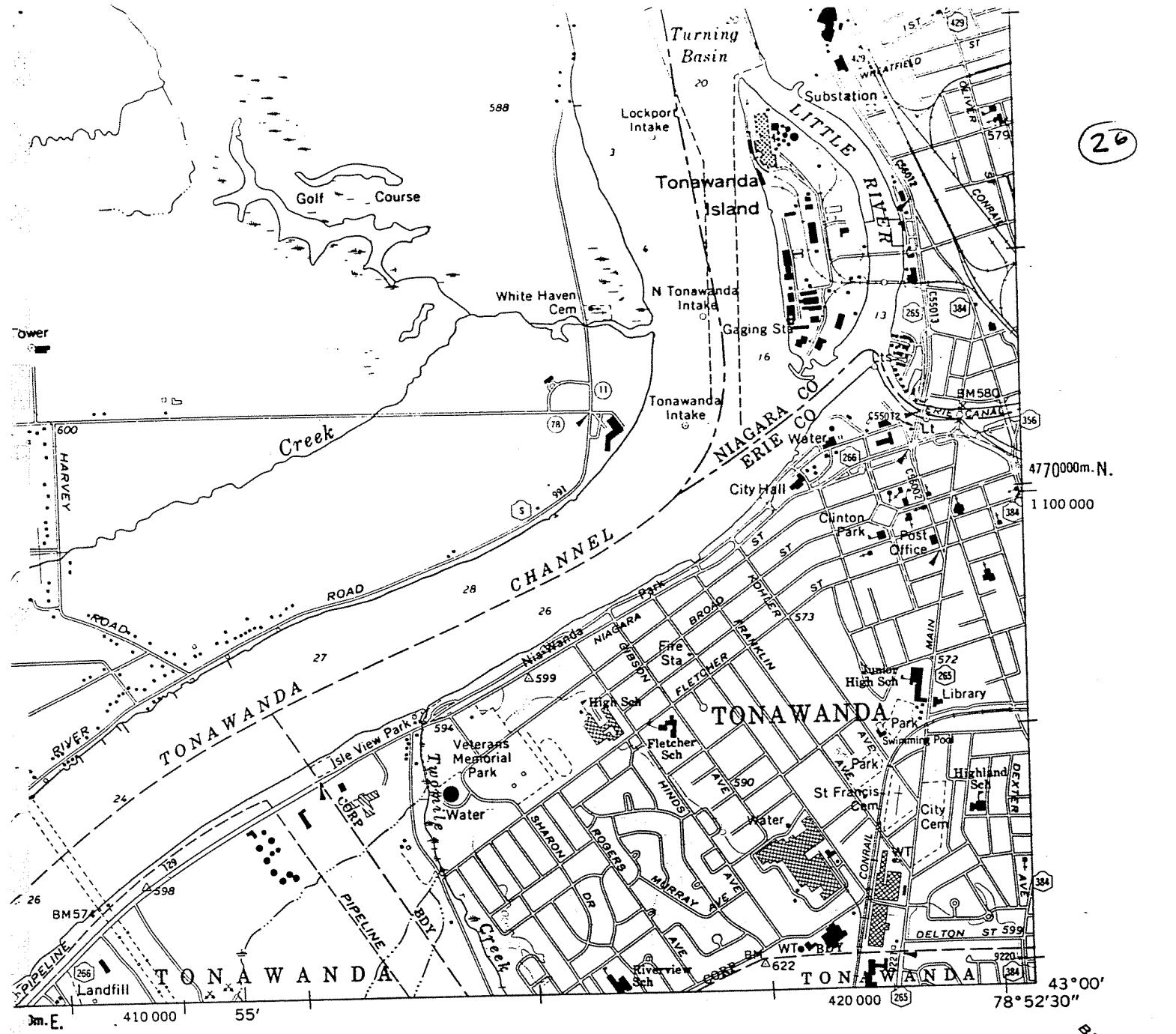
systems exist which are controlled by the major topographic features, as illustrated in figure 18. The quality of water at great depth in the area



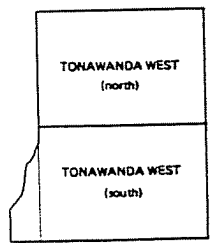
Ground water circulates through a regional flow system from the Appalachian Uplands to the Erie-Ontario Lowlands and discharges near Tonawanda Creek and through less extensive but nevertheless major flow systems. Probable flow lines are shown. The deepest circulating water may move upward toward Tonawanda Creek through bedding joints in the Camillus Shale and Lockport Dolomite rather than through the underlying rocks.

Figure 18.--Inferred regional circulation of ground water to explain variations in chemical constituents in ground water at shallow depth.

is shown by the analysis for well 250-821-1 (table 9). The concentrations of sulfate and chloride can be explained by the mixing of deeply circulating ground water with less highly mineralized shallow ground water. For example, it is possible that water moving along the deep flow path shown in figure 18 would contain a chloride content of 50,000 to 100,000 ppm and after mixing with ground water of a local flow system could produce the chloride contents of 1,500 to 2,500 ppm in samples from wells in the major discharge area along Tonawanda Creek. Ground water moving along the secondary flow system is likely to be highly mineralized but not to as great a degree as water moving along the deeper flow system. This water mixes with water of a local flow system and produces fairly high concentrations of sulfate and chloride in the secondary discharge area. Numerous abandoned gas wells in the area (Kreidler, 1963) may allow salty water to circulate upward and discharge through leaky casings into the shallow ground water. Data are not available to evaluate this possibility. The boundary of the salt beds shown in plate 5 roughly parallels the boundary of the Appalachian Uplands suggesting a topographic control for this boundary rather than a depositional one. Topography would determine the character of a flow system such as described in figure 18 and subsequent solution and removal of the



INDEX TO
1:9600 (1" = 800')
MAP COVERAGE



BOUNDARIES:

- State.....
- County.....
- Town or City.....
- Incorporated Village.....
- Federal-Aid Urban Area.....

ROADS:

- Touring Route markers:
 - Interstate..... 87
 - U. S. 20
 - State..... 36
- State Highway number and limit..... 3020
- County road..... 72
- Interchange number... 31

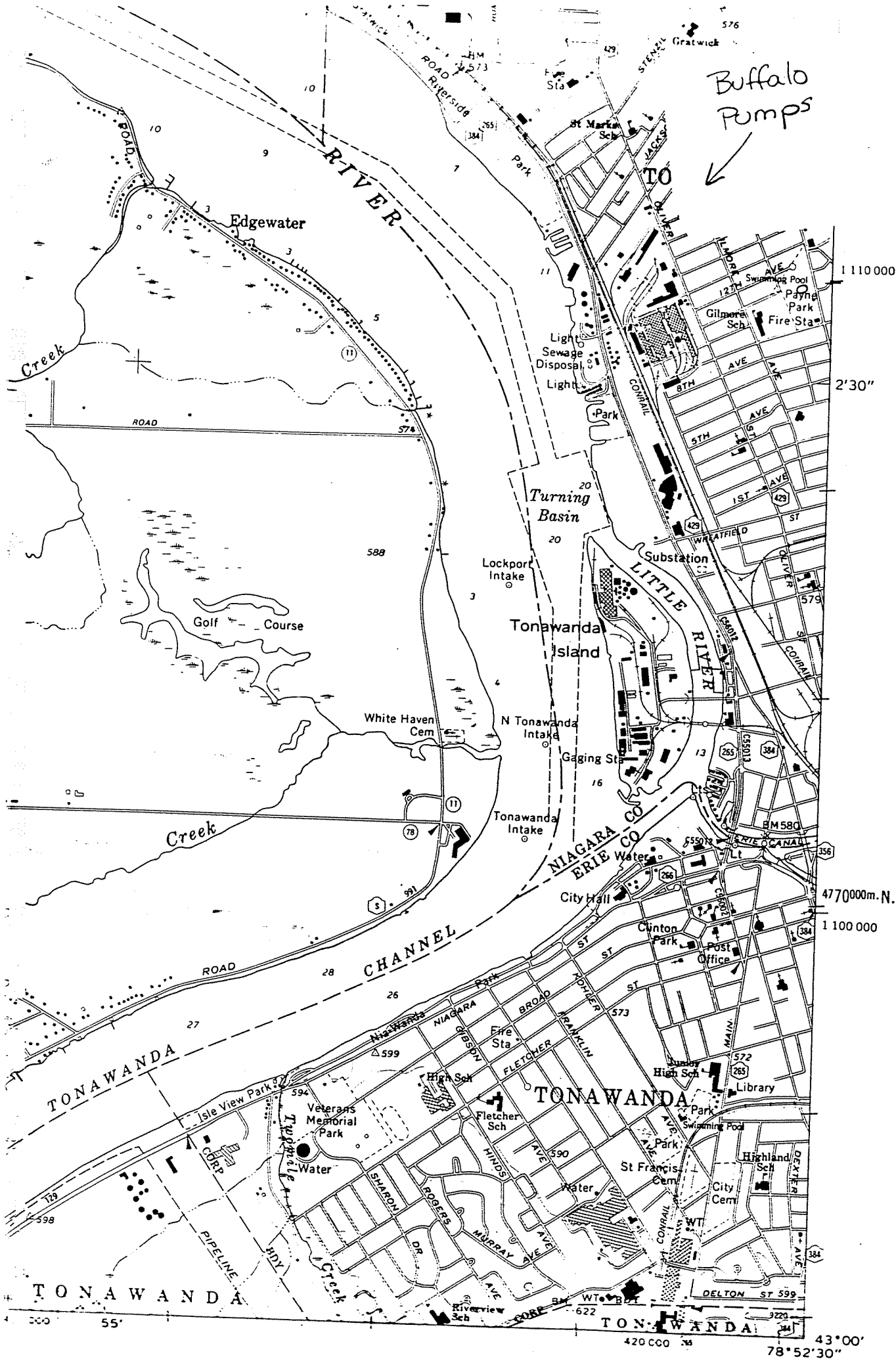
Divided highways and streets:

- Wide mall.....
- Narrow mall or barrier.....

Undivided highways and streets:

- 4 or more lanes.....
- Less than 4 lanes.....

- Vehicle track; trail.....



26



Rand McNally

World Atlas

NEW CENSUS EDITION



Colonia A-S-T	8,869	Greece ROCH.	63,700	McGraw	1,188	Oneida	10,810	Sidney Center	600
Colton	450	Greene	1,747	Madras	700	Ontario	14,933	Silver Creek BUF.	3,088
Conmack N.Y.	24,300	Green Island A-S-T	2,896	Madison	800	Orland Park BUF.	750	Silver Springs	801
Congers N.Y.	5,000	Greenlawn N.Y.	8,600	Manhasset N.Y.	5,265	Orient	3,671	Sinclairville	772
Conklin BING	1,900	Greenport	2,273	Manhasset N.Y.	7,668	Oriskany UT-R	1,680	Skaneateles SYR	2,785
Constantia SYR	900	Greenwich	1,955	Manhasset N.Y.	9,262	Oriskany Falls UT-R	802	Sloan BUF.	4,525
Cooperstown	2,342	Greenwood	450	Manhasset N.Y.	17,616	Oswego N.Y.	20,196	Skottsburg N.Y.	3,154
Copeake	700	Greenwood Lake N.Y.	2,809	Manhasset N.Y.	1,698	Oswego	19,793	Smithtown N.Y.	23,000
Copenhagen	656	Groton	2,113	Manhasset N.Y.	8,530	Otego	1,089	Sodus ROCH.	1,790
Copiasque N.Y.	21,000	Hadley	500	Manhasset N.Y.	5,241	Ovid	666	Sodus Point	1,334
Coram N.Y.	5,400	Haines Falls	700	Manhasset N.Y.	431	Owego BING	4,364	Sound Beach N.Y.	7,140
Corfu BUF.	689	Half Hollow Hills N.Y.	12,800	Manhasset N.Y.	5,384	Oxford	1,765	South New Berlin	4,000
Corinth	2,782	Hamburg BUF.	10,582	Manhasset N.Y.	1,046	Oyster Bay N.Y.	7,200	South Bethlehem A-S-T	500
Cornwall on the Hudson NWBG	3,164	Hamlet	3,725	Manhasset N.Y.	755	Painted Post ELM.	2,196	South Cornish ELM.	1,195
Corland	20,138	Hammondsport	1,065	Manhasset N.Y.	1,580	Palmyra ROCH.	3,729	South Dayton	661
Coxsackie	2,786	Hampden Bays	3,550	Manhasset N.Y.	1,580	Parish SYR	511	South Fallsburg N.Y.	1,590
Croton-on-Hudson N.Y.	5,889	Hannibal SYR	680	Manhasset N.Y.	12,851	Partsville	535	South Farmingdale N.Y.	20,500
Crown Point	703	Harrison N.Y.	23,048	Manhasset N.Y.	1,779	Patchogue N.Y.	11,291	South Glens Falls GLFLS	3,714
Cuba	1,739	Hartsville	937	Manhasset N.Y.	5,200	Patterson N.Y.	950	South Hackensack N.Y.	9,115
Cutchogue	1,000	Hartsville N.Y.	12,226	Manhasset N.Y.	5,200	Pavilion	550	South Nyack N.Y.	3,602
Danemora	3,770	Hastings-on-Hudson N.Y.	600	Manhasset N.Y.	1,200	Pawling POK	1,996	South Otisville	2,030
Danville N.Y.	4,979	Haupeauge N.Y.	14,200	Manhasset N.Y.	8,292	Pearl River N.Y.	17,146	Southport ELM.	8,700
Deerpark N.Y.	33,400	Haverstraw N.Y.	8,800	Manhasset N.Y.	1,626	Peconic	800	South Stony Brook N.Y.	15,329
Delanson A-S-T	448	Hawthorne N.Y.	4,800	Manhasset N.Y.	5,000	Pelham N.Y.	6,848	South Valley Stream N.Y.	6,500
Delewan	1,113	Hemlock ROCH.	500	Manhasset N.Y.	5,292	Pelham Manor N.Y.	5,130	South Westbury N.Y.	10,700
Delhi	3,374	Hempstead N.Y.	40,404	Manhasset N.Y.	8,550	Pelham N.Y.	9,600	Spencer	863
Delmar A-S-T	8,900	Hempstead N.Y.	1,200	Manhasset N.Y.	4,012	Penn Yan	5,242	Spencerport ROCH.	3,424
Depew BUF.	19,819	Herkimer UT-R	8,383	Manhasset N.Y.	26,400	Perry	4,100	Spring Valley N.Y.	20,537
Deposit	1,897	Herkimer	490	Manhasset N.Y.	1,621	Petersburg	1,300	Springville	4,285
Derby BUF.	1,200	Hewitt N.Y.	777	Manhasset N.Y.	1,358	Phelps	2,004	Stagwater	500
De Ruyter	542	Hicksville N.Y.	6,880	Manhasset N.Y.	600	Philadelphia	855	Stamford	950
De Witt SYR	10,032	Highland Falls	5,000	Manhasset N.Y.	1,995	Philmont	1,539	Stillwater A-S-T	1,240
Dexter WATN	1,053	Highland Falls	4,181	Manhasset N.Y.	21,454	Phoenix	700	Stony Brook N.Y.	1,572
Dix Hills N.Y.	10,500	Hillcrest N.Y.	5,357	Manhasset N.Y.	647	Phoenix SYR	2,357	Stony Creek	450
Dobbs Ferry N.Y.	10,053	Hilton ROCH.	4,151	Manhasset N.Y.	514	Phine Bush NWBG	1,200	Stony Point N.Y.	8,270
Downsville	950	Holbrook N.Y.	12,800	Manhasset N.Y.	1,343	Phine Island MIDO	950	Stottville	1,300
Dryden ITH	1,761	Holland BUF.	1,000	Manhasset N.Y.	1,013	Pittsford	32,300	Suffern N.Y.	10,784
Dundee	1,556	Holland Patent UT-R	534	Manhasset N.Y.	1,000	Pleasant Valley POK	21,057	Sylvan Beach UT-R	1,243
Dunkirk	15,310	Holley ROCH.	1,882	Manhasset N.Y.	1,000	Pleasantville N.Y.	1,372	SYRACUSE SYR	170,105
Earlville	885	Homer	3,835	Manhasset N.Y.	2,956	Poland	553	Tappan N.Y.	6,100
East Aurora BUF.	6,803	Honey Falls ROCH.	2,410	Manhasset N.Y.	5,986	Port Byron AUB.	1,400	Tarrytown N.Y.	10,648
Eastchester N.Y.	22,800	Hosack Falls	3,509	Manhasset N.Y.	7,400	Port Chester N.Y.	23,565	Tarrytown N.Y.	5,900
East Glensville A-S-T	11,800	Hopewell Junction POK	2,555	Manhasset N.Y.	1,343	Port Dickinson BING	1,974	Theresa	827
East Half Hollow Hills N.Y.	9,691	Hornell	10,234	Manhasset N.Y.	2,316	Port Ewen KNGST	2,600	Thornwood N.Y.	5,400
East Hampton	1,886	Horseheads ELM.	1,348	Manhasset N.Y.	6,306	Port Jefferson N.Y.	6,731	Ticonderoga	2,938
East Hills N.Y.	7,160	Houghton	1,620	Manhasset N.Y.	1,791	Port Jefferson Station N.Y.	7,500	Tillson KNGST	1,300
East Islip N.Y.	13,700	Hudson	7,986	Manhasset N.Y.	1,582	Port Jervis	8,899	Tirol KNGST	711
East Marion	900	Hudson Falls GLFLS	7,419	Manhasset N.Y.	500	Port Landon	600	Tomkins Cove N.Y.	700
East Meadow N.Y.	47,300	Huntington N.Y.	12,601	Manhasset N.Y.	1,500	Portville	1,136	Tonawanda BUF.	18,693
East Northport N.Y.	22,200	Huntington Bay N.Y.	3,943	Manhasset N.Y.	461	Port Washington N.Y.	15,923	Town of Tonawanda BUF.	78,100
East Patchogue N.Y.	8,300	Huntington Station N.Y.	30,200	Manhasset N.Y.	2,707	Potsdam	10,635	Troy A-S-T	56,638
Eastport, N.Y.	1,206	Hurley KNGST	4,081	Manhasset N.Y.	1,200	Pottersville	600	Tracy A-S-T	1,722
East Randolph	656	Hurleyville	500	Manhasset N.Y.	8,025	POUGHKEEPSIE POK	29,757	Truckee N.Y.	6,076
East Rochester ROCH.	7,596	Hyde Park POK	2,805	Manhasset N.Y.	3,039	Prattsburg	750	Tully SYR	1,048
East Rockaway N.Y.	10,917	Indian Lake	9,190	Manhasset N.Y.	500	Prattville	500	Tupper Lake	4,478
East Vestal BING	5,300	Interlaken	450	Manhasset N.Y.	66,713	Pulaski	2,415	Unadilla	1,367
Eden BUF.	3,000	Inwood N.Y.	8,200	Manhasset N.Y.	499	Randolph	1,398	Uniondale N.Y.	24,500
Edmeston	600	Irondequoit ROCH.	57,548	Manhasset N.Y.	8,200	Ranaville BUF.	1,500	Union Springs AUB.	1,201
Edwards	561	Islip N.Y.	12,100	Manhasset N.Y.	1,285	Raritan A-S-T	3,091	University Gardens N.Y.	5,400
Elba	750	Islip Terrace N.Y.	5,200	Manhasset N.Y.	1,225	Red Creek	800	UTICA UT-R	75,632
Elizabethtown	659	JAMAICHTOWN JMST	28,732	Manhasset N.Y.	700	Red Hook	1,892	Vale A-S-T	1,492
Elkville	4,405	Jay	450	Manhasset N.Y.	1,285	Redwood	600	Valeville N.Y.	6,600
Ellicottville	713	Jeffersonville	500	Manhasset N.Y.	1,285	Remsen UT-R	821	Valeville N.Y.	6,007
ELMIRA ELM.	35,357	Jericho N.Y.	14,200	Manhasset N.Y.	10,617	Remsen A-S-T	9,047	Vestal BING	6,000
Elmont N.Y.	30,000	Johnson City BING	17,126	Manhasset N.Y.	1,190	Rhinebeck POK	2,542	Vestal Central BING	900
Elmora A-S-T	5,500	Johnstown	9,360	Manhasset N.Y.	700	Richburg	494	Victor ROCH	2,370
Elwood N.Y.	15,400	Jordan SYR	1,371	Manhasset N.Y.	8,000	Richfield Springs	1,561	Waddington	960
Endicott BING	14,457	Keene	450	Manhasset N.Y.	2,338	Richmondville	792	Wading River	2,500
Endwell BING	15,999	Kesewille	2,025	Manhasset N.Y.	8,817	Ridgmont ROCH	8,500	Walden NWBG	5,659
Etna ITH	500	Kenmore BUF.	18,474	Manhasset N.Y.	800	Ripley	1,000	Wallkill NWBG	1,849
Evans Mills	651	Kennedy	500	Manhasset N.Y.	2,700	Rockville Centre N.Y.	24,171	Walton	3,329
Fair Haven	976	Kinderhook A-S-T	1,243	Manhasset N.Y.	9,801	Rosetonville A-S-T	5,476	Wampsville	569
Fairmount SYR	8,700	Kings Point N.Y.	5,234	Manhasset N.Y.	746	Rosetonville A-S-T	43,826	Wantage N.Y.	22,300
Fairport ROCH	5,970	Lackawanna BUF.	22,701	Manhasset N.Y.	4,941	Rosetonville A-S-T	20,200	Wappingers Falls POK	5,110
Fairport POK	2,770	Lacota	582	Manhasset N.Y.	70,794	Rosetonville A-S-T	15,000	Watkinsburg	2,743
Falconer JMST	2,770	LaFayetteville	500	Manhasset N.Y.	800	Rosetonville A-S-T	7,270	Warsaw	4,320
Farmingdale N.Y.	7,946	Lake Delta UT-R	2,400	Manhasset N.Y.	560	Rosetonville A-S-T	24,800	Watford A-S-T	2,405
Farmville N.Y.	5,700	Lake Erie Beach BUF.	3,500	Manhasset N.Y.	800	Round Lake A-S-T	791	Waterville	5,303
Fillmore	563	Lake George	1,047	Manhasset N.Y.	450	Rouses Point	2,266	WATERTOWN WATN	27,861
Flakill POK	1,555	Lake Grove N.Y.	9,692	Manhasset N.Y.	7,071,030	Rushville	700	Waterville UT-R	1,672
Floral Park N.Y.	16,805	Lake Katrine KNGST	1,092	Manhasset N.Y.	1,384	Rushville	500	Watervliet A-S-T	11,354
Florida MIDD	1,947	Lake Luzerne	1,000	Manhasset N.Y.	613	Rushville	500	Watkins Glen	2,440
Flower Hill N.Y.	4,558	Lake Placid	2,490	Manhasset N.Y.	1,379	Rye N.Y.	15,083	Wayland	4,738
Florida A-S-T	1,006	Lake Ronkonkoma N.Y.	9,600	Manhasset N.Y.	11,936	Sackett Harbor	1,017	Wayland	1,846
Fonville	804	Lake View BUF.	4,800	Manhasset N.Y.	23,000	Sag Harbor	2,581	Webster ROCH	5,499
Fort Ann GLFLS	904	Lakeville ROCH	950	Manhasset N.Y.	23,600	St. James N.Y.	11,000	Webster SYR	1,952
Fort Covington	1,200	Lakewood JMST	3,941	Manhasset N.Y.	1,496	St. Johnsville	2,019	Wellsville ELM.	647
Fort Edward GLFLS	3,561	Lancaster BUF.	13,056	Manhasset N.Y.	950	St. Regis Falls	950	Wellsville	5,769
Fort Plain	2,555	Larchmont N.Y.	6,308	Manhasset N.Y.	6,890	Salamanca	6,890	West Amityville N.Y.	5,470
Frankfort UT-R	2,995	Larchmont North N.Y.	11,500	Manhasset N.Y.	959	Salem	959	West Babylon N.Y.	32,500
Franklin	440	Latham A-S-T	8,000	Manhasset N.Y.	765	Saratoga Springs A-S-T	22,806	West Bay Shore N.Y.	8,900
Franklin Square N.Y.	32,800	Lawrence N.Y.	6,175	Manhasset N.Y.	8,700	Saugerties KNGST	3,882	Westbury N.Y.	13,871
Franklinville	1,887	Leicester	462	Manhasset N.Y.	5,578	Savannah	636	West Carthage	1,824
Fredonia	11,126	Leedsfordville	500	Manhasset N.Y.	3,882	Savona ELM.	932	West Chazy	700
Freeport N.Y.	38,272	Leicester	462	Manhasset N.Y.	3,882	Savona ELM.	932	West Elmira ELM.	5,901
Freeville ITH	449	Leicester	462	Manhasset N.Y.	3,882	Savona ELM.	932	Westfield	3,446
Frederick JMST	2,000	Leicester	462	Manhasset N.Y.	3,882	Savona ELM.	932	West Henrieville N.Y.	9,181
Fulton SYR	1,285	Leicester	462	Manhasset N.Y.	3,882	Savona ELM.	932	West Hempstead N.Y.	26,500
Galeville SYR	1,312	Leicester	462	Manhasset N.Y.	3,882	Savona ELM.	932	West Huntington N.Y.	5,170
Gang Mills ELM.	1,258	Leicester	462	Manhasset N.Y.	3,882	Savona ELM.	932	West Islip N.Y.	21,500
Garden City N.Y.	22,927	Leicester	462	Manhasset N.Y.	3,882	Savona ELM.	932	Westmere A-S-T	8,000
Garden City Park N.Y.	5,200	Leicester	462	Manhasset N.Y.	3,882	Savona ELM.	932	West Point	8,000
Garmon N.Y.	650	Leicester	462	Manhasset N.Y.	3,882	Savona ELM.	932	Westport	613
Gaspport LOCK	950	Leicester	462	Manhasset N.Y.	3,882	Savona ELM.	932	West Sayville N.Y.	6,000
Gates ROCH.	29,756	Leicester	462	Manhasset N.Y.	3,882	Savona ELM.	932	West Seneca BUF.	51,210
Gatesville	6,746	Leicester	462	Manhasset N.Y.	3,882	Savona ELM.	932	West Seneca BUF.	51,210
Ghent	15,133	Leicester	462	Manhasset N.Y.	3,882	Savona ELM.	932	West Seneca BUF.	51,210
Gilbertville	800	Leicester	462	Manhasset N.Y.	3,882	Savona ELM.	932	West Seneca BUF.	51,210
Gleaco KNGST	455	Leicester	462	Manhasset N.Y.	3,882	Savona ELM.	932	West Seneca BUF.	51,210
Glen Cove N.Y.	24,818	Leicester	462	Manhasset N.Y.	3,882	Savona ELM.	932	West Seneca BUF.	51,210
Glenham POK	2,720	Leicester	462	Manhasset N.Y.	3,882	Savona ELM.	932	West Seneca BUF.	51,210
Glen Head N.Y.	8,800	Leicester	462	Manhasset N.Y.	3,882	Savona ELM.	932	West Seneca BUF.	51,210
GLENS FALLS GLFLS	15,897	Leicester	462	Manhasset N.Y.	3,882	Savona ELM.	932	West Seneca BUF.	51,210
Gloversville	17,836	Leicester	462	Manhasset N.Y.	3,882	Savona ELM.	932	West Seneca BUF.	51,210
Gorham	800	Leicester	462	Manhasset N.Y.	3,882	Savona ELM.	932	West Seneca BUF.	51,210
Goshen MIDD	4,874	Leicester	462	Manhasset N.Y.	3,882	Savona ELM.	932	West Seneca BUF.	51,210
Gouverneur	4,285	Leicester	462	Manhasset N.Y.	3,882	Savona ELM.	932	West Seneca BUF.	51,210
Gowanda	2,713	Leicester	462	Manhasset N.Y.	3,882	Savona ELM.	932	West Seneca BUF.	51,210
Grand Gorge	800	Leicester	462	Manhasset N.Y.	3,882	Savona ELM.	932	West Seneca BUF.	51,210
Granville	2,680	Leicester	462	Manhasset N.Y.	3,882	Savona ELM.	932	West Seneca BUF.	51,210
Great Neck (P.O.) N.Y.	8,804	Leicester	462	Manhasset N.Y.	3,882	Savona ELM.	932	West Seneca BUF.	51,210
Great Neck N.Y.	9,168	Leicester	462	Manhasset N.Y.	3,882	Savona ELM.	932	West Seneca BUF.	51,210
Great Neck Estates N.Y.	2,936	Leicester	462	Manhasset N.Y.	3,882	Savona ELM.	932	West Seneca BUF.	51,210
		Leicester	462	Manhasset N.Y.	3,882	Savona ELM.	932	West Seneca BUF.	51,210

Rand McNally estimate (not reported in census)
 * Population of entire township or town, including rural area
 * Independent city, population not included in county lists

Handbook of
Toxic and Hazardous
Chemicals and
Carcinogens

Second Edition

Marshall Sittig

MP

28

Poly:

Abbreviation	Compound Designated
DBP	Dibenzopyrene
F	Fluorene
FL (also F)	Fluoranthene
IP	Indeno[1,2,3-cd]pyrene
P	Pyrene
PA (also Phen)	Phenanthrene
PR (also Per)	Perylene

Note: These abbreviations are not endorsed by any body such as the International Union of Chemistry; rather they are a form of shorthand used by authors for convenience, and they vary with the author.

Code Numbers: (For benzo[a]pyrene) CAS 50-32-8 RTECS DJ3675000

DOT Designation: —

Synonyms: PNAs, PAHs, PPAHs (Particulate Polycyclic Aromatic Hydrocarbons) and POMs (Polynuclear Organic Materials). (Benzo[a]pyrene is also known as BAP.)

Potential Exposures: PNAs can be formed in any hydrocarbon combustion process and may be released from oil spills. The less efficient the combustion process, the higher the PNA emission factor is likely to be. The major sources are stationary sources, such as heat and power generation, refuse burning, industrial activity, such as coke ovens, and coal refuse heaps. While PNAs can be formed naturally (lightning-ignited forest fires), impact of these sources appears to be minimal. It should be noted, however, that while transportation sources account for only about 1% of emitted PNAs on a national inventory basis, transportation-generated PNAs may approach 50% of the urban resident exposures.

Because of the large number of sources, most people are exposed to very low levels of PNAs. BAP has been detected in a variety of foods throughout the world. A possible source is mineral oils and petroleum waxes used in food containers and as release agents for food containers. FDA studies have indicated no health hazard from these sources.

The air pollution aspects of the carcinogenic polynuclear aromatic hydrocarbons (PAH) and of benzo[a]pyrene (BAP) in particular have been reviewed in some detail by Olsen and Haynes (1). The total emissions of benzo[a]pyrene (BAP) and some emission factors for BAP are as presented by Goldberg (2).

Permissible Exposure Limits in Air: A TLV of 0.2 mg/m³ as benzene solubles has been assigned by ACGIH. These materials are designated by ACGIH as human carcinogens.

There have been few attempts to develop exposure standards for PAHs, either individually or as a class. In the occupational setting, a Federal standard has been promulgated for coke oven emissions, based primarily on the presumed effects of the carcinogenic PAH contained in the mixture as measured by the benzene soluble fraction of total particulate matter. Similarly, the American Conference of Governmental Industrial Hygienists recommends a workplace exposure limit for coal tar pitch volatiles, based on the benzene-soluble fraction containing carcinogenic PAH.

The National Institute for Occupational Safety and Health has also recommended a workplace standard for coal tar products (coal tar, creosote, and coal tar pitch), based on measurements of the cyclohexane-extractable fraction. These standards are summarized on the following page.

Substance

Coke oven emissions	150
	w
Coal tar products	0.1
	w
Coal tar pitch and volatiles	0.2
	u
	ti

Determination in Air: chromatographic separation (A-10).

Permissible Concentration: as a class has been developed. Standards for Drinking Water: exceed 0.2 µg/l. This recommendation of six PAHs in drinking water: perylene, benzo[b]fluoranthene, and benzo[a]pyrene.

The US EPA addressed the problem of PAHs in water. They found that there was no indication of freshwater or coastal water contamination. For human health, the concentration of 1 in 100,000 is posed by PAHs.

Determination in Water: performance liquid chromatography or gas chromatography-mass spectrometry (EPA-821-R-82-010).

Routes of Entry: Inhalation, ingestion, and skin contact.

Harmful Effects and Toxicity: BAP is classified as carcinogenic in animals. It is found in urban air at very low levels. PNAs are photo-oxidized. Because PNAs are adsorbed on particles, they are removed from the atmosphere greatly, from a matter of minutes to hours. That photo-oxidized PNA is not a problem. Environmental behavior: BAP is not a problem.

It has been observed that PNAs are adsorbed on lipids. Most of the PNAs are excreted. Effects of that have been documented.

Benzo[a]pyrene (BaP) is one of the PNAs that has been the most studied. It has been summarized by the EPA. In a study, 100 ppm administered in the diet to 70% of the mice studied, 100% of the mice after 2 years produced mammary tumors. In a variety of animals, the length of application was

Set 2. For the 54% Cl
er, analysis by gas chroma-
er (A-10).

reshwater aquatic life—
er aquatic life—0.030 µg/l
erably zero. An additional
0.00079 µg/l.

A Method 608) or gas
H625).

percutaneous absorption

and skin contact may cause
stules, known as chloracne.
above standards are con-
is not known whether or

upon the degree of chlo-
stronger the effects. Acute
and symptoms include
ominal pains, and fatigue.
brominated diphenyls are em-
on skin, and increased eye
nancy.

and in mice and rats after

particularly melanoma of the
and occupationally to Aro-
4,4).

inations should include
possible effects on the fetus

ate immediately. If this
ely. If a person breathes
person to fresh air at once
al has been swallowed, get
and induce vomiting. Do

othing to prevent any pos-
at any reasonable probab-
when skin is wet or con-
if wet or contaminated.

with scrubbing to remove
n, some chemical waste

landfills have been approved for PCB disposal. More recently treatment with metallic sodium has been advocated which yields a low molecular weight polyphenylene and sodium chloride.

References

- (1) National Institute for Occupational Safety and Health, *Criteria for a Recommended Standard: Occupational Exposure to Polychlorinated Biphenyls*, NIOSH Doc. No. 77-225 (1977).
- (2) U.S. Environmental Protection Agency, *Polychlorinated Biphenyls: Ambient Water Quality Criteria*, Washington, DC (1980).
- (3) National Academy of Sciences, *Polychlorinated Biphenyls*, Washington, DC (1979).
- (4) International Agency for Research on Cancer, *IARC Monographs on the Carcinogenic Risks of Chemicals to Humans*, Lyon, France, 7, 261 (1974) and 18, 43 (1978).
- (5) World Health Organization, *Polychlorinated Biphenyls and Triphenyls*, Environmental Health Criteria No. 2, Geneva, Switzerland (1976).
- (6) See Reference (A-62). Also see Reference (A-64).
- (7) International Agency for Research on Cancer, *IARC Monographs on the Carcinogenic Risks of Chemicals to Humans*, Supplement 1, Lyon, France, p 41 (1979).
- (8) Sax, N.I., Ed., *Dangerous Properties of Industrial Materials Report*, 3, No. 4, 95-100, New York, Van Nostrand Reinhold Co. (1983).
- (9) Parmeggiani, L., Ed., *Encyclopedia of Occupational Health & Safety*, Third Edition, Vol. 2, pp 1753-55, Geneva, International Labour Office (1983).
- (10) United Nations Environment Programme, *IRPTC Legal File 1983*, Vol. II, pp VII/644-60, Geneva, Switzerland, International Register of Potentially Toxic Chemicals (1984).

POLYNUCLEAR AROMATIC HYDROCARBONS

- Carcinogen (Benzo[a]pyrene) (Animal positive, IARC) (8)
- Hazardous wastes (EPA)
- Priority toxic pollutants (EPA)

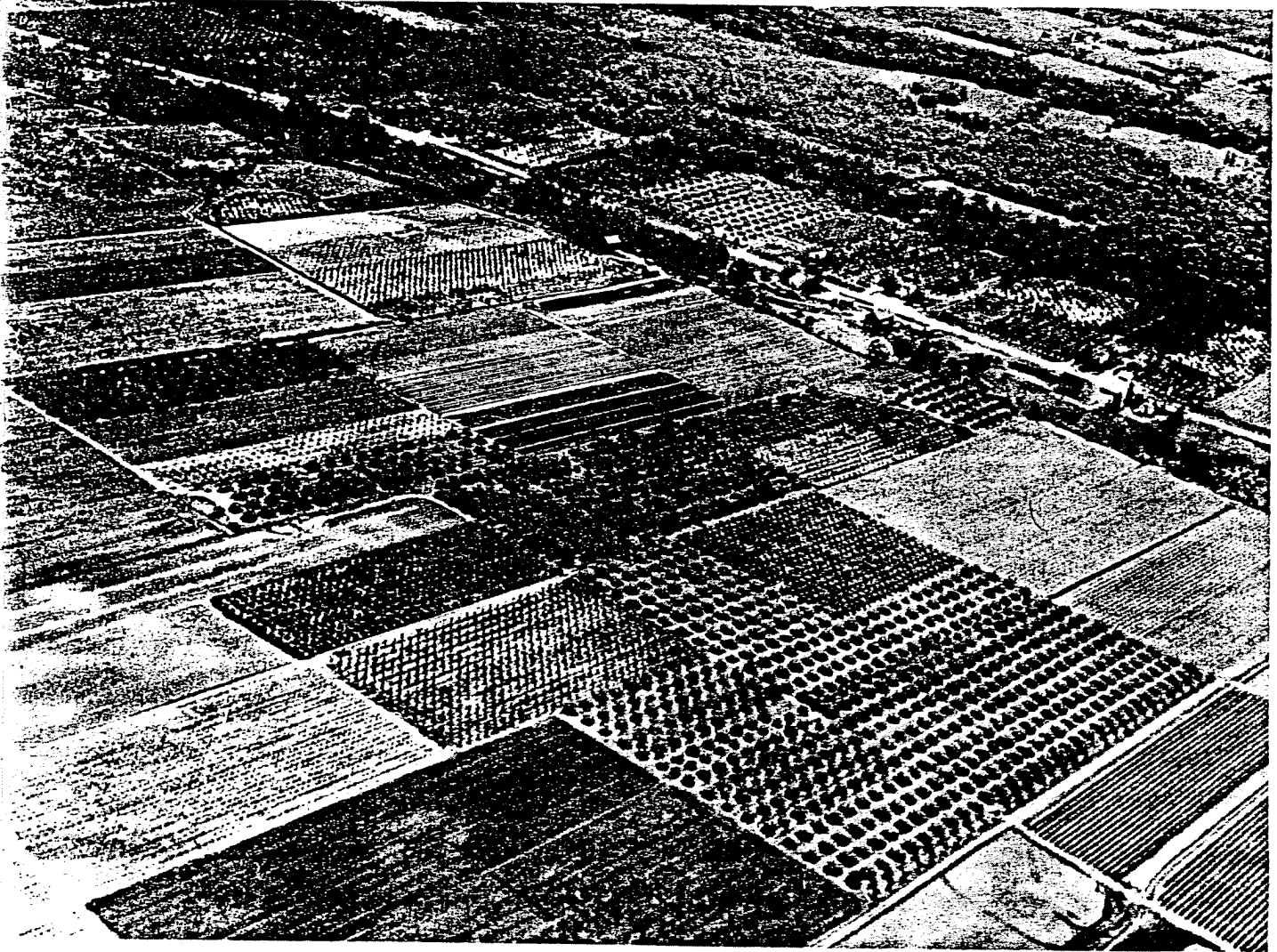
Description: The polynuclear aromatic hydrocarbons constitute a class of materials of which benzo[a]pyrene is one of the most common and also the most hazardous.

Benzo[a]pyrene, $C_{20}H_{12}$, is a yellowish crystalline solid, melting at 179°C. It consists of five benzene rings joined together. Other polynuclear aromatics which are discussed in separate sections in this volume are as follows: acenaphthene, fluoranthene and naphthalene. A variety of abbreviations are in common use for the polynuclear aromatics as shown below:

Abbreviation	Compound Designated
A	Anthracene
BaA	Benzo[a]anthracene (1,2-benzanthracene)
BaP (also BP)	Benzo[a]pyrene (3,4-benzopyrene)
BbFL (also BbF)	Benzo[b]fluoranthene
BeP	Benzo[e]pyrene
BjFL (also BjF)	Benzo[j]fluoranthene
BkFL (also BkF)	Benzo[k]fluoranthene (11,12-benzofluoranthene)
BPR	Benzo[ghi]perylene (1,12-benzoperylene)
CH (also CR)	Chrysene
OBA	Dibenzo[ah]anthracene (1,2,5,6-benzanthracene)
DBAc	Dibenz[a,h] and [a,i] acridine
DBC	Dibenzocarbazole

(continued)

SOIL SURVEY OF Niagara County, New York



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FROM
SAMUEL JAVITS
U. S. SENATOR



United States Department of Agriculture
Soil Conservation Service
In cooperation with
Cornell University Agricultural Experiment Station

Issued October 1972

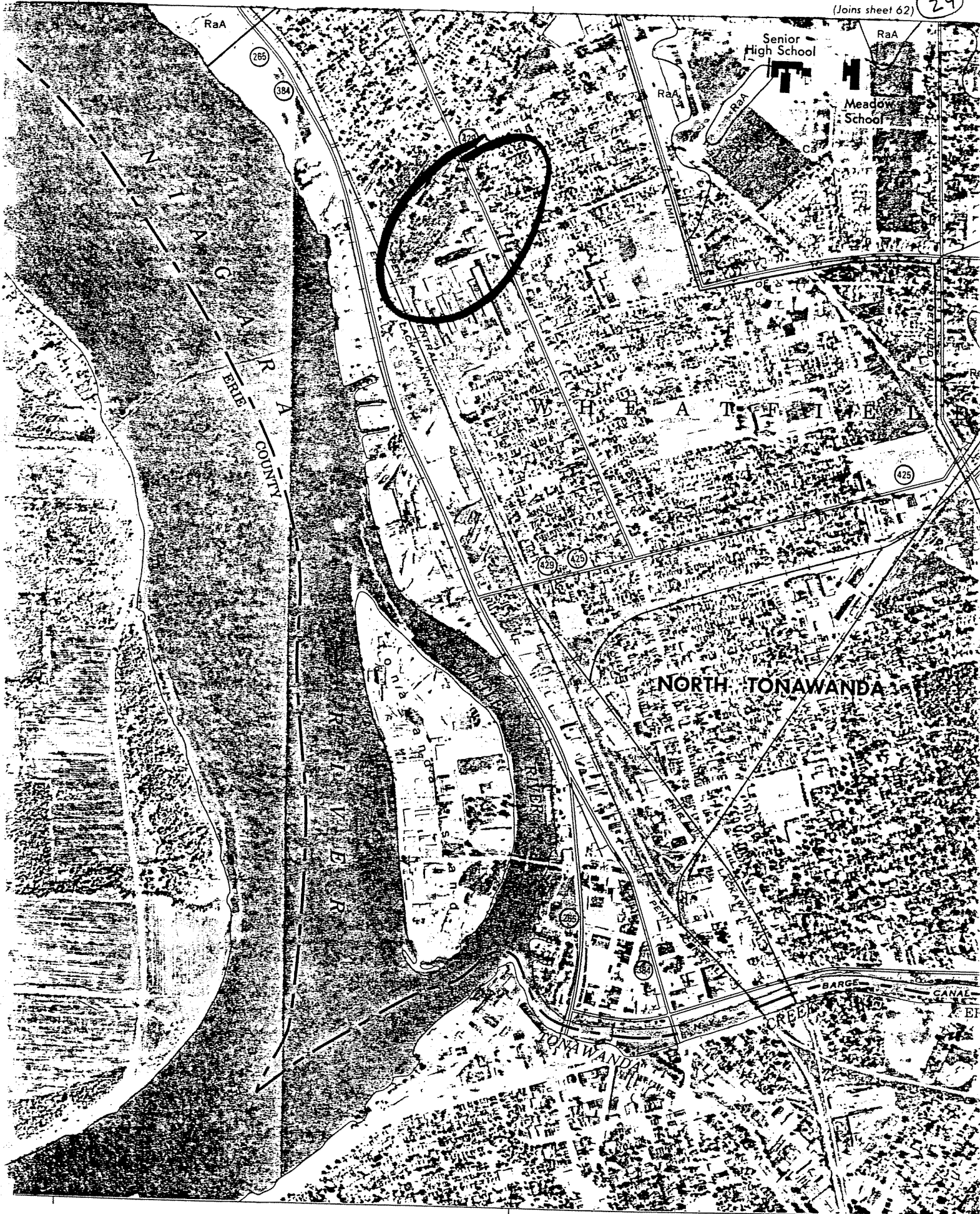
SOIL LEGEND

WORKS

The first capital letter is the initial one of the soil name. A second capital letter, A, B, C, D, E, or F, is a general guide to the slope class. Symbols without a slope letter are for those soils or miscellaneous land types where slope is not significant to use and management. A final number 3, in the symbol indicates that the soil is eroded.

SYMBOL	NAME	SYMBOL	NAME
Ad	Alluvial land	HoA	Howard gravelly loam, 0 to 3 percent slopes
Af	Altmar loamy fine sand	HoB	Howard gravelly loam, 3 to 8 percent slopes
Am	Altmar gravelly fine sandy loam	HoC	Howard gravelly loam, 8 to 15 percent slopes
AnA	Appleton gravelly loam, 0 to 3 percent slopes	HsB	Hudson silt loam, 2 to 6 percent slopes
ApA	Appleton silt loam, 0 to 3 percent slopes	HtC3	Hudson silty clay loam, 6 to 12 percent slopes, eroded
ArB	Arkport very fine sandy loam, 0 to 6 percent slopes	HuF3	Hudson soils, 20 to 45 percent slopes, eroded
ArC	Arkport very fine sandy loam, 6 to 12 percent slopes		
AsA	Arkport fine sandy loam, gravelly substratum, 0 to 2 percent slopes	LaB	Lairdsville silt loam, 0 to 6 percent slopes
AsB	Arkport fine sandy loam, gravelly substratum, 2 to 6 percent slopes	Lc	Lakemont silty clay loam
		Ld	Lamson very fine sandy loam
BoA	Bombay fine sandy loam, 0 to 2 percent slopes	Lg	Lamson fine sandy loam, gravelly substratum
BoB	Bombay fine sandy loam, 2 to 6 percent slopes	Lo	Lockport silt loam
BrA	Brockport silt loam, 0 to 4 percent slopes		
		Ma	Madalin silt loam
Ca	Canandaigua silt loam	Md	Madalin silt loam, loamy subsoil variant
Cb	Canandaigua silty clay loam	Me	Made land
CcA	Cayuga and Cazenovia silt loams, 0 to 2 percent slopes	Mf	Massena fine sandy loam
CcB	Cayuga and Cazenovia silt loams, 2 to 6 percent slopes	Mn	Minoa very fine sandy loam
CcC	Cayuga and Cazenovia silt loams, 6 to 12 percent slopes	Ms	Muck, shallow
CeA	Cazenovia gravelly silt loam, 0 to 3 percent slopes	NaA	Niagara silt loam, 0 to 2 percent slopes
CeB	Cazenovia gravelly silt loam, 3 to 8 percent slopes	NaB	Niagara silt loam, 2 to 6 percent slopes
CgA	Cazenovia gravelly silt loam, shale substratum, 0 to 3 percent slopes		
CgB	Cazenovia gravelly silt loam, shale substratum, 3 to 8 percent slopes	OdA	Odessa silty clay loam, 0 to 2 percent slopes
Ch	Cheektowaga fine sandy loam	OdB	Odessa silty clay loam, 2 to 6 percent slopes
CIA	Churchville silt loam, 0 to 2 percent slopes	OnB	Ontario loam, 2 to 8 percent slopes
CIB	Churchville silt loam, 2 to 6 percent slopes	OnC	Ontario loam, 8 to 15 percent slopes
CmA	Claverack loamy fine sand, 0 to 2 percent slopes	OnC3	Ontario loam, 8 to 15 percent slopes, eroded
CmB	Claverack loamy fine sand, 2 to 6 percent slopes	OnD3	Ontario loam, 15 to 30 percent slopes, eroded
CnA	Callamer silt loam, 0 to 2 percent slopes	OoA	Ontario loam, limestone substratum, 0 to 3 percent slopes
CnB	Callamer silt loam, 2 to 6 percent slopes	OoB	Ontario loam, limestone substratum, 3 to 8 percent slopes
CoB	Colonie loamy fine sand, 0 to 6 percent slopes	OsA	Otisville gravelly sandy loam, 0 to 3 percent slopes
Cs	Cosad fine sandy loam	OsB	Otisville gravelly sandy loam, 3 to 8 percent slopes
Cu	Cut and fill land	OvA	Ovid silt loam, 0 to 2 percent slopes
		OvB	Ovid silt loam, 2 to 6 percent slopes
DuB	Dunkirk silt loam, 2 to 6 percent slopes	OwA	Ovid silt loam, limestone substratum, 0 to 3 percent slopes
DuC3	Dunkirk silt loam, 6 to 12 percent slopes, eroded	OwB	Ovid silt loam, limestone substratum, 3 to 8 percent slopes
DvD3	Dunkirk and Arkport soils, 12 to 20 percent slopes, eroded		
		PsA	Phelps gravelly loam, 0 to 5 percent slopes
EIA	Elnora loamy fine sand, 0 to 2 percent slopes	RaA	Raynham silt loam, 0 to 2 percent slopes
EIB	Elnora loamy fine sand, 2 to 6 percent slopes	RaB	Raynham silt loam, 2 to 6 percent slopes
		RbA	Rhinebeck silt loam, 0 to 2 percent slopes
FaA	Farmington silt loam, 0 to 8 percent slopes	RbB	Rhinebeck silt loam, 2 to 6 percent slopes
Fo	Fonda mucky silt loam	RhA	Rhinebeck silty clay loam, sandy substratum, 0 to 2 percent slopes
Fr	Fredon gravelly loam	RhB	Rhinebeck silty clay loam, sandy substratum, 2 to 6 percent slopes
		Rk	Rhinebeck silt loam, thick surface variant
GnA	Galen very fine sandy loam, 0 to 2 percent slopes	RoA	Rock land, nearly level
GnB	Galen very fine sandy loam, 2 to 6 percent slopes	RoF	Rock land, steep
Ha	Hamlin silt loam	ShB	Schaharie silty clay loam, 2 to 6 percent slopes
HgA	Hilton gravelly loam, 0 to 3 percent slopes	St	Stafford loamy fine sand
HgB	Hilton gravelly loam, 3 to 8 percent slopes	Su	Stafford loamy fine sand, gravelly substratum
HIA	Hilton silt loam, 0 to 3 percent slopes	Sw	Sun silt loam
HIB	Hilton silt loam, 3 to 8 percent slopes		
HmA	Hilton and Cayuga silt loams, limestone substratum, 0 to 3 percent slopes	Wa	Wayland silt loam
HmB	Hilton and Cayuga silt loams, limestone substratum, 3 to 8 percent slopes		

Highways and roads
Dual
Good motor
Poor motor
Trail
Highway markers
National Interstate
U. S.
State or county
Railroads
Single track
Multiple track
Abandoned
Bridges and crossings
Road
Trail
Railroad
Ferry
Ford
Grade
R. R. over
R. R. under
Tunnel
Buildings
School
Church
Mine and quarry
Gravel pit
Power line
Pipeline
Cemetery
Dams
Levee
Tanks
Well, oil or gas
Forest fire or lookout
Windmill

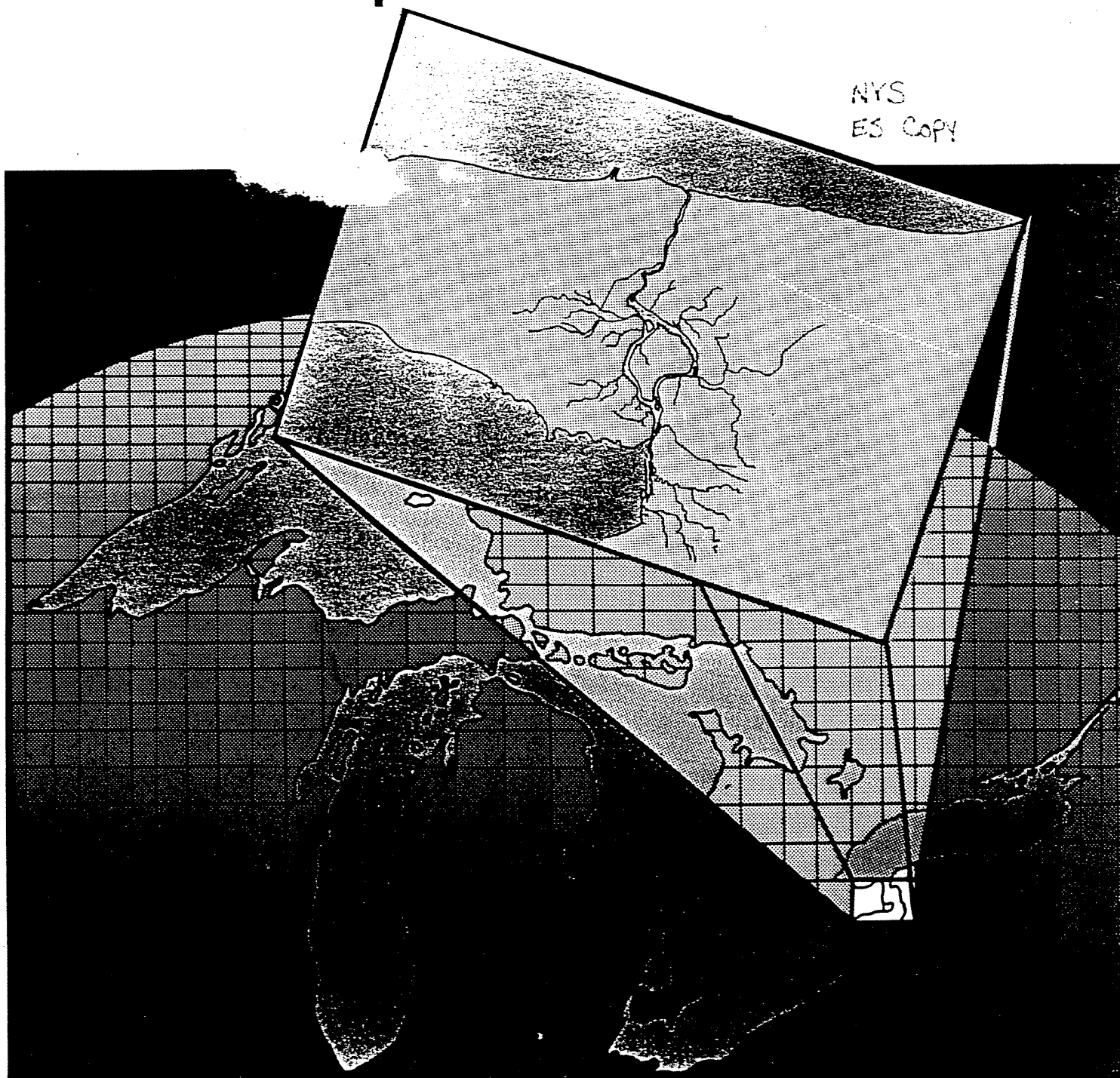




Preliminary Evaluation Of Chemical Migration To Groundwater and The Niagara River from Selected Waste- Disposal Sites



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6. BUFFALO PUMPS DIVISION (USGS reconnaissance)

NYSDEC 932044

General information and chemical-migration potential.--The Buffalo Pumps Division site, in the City of North Tonawanda, was used to dispose of an unknown quantity of boiler ash. The site was closed in 1971 and has since been partly covered with grass.

Heavy-metals concentrations in a sediment sample from a wetland at the west end of the property were higher than in water samples from near the refuse area. Additional data would be needed to determine whether migration is taking place; thus, the potential for contaminant migration is indeterminate.

Geologic information.--The site consists of glacial lacustrine clay overlying bedrock of Camillus Shale. The U.S. Geological Survey drilled on the site in 1982; locations are shown in figure B-1. The geologic logs are as follows:

<u>Boring no.</u>	<u>Depth (ft)</u>	<u>Description</u>
1	0 - 6.2	Fill.
	6.2 - 11.2	Clay, tan, wet.
	11.2 - 27.0	Same, but wetter.
	27.0 - 28.5	Clay, sandy, pinkish.
	28.5 - 30.0	Bedrock.
		SAMPLE: 5 - 7 ft.
2	0 - 1.0	Topsoil.
	1.0 - 3.0	Clay, gray.
	3.0 - 5.0	Sand, clayey, dark, very wet.
	5.0 - 5.5	Clay, dry.
	5.5 - 6.2	Sand, dry, tight.
		SAMPLE: 3 - 5 ft.

Hydrologic information.--Water levels in the two wells indicated ground water to be 3 to 5 ft below land surface. The direction of ground-water flow appeared to be toward the Niagara River.

Chemical information.--The U.S. Geological Survey collected water samples from the two wells and a sediment sample from the swamp on the west side of the property (fig. B-1) for chromium, copper, iron, and organic-compound analyses. Results are given in table B-1. No organic compounds were found; however, the sediment sample was analyzed at a detection limit of mg/kg instead of $\mu\text{g/kg}$. The concentrations of chromium, copper, and iron in the water samples exceeded USEPA criteria for drinking water and the New York State ground-water standards. The substrate sample had a higher copper concentration than soil samples from undisturbed areas.

Table B-1.--Analyses of ground-water and sediment samples from Buffalo Pumps Division, site 6, North Tonawanda, N.Y., June 21, 1982.
[Locations shown in fig. B-1. Concentrations are in µg/L and µg/kg respectively; dashes indicate that compound was not found.]

	Sample number		
	Ground water		Surface-water sediment
	1	2	3
<u>Inorganic constituents</u>			
Chromium	150†	40	--
Copper	3,400†	300	1,500,000††
Iron	260,000†	51,000†	10,000,000
<u>Organic compounds</u>			
	--	--	***

† Exceeds USEPA criterion for maximum permissible concentration in drinking water or NYS standard for maximum concentration in ground water.
 †† Exceeds concentrations in samples from undisturbed soils in the Tonawanda area. Undisturbed soils not analyzed for iron.
 *** Analyzed at detection limit above that required by this study.
 No compounds detected.

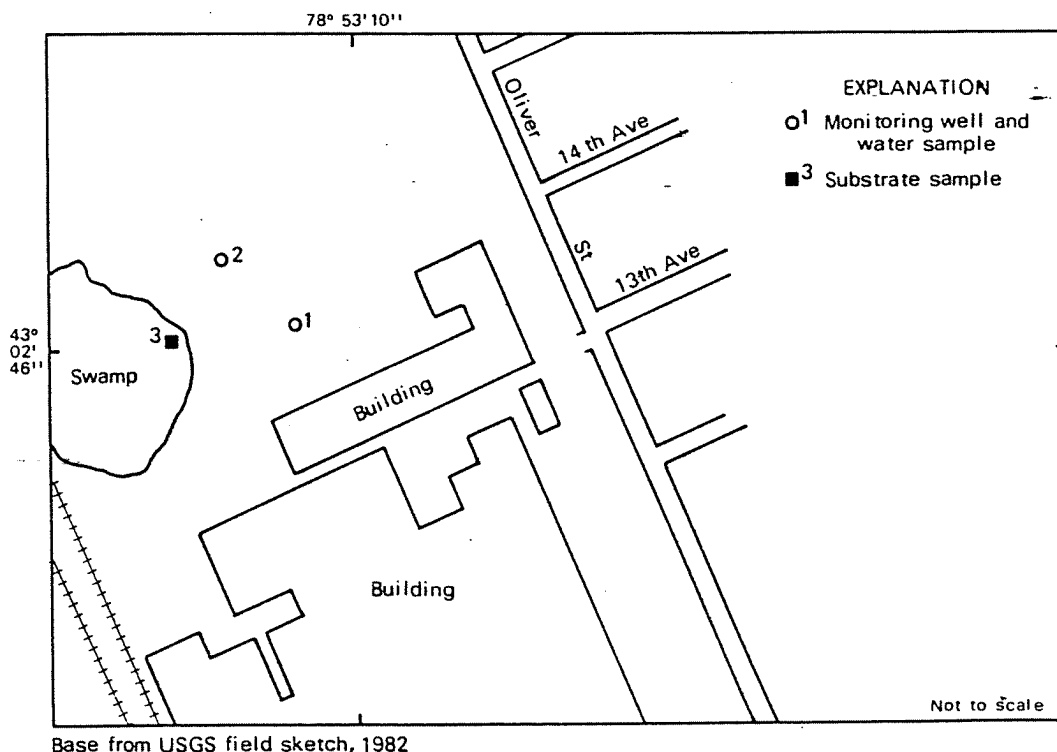


Figure B-1. Location of sampling holes and monitoring well at Buffalo Pumps Division, site 6, North Tonawanda.

6. BUFFALO PUMPS DIVISION

General Information and Chemical Migration Potential

The Buffalo Pumps Division site is located in the City of North Tonawanda, and is shown on plate 2.

The site was used to dispose of an unknown quantity of boiler ash. The site was closed in 1971 and has since been partially covered with grass.

The potential for contaminant migration is minor because higher concentrations of heavy metals were found in a sediment sample from a swamp at the west side of the property than in samples from the refuse area.

Additional data would be needed to determine whether migration is taking place. A map showing the location of test holes is given in figure ____.

Figure ____ (caption on next page) belongs near here.

Geologic Information

The site consists of glacial lacustrine clay overlying bedrock of Camillus shale. The U.S. Geological Survey drilled on the site in 1982, the locations are shown in figure _____. The geologic logs are as follows:

<u>Borehole</u>	<u>Depth (ft)</u>	<u>Description</u>
1	0 - 6.2	Fill.
	6.2 - 11.2	Clay, tan, wet.
	11.2 - 27.0	Same, but wetter.
	27.0 - 28.5	Clay, sandy, pinkish.
	28.5 - 30.0	Bedrock. SAMPLE: 5 - 7 ft.
2	0 - 1.0	Topsoil.
	1.0 - 3.0	Clay, gray.
	3.0 - 5.0	Sand, clayey, dark, very wet.
	5.0 - 5.5	Clay, dry.
	5.5 - 6.2	Sand, dry, tight. SAMPLE: 3 - 5 ft.

Hydrologic Information

Water levels in the two wells indicated the water table to be 3 to 5 ft below land surface. The direction of ground-water flow appeared to be toward the Niagara River.

Chemical Information

Water samples were collected from the two wells, and a sediment sample was collected in the swamp on the west side of the property (fig. __). Each sample was analyzed for chromium, copper, iron, and organic compounds. Results are given in table __. No organic compounds were found in the samples, however, the sediment sample was analyzed at a detection limit of mg/Kg instead of $\mu\text{g/Kg}$. The concentrations of chromium, copper, and iron were higher than the USEPA recommended criteria for drinking water. The substrate sample had a copper concentration higher than background soil samples from undisturbed sites in the Tonawanda area.

Table 1. -- Analyses of ground-water and surface-water-sediment samples from Buffalo Pump Division, North Tonawanda, N.Y., June 11, 1981. (Locations shown in fig. 1. Concentrations are in mg/kg; dashes indicate that compound was not found.)

	Sample number		
	Ground water		Surface-water sediment
	1	2	3

Inorganic constituents

Chromium	150 †	40	--
Copper	3,400 †	300	1,500,000 ††
Iron	260,000 †	51,000 †	10,000,000

Organic compounds

-- -- **

† Exceeds USEPA criterion for maximum permissible concentration in drinking water.

†† Exceeds concentrations in samples taken from undisturbed soils in the Tonawanda area.

** Analyzed at detection limit above that required by the study. No compounds detected.

APPENDIX A
FIELD PROCEDURES

APPENDIX A

PHASE II FIELD PROCEDURES

These procedures have been utilized by Engineering-Science, Inc. field teams during the Phase II field investigations. These procedures are taken from the NYSDEC-approved "Quality Assurance Project Plan for the Phase II Engineering Investigations and Evaluations at Inactive Hazardous Waste Disposal Sites", dated June, 1987.

The following procedures are contained in this appendix: drilling overburden and bedrock, monitoring well installations, well development and sampling program, including groundwater sampling and waste sampling. Procedures for performing the geophysical surveys are presented in Appendix B.

DRILLING OVERBURDEN AND BEDROCK

The procedures utilized in drilling overburden and bedrock were taken from "Guidelines for Exploratory Boring, Monitoring Wells Installations, and Documentation of these Activities", as promulgated by NYSDEC. These procedures, as found in the project Work Plan and Quality Assurance Plan were modified in the field, with NYSDEC approval, in response to site-specific conditions encountered.

Prior to beginning each well boring the downhole drilling equipment and tools were steam-cleaned. During the progress of this work, the downhole equipment and tools were placed on wooden pallets or sheets of plastic to limit cross-contamination.

Drilling was accomplished with a Mobile B-61 truck-mounted drilling rig. Generally, the overburden was drilled with 4 1/4-inch inside diameter hollow-stem augers. In general, soil samples were collected at intervals of two feet and visually classified in terms of moisture content, color, texture, density and structure. The soil samples were also screened with a Photovac Tip-II to determine the presence of certain volatile organic compounds. The soil cuttings were also monitored with the Photovac. Since no readings in excess of 5 (ppm) above background were recorded, the soil materials were left on the ground surface.

MONITORING WELL INSTALLATIONS

All wells were constructed of two-inch inside diameter PVC riser pipe and .010-inch slotted screens 5 feet in length. All well materials were steam cleaned prior to insertion in the borehole.

Once the PVC well materials were set in place through the augers, quartz sand backfill was placed around the well screen with tremie, to a point one to two feet above the screen. Above the sandpack a bentonite pellet seal two feet thick was placed to isolate the screened zone. Above the bentonite pellets, a cement/bentonite grout was placed up to ground surface. A vented PVC cap

was placed on the well pipe, and the well was secured with the installation of a locking 4-inch inside diameter steel protective casing.

Well Development

Once the well installation was complete, the wells were generally allowed to set-up for a period of approximately 12 hours or more. Each well was then developed by removing water until the water contained turbidity of less than 100 Jackson Turbidity Units, or was largely sediment-free.

Development methods included bailing and air-lift pumping. For air-lift method, the discharge of the air line was first monitored with a Photovac to ensure readings were not above background. An oil-separating device was placed on the discharge line of the compressor. The air line was steam-cleaned prior to the placement in the well. Once the air line was in place just above the screened section, the air pressure was increased until the water could be lifted out of the top of the well casing. Under both development methods, the wells were periodically surged to aid in removing sediment.

SAMPLING PROGRAM

The sampling program at the Buffalo Pumps site consisted of groundwater and waste sampling. Samples were collected in accordance with the approved Quality Assurance Project Plan. In addition to the media sampled, two types of blanks were collected. A trip blank consisting of organic-free water was prepared by the laboratory and accompanied the sample bottle shipment. This blank provides a measure of the impact of bottle preparation procedures and shipment on the samples. A field wash blank was collected by pouring organic-free water provided by the laboratory or a commercial distributor over the sampling equipment as a measure of the field decontamination procedures. The wash blank was labelled 'field work' and was analyzed for volatile organic compounds. Prior to sampling at each location, the sampling equipment was decontaminated by successively rinsing with detergent (Alconox) water, methanol, and distilled water. After collection of the water samples, field tests were performed on a separate sample to determine pH, temperature and specific conductivity. Field sampling records are presented in Appendix D.

Groundwater Sampling

Prior to collecting the groundwater samples, the static water level in the well was recorded from the top of PVC well casing and at least three well volumes of water were removed with a teflon bailer. The sample bottles were then filled using the same teflon bailer. Dedicated polypropylene or polyethylene rope was used to bail each well.

Waste Sampling

Waste samples were collected by split spoon sampling at ranges of 0-7 feet below ground surface. Bottles were filled with a composite sample collected over the sampling range. The

samples were recollected for additional analyses by drilling to the appropriate sample depths with a bucket auger.

AIR QUALITY MONITORING

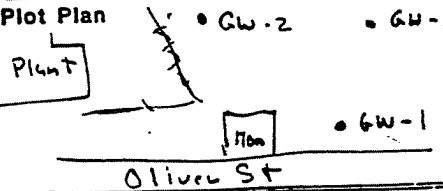
Air quality monitoring for volatile organic compounds with an Photovac Tip-II photoionization meter was implemented during the drilling and well installations and sampling events. The meter was calibrated on a daily basis before use with a 100 ppm isobutylene standard. Monitoring was generally performed as a health and safety measure. The intake of the instruments was held at head height for 30 seconds and the readings were recorded. During the drilling procedures, the split-spoon soil samples were held at approximately 1" from the intake to test for volatile organic vapors emanating from the soil samples. The air in the completed well as monitored by placing the intake over the well opening and removing the PVC cap. The intake was then placed into the well opening and any readings were recorded.

APPENDIX B

GEOLOGIC DATA

Boring Logs and Well Schematics

DRILLING CONTRACTOR: Driller: <u>M. Legare</u> Inspector: <u>W. Tilley</u> Rig Type: <u>Mobile 61</u> Drilling Method: <u>4 1/4" ID HSA</u>	ENGINEERING-SCIENCE DRILLING RECORD	BORING NO. <u>GW-1</u> Sheet <u>1</u> of <u>1</u> Location <u>Parking lot on</u> <u>Oliver St.</u>
PROJECT NAME <u>DEC Phase II Buffalo Pump</u> PROJECT NO. <u>5401218</u>		

GROUND WATER OBSERVATIONS Water Level: <table border="1" style="width:100%; height: 40px;"><tr><td> </td><td> </td><td> </td></tr></table> Time: <table border="1" style="width:100%; height: 20px;"><tr><td> </td><td> </td><td> </td></tr></table> Date: <table border="1" style="width:100%; height: 20px;"><tr><td> </td><td> </td><td> </td></tr></table> Casing Depth: <table border="1" style="width:100%; height: 20px;"><tr><td> </td><td> </td><td> </td></tr></table>													Weather <u>Fair</u> Date/Time Start <u>1/8/88 1:00 pm</u> Date/Time Finish <u>1/8/88 3:00 pm</u>	Plot Plan  Oliver St

Photovac Reading	SAMPLE DEPTHS	SAMPLE I.D.	SPT	FIELD IDENTIFICATION OF MATERIAL	WELL SCHEMATIC	Comments
0.0	0-2	S-1	21	Gray Brown Silt, some sand, Trace Clay & Fine gravel (Fill)	Grout	2.6'
	SS	1	11			
	Rec 18"		10			
			14			
0.0	2-4	S-2	9	Black Silt and Fine Sand (Fill)	Bentonite Pellets	4.6'
	SS	1	7			
	Rec 8"		6			
			8	4.5 Dark Gray Silt and Fine Sand (Fill)	2" PVC Riser	5'
0.0	4-6	S-3	3			
	SS	1	3			
	Rec 2"		5			
			7	Brown medium Fine sand + Silt (wet to Saturated)	Sand	2" PVC Screen
0.0	6-8	S-4	15			
	SS	1	4			
	Rec 3"		2			
			2	9.0		10'
0.0	8-10	S-5	7			
	SS	1	16			
	Rec 10"		19			
			18	Brown Silt, little Clay and Fine Sand (moist)		
				Boring terminated at 10'		

SPT-STANDARD PENETRATION TEST

D - DRY W - WASHED C - CORED
 U - UNDISTURBED SS - SPLIT SPOON
 P - PIT A - AUGER CUTTINGS

Soil Stratigraphy Summary Fill to 4.5' over Brown
 Medium Fine Sand to 9.0 over Brown
 Clayey Silt to 10.

Soil Swathography Summary Fill to 6.5' over Brown to Gray medium Fine Sand to 12'.

[illegible]

SPT-STANDARD PENETRATION TEST

D - DRY W - WASHED C - CORED

U - UNDISTURBED SS - SPLIT SPOON

P - PIT A - AUGER CUTTINGS

Self Stratigraphy Summary

Soil Stratigraphy Summary Fill to 4.5' over Brown-Gray
medium Fine Sand to 9.0' over Gray Brown
Clayey Silt to 10'

Geotechnical Analyses Results



PROJECT: ENGINEERING SCIENCE - BUFFALO PUMPS (SYO12-18) PROJECT NUMBER: 870837

MOISTURE AND GRADATION ANALYSIS

BORING NUMBER	DEPTH (FT.)	MOISTURE PERCENT	Gradation (% Retained on Standard Sieve)							CLAY	CLASSIFICATION
			#4	#10	#40	#100	#200	SILT			
GW-1	4-6	24.9	0.1	0.3	2.3	5.7	17.8	61.8	12.0	CL	
GW-2	10-12	23.9	11.1	4.9	23.5	9.9	15.0	25.6	10.0	SM	
GW-3	6-8	23.1	0.0	0.0	0.6	7.0	42.8	35.5	14.1	SM	



PROJECT: ENGINEERING SCIENCE - BUFFALO PUMPS (SY012-18) PROJECT NUMBER: 880837

ATTERBERG LIMITS

<u>BORING NUMBER</u>	<u>DEPTH (FT.)</u>	<u>MOISTURE PERCENT</u>	<u>L.L.</u>	<u>P.L.</u>	<u>P.I.</u>
GW-2	10-12	23.9	27.6	12.9	14.7

APPENDIX C

LABORATORY ANALYTICAL DATA

APPENDIX C

LABORATORY ANALYTICAL DATA

Waste Results

Groundwater Results

Field Sampling Records

Each group noted above is organized by sample number. Results are listed in the following orders: volatile organics, semivolatile organics, pesticide/PCBs, inorganics, and TOX. Organic data aquifiers can be found at the bottom of each Form I, page 1 (volatile compounds). Inorganic data qualifiers are limited following this cover page.

0000002

Lab Name: NANCO LABORATORIES, INC.
Lab Address: Robinson Lane, RD 6
Wappingers Falls, New York

DATE REPORTED:

2/22/88

VALUE - IF THE RESULT IS A VALUE GREATER THAN OR EQUAL TO THE INSTRUMENT
DETECTION LIMIT BUT LESS THAN THE CONTRACT-REQUIRED DETECTION LIMIT,
THE VALUE IS REPORTED IN BRACKETS (i.e., [10]. THE ANALYTICAL METHOD
USED IS INDICATED WITH P (FOR ICP), A (FOR FLAME AA) OR F (FOR FURNACE AA).

U - INDICATES ELEMENT WAS ANALYZED FOR BUT NOT DETECTED. REPORTED WITH THE
INSTRUMENT DETECTION LIMIT VALUE (e.g., 10 U).

E - INDICATES A VALUE ESTIMATED OR NOT REPORTED DUE TO THE PRESENCE OF
INTERFERENCE.

S - INDICATES A VALUE DETERMINED BY METHOD OF STANDARD ADDITION.

N - INDICATES SPIKE SAMPLE RECOVERY IS NOT WITHIN CONTROL LIMITS.

* - INDICATES DUPLICATE ANALYSIS IS NOT WITHIN CONTROL LIMITS.

+ - INDICATES THE CORRELATION COEFFICIENT FOR METHOD OF STANDARD ADDITION IS
LESS THAN 0.995

M - INDICATES DUPLICATE INJECTION RESULTS EXCEEDED CONTROL LIMITS.

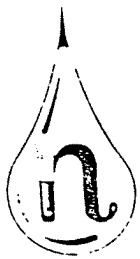
P - INDICATES ICP ANALYSIS

F - INDICATES FURNACE ANALYSIS

[] - INDICATES SAMPLE VALUE IS BETWEEN IDL AND CRDL

COMMENTS :

Waste Results



SAMPLE DATA

B-1.18__

ORGANICS ANALYSIS DATA SHEET
(PAGE 1)

SAMPLE NUMBER

Laboratory Name: NANCO LABORATORY INC.

Case No: ENGINEERING SCIENCE

B-1.18

Lab File ID No: >F1839

QC Report No: N/A

BUFFALO PUMPS

Sample Matrix: SOIL

Contract No: N/A

Data Release Authorized By: *Kathleen M. Kelly*

Date Sample Received: 01-12-88

VOLATILE COMPOUNDS

Concentration: Low Medium (Circle One)

Date Extracted/Prepared: 01-18-88

Date Analyzed: 01-18-88

Conc/Dil Factor: 1

pH: 8.9

Percent Moisture 18

CAS Number		ug/l or <u>ug/Kg</u> (Circle One)	CAS Number		ug/l or <u>ug/Kg</u> (Circle One)
74-87-3	Chloromethane	10.0 U	79-34-5	1,1,2,2-Tetrachloroethane	5.0 U
75-83-9	Bromomethane	10.0 U	78-87-5	1,2-Dichloropropane	5.0 U
75-01-4	Vinyl Chloride	10.0 U	10061-02-6	Trans-1,3-Dichloropropene	5.0 U
75-00-3	Chloroethane	10.0 U	79-01-6	Trichloroethene	5.0 U
75-09-2	Methylene Chloride	15.0 <u>B</u>	124-48-1	Dibromochloromethane	5.0 U
67-64-1	Acetone	10.0 U	79-00-5	1,1,2-Trichloroethane	5.0 U
75-15-0	Carbon Disulfide	5.0 U	71-43-2	Benzene	5.0 U
75-35-4	1,1-Dichloroethene	5.0 U	10061-01-5	cis-1,3-Dichloropropene	5.0 U
75-34-3	1,1-Dichloroethane	5.0 U	110-75-8	2-Chloroethylvinylether	10.0 U
156-60-5	Trans-1,2-Dichloroethene	5.0 U	75-25-2	Bromoform	5.0 U
67-66-3	Chloroform	5.0 U	591-78-6	2-Hexanone	10.0 U
107-06-2	1,2-Dichloroethane	5.0 U	108-10-1	4-Methyl-2-Pentanone	10.0 U
78-93-3	2-Butanone	10.0 U	127-18-4	Tetrachloroethene	5.0 U
71-55-6	1,1,1-Trichloroethane	5.0 U	108-88-3	Toluene	5.0 U
56-23-5	Carbon Tetrachloride	5.0 U	108-90-7	Chlorobenzene	5.0 U
108-05-4	Vinyl Acetate	10.0 U	100-41-4	Ethylbenzene	5.0 U
75-27-4	Bromodichloromethane	5.0 U	100-42-5	Styrene	5.0 U
				Total Xylenes	5.0 U

Data Reporting Qualifiers

For reporting results to EPA, the following results qualifiers are used.

Additional flags or footnotes explaining results are encouraged. However, the definition of each flag must be explicit.

VALUE

If the result is a value greater than or equal to the detection limit, report the value.

U

Compound was analyzed for but not detected. Report the minimum detection limit for the sample with the U (e.g. 10U based on necessary concentration dilution actions. (This is not necessarily the instrument detection limit.) The footnote should read U-Compound was analyzed for but not detected. The number is the minimum attainable detection limit for the sample.

J

Indicates an estimated value. This flag is used either when estimating a concentration for tentatively identified compounds where a 1:1 response is assumed or when the mass spectral data indicates the presence of a compound that meets the identification criteria but the result is less than the specified detection limit but greater than zero (e.g. 10J).

C

This flag applies to pesticide parameters where the identification has been confirmed by GC/MS. Single component pesticides greater than or equal to 10 ng/ul in the final extract should be confirmed by GC/MS.

B

This flag is used when the analyte is found in the blank as well as a sample. It indicates possible/probable blank contamination and warns the data user to take appropriate action.

OTHER

Other specific flags and footnotes may be required to properly define the results. If used, they must be fully described and such description attached to the data summary report.

ORGANIC ANALYSIS DATA SHEET

(PAGE 2)

LABORATORY NAME: NANCO LABS. INC.

SAMPLE NO. B-1.18

CASE NO: ENGINEERING SCIENCE - BUFFALO PUMPS

SEMIVOLATILE COMPOUNDS

Concentration: Low Medium (Circle One)

Date Extracted/Prepared: 1/12/88

GPC Cleanup: Yes XXX No

Date Analyzed: 1/20/88

Separatory Funnel Extraction: Yes

Conc/Dil Factor: ----->

2

Continuous Liquid - Liquid Extraction: Yes

Percent Moisture: 18

CAS Number		ug/l or <u>ug/Kg</u> (Circle One)	CAS Number		ug/l or <u>ug/Kg</u> (Circle One)
108-95-2	Phenol	660.0 U	83-32-9	Acenaphthene	660.0 U
111-44-4	bis(-2-Chloroethyl)Ether	660.0 U	51-28-5	2,4-Dinitrophenol	3200.0 U
95-57-8	2-Chlorophenol	660.0 U	100-02-7	4-Nitrophenol	3200.0 U
541-73-1	1,3-Dichlorobenzene	660.0 U	132-64-9	Dibenzofuran	660.0 U
106-46-7	1,4-Dichlorobenzene	660.0 U	121-14-2	2,4-Dinitrotoluene	660.0 U
100-51-6	Benzyl Alcohol	660.0 U	606-20-2	2,6-Dinitrotoluene	660.0 U
95-50-1	1,2-Dichlorobenzene	660.0 U	84-66-2	Diethylphthalate	660.0 U
95-48-7	2-Methylphenol	660.0 U	7005-72-3	4-Chlorophenyl-phenylether	660.0 U
39638-32-9	bis(2-chloroisopropyl)Ether	660.0 U	86-73-7	Fluorene	660.0 U
106-44-5	4-Methylphenol	660.0 U	100-01-6	4-Nitroaniline	3200.0 U
621-64-7	N-Nitroso-Di-n-Propylamine	660.0 U	534-52-1	4,6-Dinitro-2-Methylphenol	3200.0 U
67-72-1	Hexachloroethane	660.0 U	86-30-6	N-Nitrosodiphenylamine (1)	660.0 U
98-95-3	Nitrobenzene	660.0 U	101-55-3	4-Bromophenyl-phenylether	660.0 U
78-59-1	Isophorone	660.0 U	118-74-1	Hexachlorobenzene	660.0 U
88-75-5	2-Nitrophenol	660.0 U	87-86-5	Pentachlorophenol	3200.0 U
105-67-9	2,4-Dimethylphenol	660.0 U	85-01-8	Phenanthrene	300.0 J
65-85-0	Benzoic Acid	3200.0 U	120-12-7	Anthracene	660.0 U
111-91-1	bis(-2-Chloroethoxy)Methane	660.0 U	84-74-2	Di-n-Butylphthalate	230.0 J
120-83-2	2,4-Dichlorophenol	660.0 U	206-44-0	Fluoranthene	770.0
120-82-1	1,2,4-Trichlorobenzene	660.0 U	129-00-0	Pyrene	660.0 U
91-20-3	Naphthalene	660.0 U	85-68-7	Butylbenzylphthalate	660.0 U
106-47-8	4-Chloroaniline	660.0 U	91-94-1	3,3'-Dichlorobenzidine	1320.0 U
87-68-3	Hexachlorobutadiene	660.0 U	56-55-3	Benzo(a)Anthracene	660.0 U
59-50-7	4-Chloro-3-Methylphenol	660.0 U	117-81-7	bis(2-Ethylhexyl)Phthalate	1700.0 B
91-57-6	2-Methylnaphthalene	660.0 U	218-01-9	Chrysene	580.0 J
77-47-4	Hexachlorocyclopentadiene	660.0 U	117-84-0	Di-n-Octyl Phthalate	660.0 U
88-06-2	2,4,6-Trichlorophenol	660.0 U	205-99-2	Benzo(b)Fluoranthene	720.0
95-95-4	2,4,5-Trichlorophenol	3200.0 U	207-08-9	Benzo(k)Fluoranthene	660.0 U
91-58-7	2-Chloronaphthalene	660.0 U	50-32-8	Benzo(a)Pyrene	520.0 J
88-74-4	2-Nitroaniline	3200.0 U	193-39-5	Indeno(1,2,3-cd)Pyrene	330.0 J
131-11-3	Dimethyl Phthalate	660.0 U	53-70-3	Dibenz(a,h)Anthracene	660.0 U
208-96-8	Acenaphthylene	660.0 U	191-24-2	Benzo(g,h,i)Perylene	660.0 U
99-09-2	3-Nitroaniline	3200.0 U			

(1) - Cannot be separated from diphenylamine

TABLE 2.4
30890-0092
ENGINEERING SCIENCE
EPA TCL PESTICIDES/PCB's

All results reported as ug/Kg.

Sample Identification

<u>Dilution Factor</u>	<u>1.00</u>	<u>1.19</u>	<u>1.11</u>	<u>1.20</u>	
	<u>1019</u>	<u>1019</u>	<u>1019</u>	<u>1019</u>	
<u>Method Blank I.D.</u>	<u>-B02</u>	<u>-B02</u>	<u>-B02</u>	<u>-B02</u>	
<u>Compound</u>	<u>Method Blank</u>	<u>B-1</u>	<u>B-2</u>	<u>B-3</u>	<u>Lower Limits of Detection with no Dilution</u>
alpha BHC	U	U	U	U	8.0
beta BHC	U	U	U	U	8.0
delta BHC	U	U	U	U	8.0
gamma BHC	U	U	U	U	8.0
Heptachlor	U	U	U	U	8.0
Aldrin	U	U	U	U	8.0
Heptachlor Epoxide	U	U	U	U	8.0
Endosulfan I	U	U	U	U	8.0
Dieldrin	U	U	U	U	16
4,4' DDE	U	U	U	U	16
Endrin	U	U	U	U	16
Endosulfan II	U	U	U	U	16
4,4' DDD	U	U	U	U	16
Endosulfan Sulfate	U	U	U	U	16
4,4' DDT	U	U	U	U	16
Methoxychlor	U	U	U	U	80
Endrin Ketone	U	U	U	U	16
alpha Chlordane	U	U	U	U	80
gamma Chlordane	U	U	U	U	80
Toxaphene	U	U	U	U	160
Aroclor - 1016	U	U	U	U	80
Aroclor - 1221	U	U	U	U	80
Aroclor - 1232	U	U	U	U	80
Aroclor - 1242	U	U	U	U	80
Aroclor - 1248	U	U	U	U	80
Aroclor - 1254	U	1,700	U	U	160
Aroclor - 1260	U	U	U	U	160

U - See Appendix for definition.

ORGANICS ANALYSIS DATA SHEET
(PAGE 4)

SAMPLE NUMBER

LABORATORY NAME :NANCO LABS.INC.
CASE NO: ENGINEERING SCIENCE

B-1.18
BUFFALO PUMPS

Tentatively Identified Compounds

CAS Number	Compound Name	Fraction	RT or Scan Number	Estimated Concentration (ug/l or ug/Kg)
1 -----	PENTANE,2,2,4-TRIMETHYL	VOA	312	9.3 J
2 -----				
3 -----				
4 -----	UNKNOWN	BNA	49	1200.0 J
5 -----	UNKNOWN	BNA	95	44000.0 J
6 -----	UNKNOWN	BNA	119	27000.0 J
7 -----	UNKNOWN	BNA	130	440.0 J
8 -----	UNKNOWN	BNA	188	290.0 J
9 -----	UNKNOWN	BNA	264	790.0 J
10 -----	UNKNOWN	BNA	855	260.0 J
11 117828	1,2-BENZENE DICARBOXYLIC ACID,BIS(2 METHOXYETHYL)	BNA	1044	610.0 J
12 10544500	UNKNOWN	BNA	1158	550.0 J
13 -----	UNKNOWN	BNA	1355	770.0 J
14 -----	UNKNOWN	BNA	1504	500.0 J
15 -----	UNKNOWN	BNA	1584	460.0 J
16 -----	UNKNOWN	BNA	1619	480.0 J
17 -----	UNKNOWN	BNA	1677	700.0 J
18 -----	UNKNOWN	BNA	1715	610.0 J
19 -----	UNKNOWN	BNA	1770	390.0 J
20 -----	UNKNOWN	BNA	1801	440.0 J
21 -----				
22 -----				
23 -----				
24 -----				
25 -----				
26 -----				

INORGANIC ANALYSIS DATA SHEET
FORM I

0000003

SMPL NO.: B-1.18

Lab Name : NANCO LABORATORIES, INC.

Customer Name: ENGINEERING SCIENCE

SOW NO. : N/A

Lab Receipt Date : 1/12/88

Lab Sample ID: 87-ES-5069

Date Reported: 2/3/88

Location ID: Buffalo Pumps

ELEMENTS IDENTIFIED AND MEASURED

CONCENTRATION : LOW ☒ MEDIUM ☐

MATRIX : WATER ☐ SOIL ☒ SLUDGE ☐ OTHER ☐

UG/L OR MG/KG DRY WEIGHT (CIRCLE ONE)

1. ALUMINUM	8400.0 P * E	13. MAGNESIUM	17800.0 P * E
2. ANTIMONY	12.2 UP N	14. MANGANESE	650.0 P E
3. ARSENIC	3.9 F N	15. MERCURY	0.8 CV *
4. BARIUM	130.0 P	16. NICKEL	95.1 P
5. BERYLLIUM	[0.7] P	17. POTASSIUM	1200.0 UP *
6. CADMIUM	14.9 P N	18. SELENIUM	7.3 UF (1:10) N
7. CALCIUM	60400.0 P E	19. SILVER	2.4 UP N
8. CHROMIUM	21.0 P	20. SODIUM	140.0 UP
9. COBALT	[10.5] P	21. THALLIUM	0.5 UF
10. COPPER	340.0 P	22. VANADIUM	[3.9] P
11. IRON	32400.0 P * E	23. ZINC	5100.0 P (1:10) N * E
12. LEAD	57.8 F (1:10) N *	PERCENT SOLIDS (%)	82.0
CYANIDE	NR		
PHENOL	NR		

FOOTNOTES : FOR REPORTING RESULTS STANDARD RESULT QUALIFIERS ARE USED AS DEFINED ON PAGE 2.

COMMENTS : This sample was a brown/black liquid that became light yellow after ICP and furnace digestion procedures. Lead, Zinc, and Selenium were analysed at a (1:10) dilution

[Signature]

LAB MANAGER

.....
MANCO LABS, INC.
.....

0000302

Reporting Date: 1/15/88

TOX

Results of analysis on ~~Drinking Water~~ sample received 1/12/88

FILE ID :

MANCO ID: 88-ES 5069

PARAMETERS

TOX

RESULTS

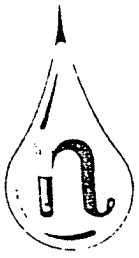
ND

UNITS

mg/kg

ALL RESULTS ARE EXPRESSED IN UG/L UNLESS OTHERWISE INDICATED

CONSTANCE H. GAITHER
CHIEF EXECUTIVE OFFICER,
LABORATORY DIRECTOR



SAMPLE DATA

B-2.18

ORGANICS ANALYSIS DATA SHEET
(PAGE 1)

SAMPLE NUMBER

Laboratory Name: NANCO LABORATORY INC.

Case No: ENGINEERING SCIENCE

B-2.18

Lab File ID No: >F1840

QC Report No: N/A

BUFFALO PUMPS

Sample Matrix: SOIL

Contract No: N/A

Data Release Authorized By:

Kathleen M. Kelly

Date Sample Received: 01-12-88

VOLATILE COMPOUNDS

Concentration: Low Medium (Circle One)

Date Extracted/Prepared: 01-18-88

Date Analyzed: 01-18-88

Conc/Dil Factor: 1

pH: 8.2

Percent Moisture 42

CAS Number		ug/l or <u>ug/Kg</u> (Circle One)	CAS Number		ug/l or <u>ug/Kg</u> (Circle One)
74-87-3	Chloromethane	10.0 U	79-34-5	1,1,2,2-Tetrachloroethane	5.0 U
78-83-9	Bromomethane	10.0 U	78-87-5	1,2-Dichloropropane	5.0 U
75-01-4	Vinyl Chloride	10.0 U	10061-02-6	Trans-1,3-Dichloropropene	5.0 U
75-00-3	Chloroethane	10.0 U	79-01-6	Trichloroethene	5.0 U
75-09-2	Methylene Chloride	13.0 <u>B</u>	124-48-1	Dibromochloromethane	5.0 U
67-64-1	Acetone	10.0 U	79-00-5	1,1,2-Trichloroethane	5.0 U
75-15-0	Carbon Disulfide	5.0 U	71-43-2	Benzene	5.0 U
75-35-4	1,1-Dichloroethene	5.0 U	10061-01-5	cis-1,3-Dichloropropene	5.0 U
75-34-3	1,1-Dichloroethane	5.0 U	110-75-8	2-Chloroethylvinylether	10.0 U
156-60-5	Trans-1,2-Dichloroethene	5.0 U	75-25-2	Bromoform	5.0 U
67-66-3	Chloroform	5.0 U	591-78-6	2-Hexanone	10.0 U
107-06-2	1,2-Dichloroethane	5.0 U	108-10-1	4-Methyl-2-Pentanone	10.0 U
78-93-3	2-Butanone	10.0 U	127-18-4	Tetrachloroethene	5.0 U
71-55-6	1,1,1-Trichloroethane	5.0 U	108-88-3	Toluene	5.0 U
56-23-5	Carbon Tetrachloride	5.0 U	108-90-7	Chlorobenzene	5.0 U
108-05-4	Vinyl Acetate	10.0 U	100-41-4	Ethylbenzene	5.0 U
75-27-4	Bromodichloromethane	5.0 U	100-42-5	Styrene	5.0 U
				Total Xylenes	5.0 U

Data Reporting Qualifiers

For reporting results to EPA, the following results qualifiers are used.

Additional flags or footnotes explaining results are encouraged. However, the definition of each flag must be explicit.

VALUE

If the result is a value greater than or equal to the detection limit, report the value.

U

Indicates compound was analyzed for but not detected. Report the minimum detection limit for the sample with the U (e.g. 10U

based on necessary concentration dilution actions. (This is not necessarily the instrument detection limit.) The footnote should read U-Compound was analyzed for but not detected. The number is the minimum attainable detection limit for the sample.

J

Indicates an estimated value. This flag is used either when estimating a concentration for tentatively identified compounds where a 1:1 response is assumed or when the mass spectral data indicates the presence of a compound that meets the identification criteria but the result is less than the specified detection limit but greater than zero (e.g. 10J).

C

This flag applies to pesticide parameters where the identification has been confirmed by GC/MS. Single component pesticides greater than or equal to 10 ng/ul in the final extract should be confirmed by GC/MS.

B

This flag is used when the analyte is found in the blank as well as a sample. It indicates possible/probable blank contamination and warns the data user to take appropriate action.

OTHER

Other specific flags and footnotes may be required to properly define the results. If used, they must be fully described and such description attached to the data summary report.

ORGANIC ANALYSIS DATA SHEET

(PAGE 2)

LABORATORY NAME: NANCO LABS. INC.

SAMPLE NO.B-2.18

CASE NO: ENGINEERING SCIENCE - BUFFALO PUMPS

SEMIVOLATILE COMPOUNDS

Concentration: Low Medium (Circle One)

Date Extracted/Prepared: 1/12/88

GPC Cleanup: Yes_XXX_ No_____

Date Analyzed: 1/20/88

Separatory Funnel Extraction: Yes_____

Conc/Dil Factor:----->

2

Continuous Liquid - Liquid Extraction: Yes_____

Percent Moisture: 16

CAS Number		ug/l or <u>ug/Kg</u> (Circle One)	CAS Number		ug/l or <u>ug/Kg</u> (Circle One)
108-95-2	Phenol	660.0 U	83-32-9	Acenaphthene	1000.0
111-44-4	bis(-2-Chloroethyl)Ether	660.0 U	51-28-5	2,4-Dinitrophenol	3200.0 U
95-57-8	2-Chlorophenol	660.0 U	100-02-7	4-Nitrophenol	3200.0 U
541-73-1	1,3-Dichlorobenzene	660.0 U	132-64-9	Dibenzofuran	570.0 U
106-46-7	1,4-Dichlorobenzene	660.0 U	121-14-2	2,4-Dinitrotoluene	660.0 U
100-51-6	Benzyl Alcohol	660.0 U	606-20-2	2,6-Dinitrotoluene	660.0 U
95-50-1	1,2-Dichlorobenzene	660.0 U	84-66-2	Diethylphthalate	660.0 U
95-48-7	2-Methylphenol	660.0 U	7005-72-3	4-Chlorophenyl-phenylether	660.0 U
39638-32-9	bis(2-chloroisopropyl)Ether	660.0 U	86-73-7	Fluorene	1100.0
106-44-5	4-Methylphenol	660.0 U	100-01-6	4-Nitroaniline	3200.0 U
621-64-7	N-Nitroso-Di-n-Propylamine	660.0 U	534-52-1	4,6-Dinitro-2-Methylphenol	3200.0 U
67-72-1	Hexachloroethane	660.0 U	86-30-6	N-Nitrosodiphenylamine (1)	660.0 U
98-95-3	Nitrobenzene	660.0 U	101-55-3	4-Bromophenyl-phenylether	660.0 U
78-59-1	Isophorone	660.0 U	118-74-1	Hexachlorobenzene	660.0 U
88-75-5	2-Nitrophenol	660.0 U	87-86-5	Pentachlorophenol	3200.0 U
105-67-9	2,4-Dimethylphenol	660.0 U	85-01-8	Phenanthrene	5600.0
65-85-0	Benzoic Acid	3200.0 U	120-12-7	Anthracene	660.0 U
111-91-1	bis(-2-Chloroethoxy)Methane	660.0 U	84-74-2	Di-n-Butylphthalate	210.0 U
120-83-2	2,4-Dichlorophenol	660.0 U	206-44-0	Fluoranthene	5700.0
120-82-1	1,2,4-Trichlorobenzene	660.0 U	129-00-0	Pyrene	4900.0
91-20-3	Naphthalene	660.0 U	85-68-7	Butylbenzylphthalate	660.0 U
106-47-8	4-Chloroaniline	660.0 U	91-94-1	3,3'-Dichlorobenzidine	1320.0 U
87-68-3	Hexachlorobutadiene	660.0 U	56-55-3	Benzo(a)Anthracene	2600.0
59-50-7	4-Chloro-3-Methylphenol	660.0 U	117-81-7	bis(2-Ethylhexyl)Phthalate	1700.0 B
91-57-6	2-Methylnaphthalene	660.0 U	218-01-9	Chrysene	2600.0
77-47-4	Hexachlorocyclopentadiene	660.0 U	117-84-0	Di-n-Octyl Phthalate	660.0 U
88-06-2	2,4,6-Trichlorophenol	660.0 U	205-99-2	Benzo(b)Fluoranthene	1600.0
95-95-4	2,4,5-Trichlorophenol	3200.0 U	207-08-9	Benzo(k)Fluoranthene	1900.0
91-58-7	2-Chloronaphthalene	660.0 U	50-32-8	Benzo(a)Pyrene	2100.0
88-74-4	2-Nitroaniline	3200.0 U	193-39-5	Indeno(1,2,3-cd)Pyrene	1200.0
131-11-3	Dimethyl Phthalate	660.0 U	53-70-3	Dibenz(a,h)Anthracene	250.0 U
208-96-8	Acenaphthylene	660.0 U	191-24-2	Benzo(g,h,i)Perylene	660.0 U
99-09-2	3-Nitroaniline	3200.0 U			

(1) - Cannot be separated from diphenylamine

TABLE 2.4
30890-0092
ENGINEERING SCIENCE
EPA TCL PESTICIDES/PCB's

All results reported as ug/Kg.

Sample Identification

<u>Dilution Factor</u>	<u>1.00</u>	<u>1.19</u>	<u>1.11</u>	<u>1.20</u>	<u>Lower Limits of Detection with no Dilution</u>
<u>Method Blank I.D.</u>	<u>1019</u>	<u>1019</u>	<u>1019</u>	<u>1019</u>	
	<u>-B02</u>	<u>-B02</u>	<u>-B02</u>	<u>-B02</u>	
<u>Compound</u>	<u>Method Blank</u>	<u>B-1</u>	<u>B-2</u>	<u>B-3</u>	
alpha BHC	U	U	U	U	8.0
beta BHC	U	U	U	U	8.0
delta BHC	U	U	U	U	8.0
gamma BHC	U	U	U	U	8.0
Heptachlor	U	U	U	U	8.0
Aldrin	U	U	U	U	8.0
Heptachlor Epoxide	U	U	U	U	8.0
Endosulfan I	U	U	U	U	16
Dieldrin	U	U	U	U	16
4,4'-DDE	U	U	U	U	16
Endrin	U	U	U	U	16
Endosulfan II	U	U	U	U	16
4,4' DDD	U	U	U	U	16
Endosulfan Sulfate	U	U	U	U	16
4,4' DDT	U	U	U	U	16
Methoxychlor	U	U	U	U	80
Endrin Ketone	U	U	U	U	16
alpha Chlordane	U	U	U	U	80
gamma Chlordane	U	U	U	U	80
Toxaphene	U	U	U	U	160
Aroclor - 1016	U	U	U	U	80
Aroclor - 1221	U	U	U	U	80
Aroclor - 1232	U	U	U	U	80
Aroclor - 1242	U	U	U	U	80
Aroclor - 1248	U	U	U	U	80
Aroclor - 1254	U	1,700	U	U	160
Aroclor - 1260	U	U	U	U	160

U - See Appendix for definition.

ORGANICS ANALYSIS DATA SHEET

(PAGE 4)

LABORATORY NAME :NANCO LABS.INC.

CASE NO: ENGINEERING SCIENCE

SAMPLE NUMBER

B-2.18

BUFFALO PUMPS

Tentatively Identified Compounds

CAS Number	Compound Name	Fraction	RT or Scan Number	Estimated Concentration	
				(ug/l or	ug/Kg)
1 -----	UNKNOWN ALKENE	VOA	257	6.3 J	
2					
3					
4 -----	UNKNOWN	BNA	48	1000.0 J	
5 -----	UNKNOWN	BNA	95	36000.0 J	
6 2216333	OCTANE,3-METHYL	BNA	130	640.0 J	
7					
8					
9					
10					
11					
12					
13					
14					
15					
16					
17					
18					
19					
20					
21					
22					
23					
24					
25					
26					

0000004

INORGANIC ANALYSIS DATA SHEET
FORM I

SMPL NO.: B-2.18

Lab Name : NANCO LABORATORIES, INC.

Customer Name: ENGINEERING SCIENCE

SOW NO. : N/A

Lab Receipt Date : 1/12/88

Lab Sample ID: 87-ES-5070

Date Reported: 2/3/88

Location ID: Buffalo Pumps

ELEMENTS IDENTIFIED AND MEASURED

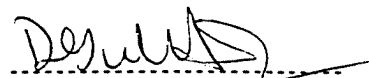
CONCENTRATION : LOW X MEDIUM MATRIX : WATER SOIL X SLUDGE OTHER

UG/L OR MG/KG DRY WEIGHT (CIRCLE ONE)

1. ALUMINUM	15100.0 P * E	13. MAGNESIUM	32700.0 P * E
2. ANTIMONY	17.2 UP N	14. MANGANESE	960.0 P E
3. ARSENIC	3.9 SF N	15. MERCURY	5.2 CV *
4. BARIUM	160.0 P	16. NICKEL	7.6 UP
5. BERYLLIUM	[0.9] P	17. POTASSIUM	2100.0 P *
6. CADMIUM	1.4 UP N	18. SELENIUM	10.3 UF(1:10) N
7. CALCIUM	127500.0 P E	19. SILVER	3.4 UP N
8. CHROMIUM	19.3 P	20. SODIUM	[570.0] P
9. COBALT	[14.1] P	21. THALLIUM	0.7 UF
10. COPPER	24.1 P	22. VANADIUM	[5.5] P
11. IRON	20400.0 P * E	23. ZINC	190.0 P N * E
12. LEAD	29.6 SF(1:10) N *	PERCENT SOLIDS (%)	58.0
CYANIDE	NR		
PHENOL	NR		

FOOTNOTES : FOR REPORTING RESULTS STANDARD RESULT QUALIFIERS ARE USED AS DEFINED ON PAGE 2.

COMMENTS : This sample was a brown/black liquid that became light yellow after ICP and furnace digestion procedures. Selenium and lead were analyzed at a (1:10) dilution.



LAB MANAGER

.....
HARSCO LABS, INC.
.....

0000303

Reporting Date: 1/15/88

TOX:

Results of analysis on Drinking Water sample received 1/12/88

FILE ID :

ECO ID: 88-ES 5070

PARAMETERS

RESULTS

UNITS

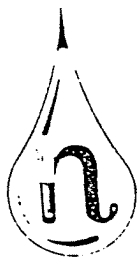
TOX

ND

mg/kg

ALL RESULTS ARE EXPRESSED IN UG/L UNLESS OTHERWISE INDICATED

CONSTANCE H. GAYED
CHIEF EXECUTIVE OFFICER,
LABORATORY DIRECTOR



SAMPLE DATA

B-3.18

ORGANICS ANALYSIS DATA SHEET

(PAGE 1)

SAMPLE NUMBER

Laboratory Name: NANCO LABORATORY INC.

Lab File ID No: >F1843

Sample Matrix: SOIL

Data Release Authorized By: *Kathleen M. Kelly*

Case No: ENGINEERING SCIENCE

QC Report No: N/A

Contract No: N/A

Date Sample Received: 01-12-88

B-3.18

BUFFALO PUMPS

VOLATILE COMPOUNDS

Concentration: Low Medium (Circle One)

Date Extracted/Prepared: 01-18-88

Date Analyzed: 01-18-88

Conc/Dil Factor: 1

pH: 7.8

Percent Moisture 16

CAS Number		ug/l or <u>ug/Kg</u> (Circle One)	CAS Number		ug/l or <u>ug/Kg</u> (Circle One)
74-87-3	Chloromethane	10.0 U	79-34-5	1,1,2,2-Tetrachloroethane	5.0 U
83-9	Bromomethane	10.0 U	78-87-5	1,2-Dichloropropane	5.0 U
75-01-4	Vinyl Chloride	10.0 U	10061-02-6	Trans-1,3-Dichloropropene	5.0 U
75-00-3	Chloroethane	10.0 U	79-01-6	Trichloroethene	5.0 U
75-09-2	Methylene Chloride	12.0 B	124-48-1	Dibromochloromethane	5.0 U
67-64-1	Acetone	15.0	79-00-5	1,1,2-Trichloroethane	5.0 U
75-15-0	Carbon Disulfide	5.0 U	71-43-2	Benzene	5.0 U
75-35-4	1,1-Dichloroethene	5.0 U	10061-01-5	cis-1,3-Dichloropropene	5.0 U
75-34-3	1,1-Dichloroethane	5.0 U	110-75-8	2-Chloroethylvinylether	10.0 U
156-60-5	Trans-1,2-Dichloroethene	5.0 U	75-25-2	Bromoform	5.0 U
67-66-3	Chloroform	5.0 U	591-78-6	2-Hexanone	10.0 U
107-06-2	1,2-Dichloroethane	5.0 U	108-10-1	4-Methyl-2-Pentanone	10.0 U
78-93-3	2-Butanone	10.0 U	127-18-4	Tetrachloroethene	5.0 U
71-55-6	1,1,1-Trichloroethane	5.0 U	108-88-3	Toluene	5.0 U
56-23-5	Carbon Tetrachloride	5.0 U	108-90-7	Chlorobenzene	5.0 U
108-05-4	Vinyl Acetate	10.0 U	100-41-4	Ethylbenzene	5.0 U
75-27-4	Bromodichloromethane	5.0 U	100-42-5	Styrene	5.0 U
				Total Xylenes	5.0 U

Data Reporting Qualifiers

For reporting results to EPA, the following results qualifiers are used.

Additional flags or footnotes explaining results are encouraged. However, the definition of each flag must be explicit.

VALUE

If the result is a value greater than or equal to the detection limit, report the value.

U

Indicates compound was analyzed for but not detected. Report the minimum detection limit for the sample with the U (e.g. 10U based on necessary concentration dilution actions. (This is not necessarily the instrument detection limit.) The footnote should read U-Compound was analyzed for but not detected. The number is the minimum attainable detection limit for the sample.

J

Indicates an estimated value. This flag is used either when estimating a concentration for tentatively identified compounds where a 1:1 response is assumed or when the mass spectral data indicates the presence of a compound that meets the identification criteria but the result is less than the specified detection limit but greater than zero (e.g. 10J).

C

This flag applies to pesticide parameters where the identification has been confirmed by GC/MS. Single component pesticides greater than or equal to 10 ng/ul in the final extract should be confirmed by GC/MS.

B

This flag is used when the analyte is found in the blank as well as a sample. It indicates possible/probable blank contamination and warns the data user to take appropriate action.

OTHER

Other specific flags and footnotes may be required to properly define the results. If used, they must be fully described and such description attached to the data summary report.

ORGANIC ANALYSIS DATA SHEET

(PAGE 2)

LABORATORY NAME: NANCO LABS. INC.

SAMPLE NO. B-3.18

CASE NO: ENGINEERING SCIENCE - BUFFALO PUMPS

SEMIVOLATILE COMPOUNDS

Concentration: Low Medium (Circle One)

GPC Cleanup: Yes_XXX_ No_____

Date Extracted/Prepared: 1/12/88

Separatory Funnel Extraction: Yes_____

Date Analyzed: 1/20/88

Continuous Liquid - Liquid Extraction: Yes_____

Conc/Dil Factor:----->

2

Percent Moisture: 18

CAS Number		ug/l or <u>ug/Kg</u> (Circle One)	CAS Number		ug/l or <u>ug/Kg</u> (Circle One)
108-95-2	Phenol	660.0 U	83-32-9	Acenaphthene	660.0 U
111-44-4	bis(-2-Chloroethyl)Ether	660.0 U	51-28-5	2,4-Dinitrophenol	3200.0 U
95-57-8	2-Chlorophenol	660.0 U	100-02-7	4-Nitrophenol	3200.0 U
541-73-1	1,3-Dichlorobenzene	660.0 U	132-64-9	Dibenzofuran	660.0 U
106-46-7	1,4-Dichlorobenzene	660.0 U	121-14-2	2,4-Dinitrotoluene	660.0 U
100-51-6	Benzyl Alcohol	660.0 U	606-20-2	2,6-Dinitrotoluene	660.0 U
95-50-1	1,2-Dichlorobenzene	660.0 U	84-66-2	Diethylphthalate	660.0 U
95-48-7	2-Methylphenol	660.0 U	7005-72-3	4-Chlorophenyl-phenylether	660.0 U
39638-32-9	bis(2-chloroisopropyl)Ether	660.0 U	86-73-7	Fluorene	660.0 U
106-44-5	4-Methylphenol	660.0 U	100-01-6	4-Nitroaniline	3200.0 U
621-64-7	N-Nitroso-Di-n-Propylamine	660.0 U	534-52-1	4,6-Dinitro-2-Methylphenol	3200.0 U
67-72-1	Hexachloroethane	660.0 U	86-30-6	N-Nitrosodiphenylamine (1)	660.0 U
98-95-3	Nitrobenzene	660.0 U	101-55-3	4-Bromophenyl-phenylether	660.0 U
78-59-1	Isophorone	660.0 U	118-74-1	Hexachlorobenzene	660.0 U
88-75-5	2-Nitrophenol	660.0 U	87-86-5	Pentachlorophenol	3200.0 U
105-67-9	2,4-Dimethylphenol	660.0 U	85-01-8	Phenanthrene	300.0 U
65-85-0	Benzoic Acid	3200.0 U	120-12-7	Anthracene	660.0 U
111-91-1	bis(-2-Chloroethoxy)Methane	660.0 U	84-74-2	Di-n-Butylphthalate	230.0 U
120-83-2	2,4-Dichlorophenol	660.0 U	206-44-0	Fluoranthene	750.0
120-82-1	1,2,4-Trichlorobenzene	660.0 U	129-00-0	Pyrene	770.0
91-20-3	Naphthalene	660.0 U	85-68-7	Butylbenzylphthalate	660.0 U
106-47-8	4-Chloroaniline	660.0 U	91-94-1	3,3'-Dichlorobenzidine	1320.0 U
87-68-3	Hexachlorobutadiene	660.0 U	56-55-3	Benzo(a)Anthracene	660.0 U
59-50-7	4-Chloro-3-Methylphenol	660.0 U	117-81-7	bis(2-Ethylhexyl)Phthalate	1700.0 B
91-57-6	2-Methylnaphthalene	660.0 U	218-01-9	Chrysene	580.0 U
77-47-4	Hexachlorocyclopentadiene	660.0 U	117-84-0	Di-n-Octyl Phthalate	660.0 U
88-06-2	2,4,6-Trichlorophenol	660.0 U	205-99-2	Benzo(b)Fluoranthene	720.0
95-95-4	2,4,5-Trichlorophenol	3200.0 U	207-08-9	Benzo(k)Fluoranthene	660.0 U
91-58-7	2-Chloronaphthalene	660.0 U	50-32-8	Benzo(a)Pyrene	520.0 U
88-74-4	2-Nitroaniline	3200.0 U	193-39-5	Indeno(1,2,3-cd)Pyrene	330.0 U
131-11-3	Dimethyl Phthalate	660.0 U	53-70-3	Dibenz(a,h)Anthracene	660.0 U
208-96-8	Acenaphthylene	660.0 U	191-24-2	Benzo(g,h,i)Perylene	660.0 U
99-09-2	3-Nitroaniline	3200.0 U			

(1) - Cannot be separated from diphenylamine

TABLE 2.4
30890-0092
ENGINEERING SCIENCE
EPA TCL PESTICIDES/PCB's

All results reported as ug/Kg.

Sample Identification

<u>Dilution Factor</u>	<u>1.00</u>	<u>1.19</u>	<u>1.11</u>	<u>1.20</u>	
	1019	1019	1019	1019	
<u>Method Blank I.D.</u>	<u>-B02</u>	<u>-B02</u>	<u>-B02</u>	<u>-B02</u>	
<u>Compound</u>	<u>Method Blank</u>	<u>B-1</u>	<u>B-2</u>	<u>B-3</u>	<u>Lower Limits of Detection with no Dilution</u>
alpha BHC	U	U	U	U	8.0
beta BHC	U	U	U	U	8.0
delta BHC	U	U	U	U	8.0
gamma BHC	U	U	U	U	8.0
Heptachlor	U	U	U	U	8.0
Aldrin	U	U	U	U	8.0
Heptachlor Epoxide	U	U	U	U	8.0
Endosulfan I	U	U	U	U	8.0
Dieldrin	U	U	U	U	16
4,4' DDE	U	U	U	U	16
Endrin	U	U	U	U	16
Endosulfan II	U	U	U	U	16
4,4' DDD	U	U	U	U	16
Endosulfan Sulfate	U	U	U	U	16
4,4' DDT	U	U	U	U	16
Methoxychlor	U	U	U	U	80
Endrin Ketone	U	U	U	U	16
alpha Chlordane	U	U	U	U	80
gamma Chlordane	U	U	U	U	80
Toxaphene	U	U	U	U	160
Aroclor - 1016	U	U	U	U	80
Aroclor - 1221	U	U	U	U	80
Aroclor - 1232	U	U	U	U	80
Aroclor - 1242	U	U	U	U	80
Aroclor - 1248	U	U	U	U	80
Aroclor - 1254	U	1,700	U	U	160
Aroclor - 1260	U	U	U	U	160

U - See Appendix for definition.

ORGANICS ANALYSIS DATA SHEET
(PAGE 4)

LABORATORY NAME :NANCO LABS.INC.
CASE NO: ENGINEERING SCIENCE

SAMPLE NUMBER

B-3.18
BUFFALO PUMPS

Tentatively Identified Compounds

CAS Number	Compound Name	Fraction	RT or Scan Number	Estimated Concentration (ug/l or ug/Kg)
1 79209	ACETIC ACID,METHYL ESTER	VOA	129	20.4 J
2				
3				
4 141797	3 PENTE-2-ONE,4 METHYL	BNA	15	240.0 J
5 106978	BUTANE	BNA	78	1200.0 J
6 -----	UNKNOWN	BNA	94	39000.0 J
7 -----	UNKNOWN	BNA	104	220.0 J
8 -----	UNKNOWN	BNA	118	570.0 J
9				
10				
11				
12				
13				
14				
15				
16				
17				
18				
19				
20				
21				
22				
23				
24				
25				
26				

0000005

INORGANIC ANALYSIS DATA SHEET
FORM I

SMPL NO.: B-3.18

Lab Name : NANCO LABORATORIES, INC.

Customer Name: ENGINEERING SCIENCE

SOW NO. : N/A

Lab Receipt Date : 1/12/88

Lab Sample ID: 87-ES-5071

Date Reported: 2/3/88

Location ID: Buffalo Pumps

ELEMENTS IDENTIFIED AND MEASURED

CONCENTRATION : LOW X MEDIUM

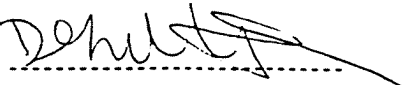
MATRIX : WATER SOIL X SLUDGE OTHER

UG/L OR MG/KG DRY WEIGHT (CIRCLE ONE)

1. ALUMINUM	3000.0 P * E	13. MAGNESIUM	1400.0 P * E
2. ANTIMONY	11.9 UP N	14. MANGANESE	760.0 P E
3. ARSENIC	12.4 SF N	15. MERCURY	0.2 CV *
4. BARIUM	23.8 UP	16. NICKEL	5.2 UP
5. BERYLLIUM	0.1 UP	17. POTASSIUM	1100.0 UP *
6. CADMIUM	1.0 UP	18. SELENIUM	0.7 UF N
7. CALCIUM	6200.0 P	19. SILVER	2.4 UP N
8. CHROMIUM	1.4 UP	20. SODIUM	140.0 UP
9. COBALT	[11.7] P	21. THALLIUM	0.5 UF
10. COPPER	37.9 P	22. VANADIUM	[11.9] P
11. IRON	132800.0 P * E	23. ZINC	56.2 PN * E
12. LEAD	33.8 F (1:10) N *	PERCENT SOLIDS (%)	84.0
CYANIDE	NR		
PHENOL	NR		

FOOTNOTES : FOR REPORTING RESULTS STANDARD RESULT QUALIFIERS ARE USED AS DEFINED ON PAGE 2.

COMMENTS : This sample was a brown/black liquid that became light yellow after ICP and furnace digestion procedures. Lead was analyzed at a (1:10) dilution.


 LAB MANAGER

.....
MANCO LABS, INC.
.....

0000306

Reporting Date: 1/15/88

TOX

Results of analysis on ~~Drinking water~~ sample received 1/12/88

FILE ID :

CO ID: 88-ES 5071

PARAMETERS

TOX

RESULTS

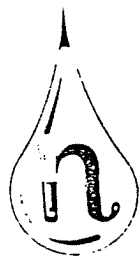
NO

UNITS

mg/kg

ALL RESULTS ARE EXPRESSED IN UG/L UNLESS OTHERWISE INDICATED

CONSTANCE M. GAYNE
CHIEF EXECUTIVE OFFICER,
LABORATORY DIRECTOR



SAMPLE DATA

Trip Blank
TB-1.18

ORGANICS ANALYSIS DATA SHEET

(PAGE 1)

SAMPLE NUMBER

Laboratory Name: NANCO LABORATORY INC.

Lab File ID No: >B3635

Sample Matrix: WATER

Data Release Authorized By:

Kathleen M. Kelley

Case No: ENGINEERING SCIENCE

QC Report No: N/A

Contract No: N/A

Date Sample Received: 01-12-88

TB-1.18

BUFFALO PUMPS

VOLATILE COMPOUNDS

Concentration: Low Medium (Circle One)

Date Extracted/Prepared: 01-12-88

Date Analyzed: 01-12-88

Conc/Dil Factor: 1

pH: 9.5

Percent Moisture: N/A

CAS
Numberug/l or ug/Kg
(Circle One)CAS
Numberug/l or ug/Kg
(Circle One)

74-87-3	Chloromethane	10.0 U	79-34-5	1,1,2,2-Tetrachloroethane	5.0 U
50-83-9	Bromomethane	10.0 U	78-87-5	1,2-Dichloropropane	5.0 U
75-01-4	Vinyl Chloride	10.0 U	10061-02-6	Trans-1,3-Dichloropropene	5.0 U
75-00-3	Chloroethane	10.0 U	79-01-6	Trichloroethene	5.0 U
75-09-2	Methylene Chloride	5.8 B	124-48-1	Dibromochloromethane	5.0 U
67-64-1	Acetone	2.8 J	79-00-5	1,1,2-Trichloroethane	5.0 U
75-15-0	Carbon Disulfide	5.0 U	71-43-2	Benzene	5.0 U
75-35-4	1,1-Dichloroethene	5.0 U	10061-01-5	cis-1,3-Dichloropropene	5.0 U
75-34-3	1,1-Dichloroethane	5.0 U	110-75-8	2-Chloroethylvinylether	10.0 U
75-60-5	Trans-1,2-Dichloroethene	5.0 U	75-25-2	Bromoform	5.0 U
67-66-3	Chloroform	5.0 U	591-78-6	2-Hexanone	10.0 U
107-06-2	1,2-Dichloroethane	5.0 U	108-10-1	4-Methyl-2-Pentanone	10.0 U
78-93-3	2-Butanone	10.0 U	127-18-4	Tetrachloroethene	5.0 U
71-55-6	1,1,1-Trichloroethane	5.0 U	108-88-3	Toluene	5.0 U
56-23-5	Carbon Tetrachloride	5.0 U	108-90-7	Chlorobenzene	5.0 U
108-05-4	Vinyl Acetate	10.0 U	100-41-4	Ethylbenzene	5.0 U
75-27-4	Bromodichloromethane	5.0 U	100-42-5	Styrene	5.0 U
				Total Xylenes	5.0 U

Data Reporting Qualifiers

For reporting results to EPA, the following results qualifiers are used.

Additional flags or footnotes explaining results are encouraged. However, the definition of each flag must be explicit.

VALUE

If the result is a value greater than or equal to the detection limit, report the value.

U

Indicates compound was analyzed for but not detected. Report the minimum detection limit for the sample with the U (e.g. 10U based on necessary concentration dilution actions. (This is not necessarily the instrument detection limit.) The footnote should read U-Compound was analyzed for but not detected. The number is the minimum attainable detection limit for the sample.

J

Indicates an estimated value. This flag is used either when estimating a concentration for tentatively identified compounds where a 1:1 response is assumed or when the mass spectral data indicates the presence of a compound that meets the identification criteria but the result is less than the specified detection limit but greater than zero (e.g. 10J).

C

This flag applies to pesticide parameters where the identification has been confirmed by GC/MS. Single component pesticides greater than or equal to 10 ng/ul in the final extract should be confirmed by GC/MS.

B

This flag is used when the analyte is found in the blank as well as a sample. It indicates possible/probable blank contamination and warns the data user to take appropriate action.

OTHER

Other specific flags and footnotes may be required to properly define the results. If used, they must be fully described and such description attached to the data summary report.

ORGANICS ANALYSIS DATA SHEET

(PAGE 4)

LABORATORY NAME :NANCO LABS.INC.

CASE NO: ENGINEERING SCIENCE

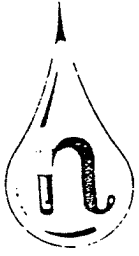
SAMPLE NUMBER

TB-1.18

BUFFALO PUMPS

Tentatively Identified Compounds

CAS Number	Compound Name	Fraction	RT or Scan Number	Estimated Concentration (ug/l or ug/Kg)
1	NONE FOUND	VOA		
2				
3				
4	NOT REQUIRED	BNA		
5				
6				
7				
8				
9				
10				
11				
12				
13				
14				
15				
16				
17				
18				
19				
20				
21				
22				
23				
24				
25				
26				



SAMPLE DATA

Field Blank

FB-1.18

ORGANICS ANALYSIS DATA SHEET

(PAGE 1)

SAMPLE NUMBER

Laboratory Name: NANCO LABORATORY INC.

Lab File ID No: >B3636

Sample Matrix: WATER

Data Release Authorized By: *Kathleen TX Kelly*

Case No: ENGINEERING SCIENCE

QC Report No: N/A

Contract No: N/A

Date Sample Received: 01-12-88

FB-1.18

BUFFALO PUMPS

VOLATILE COMPOUNDS

Concentration: Low Medium (Circle One)

Date Extracted/Prepared: 01-12-88

Date Analyzed: 01-12-88

Conc/Dil Factor: 1

pH: 10.0

Percent Moisture: N/A

CAS
Numberug/l or ug/Kg
(Circle One)CAS
Numberug/l or ug/Kg
(Circle One)

74-87-3	Chloromethane	10.0 U	79-34-5	1,1,2,2-Tetrachloroethane	5.0 U
83-9	Bromomethane	10.0 U	78-87-5	1,2-Dichloropropane	5.0 U
75-01-4	Vinyl Chloride	10.0 U	10061-02-6	Trans-1,3-Dichloropropene	5.0 U
75-00-3	Chloroethane	10.0 U	79-01-6	Trichloroethene	5.0 U
75-09-2	Methylene Chloride	5.0 B	124-48-1	Dibromochloromethane	5.0 U
67-64-1	Acetone	3.1 J	79-00-5	1,1,2-Trichloroethane	5.0 U
75-15-0	Carbon Disulfide	5.0 U	71-43-2	Benzene	5.0 U
75-35-4	1,1-Dichloroethene	5.0 U	10061-01-5	cis-1,3-Dichloropropene	5.0 U
75-34-3	1,1-Dichloroethane	5.0 U	110-75-8	2-Chloroethylvinylether	10.0 U
156-60-5	Trans-1,2-Dichloroethene	5.0 U	75-25-2	Bromoform	5.0 U
67-66-3	Chloroform	5.0 U	591-78-6	2-Hexanone	10.0 U
107-06-2	1,2-Dichloroethane	5.0 U	108-10-1	4-Methyl-2-Pentanone	10.0 U
78-93-3	2-Butanone	10.0 U	127-18-4	Tetrachloroethene	5.0 U
71-55-6	1,1,1-Trichloroethane	5.0 U	108-88-3	Toluene	5.0 U
56-23-5	Carbon Tetrachloride	5.0 U	108-90-7	Chlorobenzene	5.0 U
108-05-4	Vinyl Acetate	10.0 U	100-41-4	Ethylbenzene	5.0 U
75-27-4	Bromodichloromethane	5.0 U	100-42-5	Styrene	5.0 U
				Total Xylenes	5.0 U

Data Reporting Qualifiers

For reporting results to EPA, the following results qualifiers are used.

Additional flags or footnotes explaining results are encouraged. However, the definition of each flag must be explicit.

VALUE

If the result is a value greater than or equal to the detection limit, report the value.

U

Indicates compound was analyzed for but not detected. Report the minimum detection limit for the sample with the U (e.g. 10U based on necessary concentration dilution actions. (This is not necessarily the instrument detection limit.) The footnote should read U-Compound was analyzed for but not detected. The number is the minimum attainable detection limit for the sample.

J

Indicates an estimated value. This flag is used either when estimating a concentration for tentatively identified compounds where a 1:1 response is assumed or when the mass spectral data indicates the presence of a compound that meets the identification criteria but the result is less than the specified detection limit but greater than zero (e.g. 10J).

C

This flag applies to pesticide parameters where the identification has been confirmed by GC/MS. Single component pesticides greater than or equal to 10 ng/ul in the final extract should be confirmed by GC/MS.

B

This flag is used when the analyte is found in the blank as well as a sample. It indicates possible/probable blank contamination and warns the data user to take appropriate action.

OTHER

Other specific flags and footnotes may be required to properly define the results. If used, they must be fully described and such description attached to the data summary report.

ORGANICS ANALYSIS DATA SHEET

(PAGE 4)

LABORATORY NAME :NANCO LABS.INC.
CASE NO: ENGINEERING SCIENCE

SAMPLE NUMBER

FB-1.18
BUFFALO PUMPS

Tentatively Identified Compounds

CAS Number	Compound Name	Fraction	RT or Scan Number	Estimated Concentration	
				(ug/l or ug/Kg)	
1	-----	UNKNOWN	VOA	592	3.0 J
2					
3					
4	-----	NOT REQUIRED	BNA	-----	-----
5					
6					
7					
8					
9					
10					
11					
12					
13					
14					
15					
16					
17					
18					
19					
20					
21					
22					
23					
24					
25					
26					

Groundwater Results



SAMPLE DATA

GW-1.18

ORGANICS ANALYSIS DATA SHEET
(PAGE 1)

SAMPLE NUMBER

Laboratory Name: NANCO LABORATORY INC.

Lab File ID No: >G0288

Sample Matrix: WATER

Data Release Authorized By:

Kathleen M. Kelly

BUFFALO PUMPS

Case No: ENG.SCI.

QC Report No: N/A

Contract No: N/A

Date Sample Received: 01/30/88

GW-1.18

VOLATILE COMPOUNDS

Concentration: Low Medium (Circle One)

Date Extracted/Prepared: 02/03/88

Date Analyzed: 02/03/88

Conc/Dil Factor: 1

pH: 6.9

Percent Moisture: N/A

CAS
Number

ug/l or ug/Kg
(Circle One)

CAS
Number

ug/l or ug/Kg
(Circle One)

74-87-3	Chloromethane	10.0 U
74-83-9	Bromomethane	10.0 U
75-01-4	Vinyl Chloride	10.0 U
75-00-3	Chloroethane	10.0 U
75-09-2	Methylene Chloride	15.0 B
67-64-1	Acetone	11.0 B
75-15-0	Carbon Disulfide	27.0
75-35-4	1,1-Dichloroethene	5.0 U
75-34-3	1,1-Dichloroethane	5.0 U
156-60-5	Trans-1,2-Dichloroethene	5.0 U
67-66-3	Chloroform	5.0 U
107-06-2	1,2-Dichloroethane	5.0 U
78-93-3	2-Butanone	10.0 U
71-55-6	1,1,1-Trichloroethane	5.0 U
56-23-5	Carbon Tetrachloride	5.0 U
108-05-4	Vinyl Acetate	10.0 U
75-27-4	Bromodichloromethane	5.0 U

79-34-5	1,1,2,2-Tetrachloroethane	5.0 U
78-87-5	1,2-Dichloropropane	5.0 U
10061-02-6	Trans-1,3-Dichloropropene	5.0 U
79-01-6	Trichloroethene	5.0 U
124-48-1	Dibromochloromethane	5.0 U
79-00-5	1,1,2-Trichloroethane	5.0 U
71-43-2	Benzene	1.6 J
10061-01-5	cis-1,3-Dichloropropene	5.0 U
110-75-8	2-Chloroethylvinylether	10.0 U
75-25-2	Bromoform	5.0 U
591-78-6	2-Hexanone	10.0 U
108-10-1	4-Methyl-2-Pentanone	10.0 U
127-18-4	Tetrachloroethene	5.0 U
108-88-3	Toluene	5.0 U
108-90-7	Chlorobenzene	5.0 U
100-41-4	Ethylbenzene	5.0 U
100-42-5	Styrene	5.0 U
	Total Xylenes	5.0 U

Data Reporting Qualifiers

For reporting results to EPA, the following results qualifiers are used.
Additional flags or footnotes explaining results are encouraged. However, the definition of each flag must be explicit.

VALUE

If the result is a value greater than or equal to the detection limit, report the value.

U

Indicates compound was analyzed for but not detected. Report the minimum detection limit for the sample with the U(e.g. 10U based on necessary concentration dilution actions. (This is not necessarily the instrument detection limit.) The footnote should read U-Compound was analyzed for but not detected. The number is the minimum attainable detection limit for the sample.

J

Indicates an estimated value. This flag is used either when estimating a concentration for tentatively identified compounds where a 1:1 response is assumed or when the mass spectral data indicates the presence of a compound that meets the identification criteria but the result is less than the specified detection limit but greater than zero (e.g. 10J).

C

This flag applies to pesticide parameters where the identification has been confirmed by GC/MS. Single component pesticides greater than or equal to 10 ng/ul in the final extract should be confirmed by GC/MS.

B

This flag is used when the analyte is found in the blank as well as a sample. It indicates possible/probable blank contamination and warns the data user to take appropriate action.

OTHER

Other specific flags and footnotes may be required to properly define the results. If used, they must be fully described and such description attached to the data summary report.

ORGANIC ANALYSIS DATA SHEET

(PAGE 2)

LABORATORY NAME: NANCO LABS. INC.
CASE NO: ENGINEERING SCIENCE
BUFFALO PUMPS

SAMPLE NO.
GW.1.18

SEMIVOLATILE COMPOUNDS

Concentration: Low Medium (Circle One)

Date Extracted/Prepared: 2/01/88

Date Analyzed: 2/10/88

Conc/Dil Factor: -----> 2

Percent Moisture: N/A

GPC Cleanup: Yes _____ No XX

Separatory Funnel Extraction: Yes XX

Continuous Liquid - Liquid Extraction: Yes _____

CAS Number		ug/l or ug/Kg (Circle One)
108-95-2	Phenol	20.0 U
111-44-4	bis(-2-Chloroethyl)Ether	20.0 U
95-57-8	2-Chlorophenol	20.0 U
541-73-1	1,3-Dichlorobenzene	20.0 U
106-46-7	1,4-Dichlorobenzene	20.0 U
100-51-6	Benzyl Alcohol	20.0 U
95-50-1	1,2-Dichlorobenzene	20.0 U
95-48-7	2-Methylphenol	20.0 U
39638-32-9	bis(2-chloroisopropyl)Ether	20.0 U
106-44-5	4-Methylphenol	20.0 U
621-64-7	N-Nitroso-Di-n-Propylamine	20.0 U
67-72-1	Hexachloroethane	20.0 U
98-95-3	Nitrobenzene	20.0 U
78-59-1	Isophorone	20.0 U
88-75-5	2-Nitrophenol	20.0 U
105-67-9	2,4-Dimethylphenol	20.0 U
65-85-0	Benzoic Acid	100.0 U
111-91-1	bis(-2-Chloroethoxy)Methane	20.0 U
120-83-2	2,4-Dichlorophenol	20.0 U
120-82-1	1,2,4-Trichlorobenzene	20.0 U
91-20-3	Naphthalene	20.0 U
106-47-8	4-Chloroaniline	20.0 U
87-68-3	Hexachlorobutadiene	20.0 U
59-50-7	4-Chloro-3-Methylphenol	20.0 U
91-57-6	2-Methylnaphthalene	20.0 U
77-47-4	Hexachlorocyclopentadiene	20.0 U
88-06-2	2,4,6-Trichlorophenol	20.0 U
95-95-4	2,4,5-Trichlorophenol	100.0 U
91-58-7	2-Chloronaphthalene	20.0 U
88-74-4	2-Nitroaniline	100.0 U
131-11-3	Dimethyl Phthalate	20.0 U
208-96-8	Acenaphthylene	20.0 U
99-09-2	3-Nitroaniline	100.0 U

CAS Number		ug/l or ug/Kg (Circle One)
83-32-9	Acenaphthene	20.0 U
51-28-5	2,4-Dinitrophenol	100.0 U
100-02-7	4-Nitrophenol	100.0 U
132-64-9	Dibenzofuran	20.0 U
121-14-2	2,4-Dinitrotoluene	20.0 U
606-20-2	2,6-Dinitrotoluene	20.0 U
84-66-2	Diethylphthalate	20.0 U
7005-72-3	4-Chlorophenyl-phenylether	20.0 U
86-73-7	Fluorene	20.0 U
100-01-6	4-Nitroaniline	100.0 U
534-52-1	4,6-Dinitro-2-Methylphenol	100.0 U
86-30-6	N-Nitrosodiphenylamine (1)	20.0 U
101-55-3	4-Bromophenyl-phenylether	20.0 U
118-74-1	Hexachlorobenzene	20.0 U
87-86-5	Pentachlorophenol	100.0 U
85-01-8	Phenanthrene	20.0 U
120-12-7	Anthracene	20.0 U
84-74-2	Di-n-Butylphthalate	20.0 U
206-44-0	Fluoranthene	20.0 U
129-00-0	Pyrene	20.0 U
85-68-7	Butylbenzylphthalate	20.0 U
91-94-1	3,3'-Dichlorobenzidine	40.0 U
56-55-3	Benzo(a)Anthracene	20.0 U
117-81-7	bis(2-Ethylhexyl)Phthalate	20.0 U
218-01-9	Chrysene	20.0 U
117-84-0	Di-n-Octyl Phthalate	32.0
205-99-2	Benzo(b)Fluoranthene	20.0 U
207-08-9	Benzo(k)Fluoranthene	20.0 U
50-32-8	Benzo(a)Pyrene	20.0 U
193-39-5	Indeno(1,2,3-cd)Pyrene	20.0 U
53-70-3	Dibenz(a,h)Anthracene	20.0 U
191-24-2	Benzo(g,h,i)Perylene	20.0 U

(1) - Cannot be separated from diphenylamine

TABLE 2.0
30890-0092
ENGINEERING SCIENCE
EPA TCL PESTICIDES/PCB'S

Aqueous

All results reported as ug/L.

Sample Identification					
<u>Dilution Factor</u>	<u>1.0</u>	<u>1.0</u>	<u>1.0</u>	<u>1.0</u>	
	<u>1018</u>	<u>1018</u>	<u>1018</u>	<u>1018</u>	
<u>Method Blank I.D.</u>	<u>-B01</u>	<u>-B01</u>	<u>-B01</u>	<u>-B01</u>	
<u>Compound</u>	<u>Method Blank</u>	<u>GW-1</u>	<u>GW-2</u>	<u>GW-3</u>	<u>Lower Limits of Detection with no Dilution</u>
alpha BHC	U	U	U	U	0.05
beta BHC	U	U	U	U	0.05
delta BHC	U	U	U	U	0.05
gamma BHC	U	U	U	U	0.05
Heptachlor	U	U	U	U	0.05
ldrin	U	U	U	U	0.05
eptachlor Epoxide	U	U	U	U	0.05
Endosulfan I	U	U	U	U	0.10
Dieldrin	U	U	U	U	0.10
,4' DDE	U	U	U	U	0.10
ndrin	U	U	U	U	0.10
Endosulfan II	U	U	U	U	0.10
,4' DDD	U	U	U	U	0.10
ndosulfan Sulfate	U	U	U	U	0.10
4,4' DDT	U	U	U	U	0.10
Methoxychlor	U	U	U	U	0.50
ndrin Ketone	U	U	U	U	0.10
alpha Chlordane	U	U	U	U	0.50
gamma Chlordane	U	U	U	U	0.50
loxaphene	U	U	U	U	1.0
Aroclor - 1016	U	U	U	U	0.50
Aroclor - 1221	U	U	U	U	0.50
Aroclor - 1232	U	U	U	U	0.50
Aroclor - 1242	U	U	U	U	0.50
Aroclor - 1248	U	U	U	U	0.50
Aroclor - 1254	U	U	U	U	1.0
Aroclor - 1260	U	U	U	U	1.0

U - See Appendix for definition.

ORGANICS ANALYSIS DATA SHEET
(PAGE 4)

SAMPLE NUMBER

LABORATORY NAME :NANCO LABS.INC.
CASE NO: ENGINEERING SCIENCE
BUFFALO PUMPS

GW-1.18

Tentatively Identified Compounds

CAS Number	Compound Name	Fraction	RT or Scan Number	Estimated Concentration (ug/L or ug/Kg)
1 -----	UNKNOWN	VOA	9	21.0 J
2 -----	2-ETHENYLOXY, ETHANOL	VOA	97	21.0 JB
3 -----	UNKNOWN	VOA	370	16.0 JB
4 -----				
5 -----				
6 -----	UNKNOWN	BN/A	1177	19.0 J
7 -----	UNKNOWN	BN/A	1180	27.0 J
8 -----	UNKNOWN	BN/A	1191	22.0 J
9 -----	UNKNOWN	BN/A	1198	59.0 J
10 -----	UNKNOWN	BN/A	1208	42.0 J
11 -----	UNKNOWN	BN/A	1212	58.0 J
12 -----	UNKNOWN	BN/A	1229	43.0 J
13 -----	UNKNOWN	BN/A	1328	31.0 J
14 -----	UNKNOWN	BN/A	1332	35.0 J
15 -----	UNKNOWN	BN/A	1386	17.0 J
16 -----	UNKNOWN	BN/A	1475	17.0 J
17 -----	UNKNOWN	BN/A	1510	51.0 J
18 -----	UNKNOWN	BN/A	1593	21.0 J
19 -----	UNKNOWN	BN/A	1915	17.0 J
20 -----				
21 -----				
22 -----				
23 -----				
24 -----				
25 -----				
26 -----				

INORGANIC ANALYSIS DATA SHEET
FORM I

SMPL NO. : GW-1.18

0000003

Lab Name : NANCO LABORATORIES, INC.

Customer Name: Engineering Science

SOW NO. N/A

Lab Receipt Date : 01/30/88

Lab Sample ID: 88-EW-5341

Date Reported: 2/22/88

Location ID: Buffalo Pumps

ELEMENTS IDENTIFIED AND MEASURED

CONCENTRATION : LOW X

MEDIUM _____

MATRIX : WATER X

SOIL _____

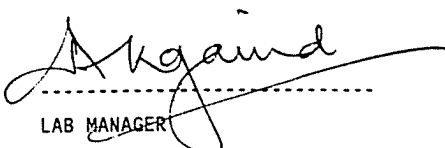
SLUDGE _____ OTHER _____

UG/L OR MG/KG DRY WEIGHT (CIRCLE ONE)

1. ALUMINUM	29700.0 P ^N	13. MAGNESIUM	110700.0 P
2. ANTIMONY	50.0 UP	14. MANGANESE	1300.0 P ^E
3. ARSENIC	15.0 SF	15. MERCURY	0.2 U C.V.
4. BARIUM	240.0 P	16. NICKEL	22.0 UP
5. BERYLLIUM	[0.7]P	17. POTASSIUM	5000.0 P
6. CADMIUM	4.0 UP ^N	18. SELENIUM	30.0 UF ^N (1:10)
7. CALCIUM	500000.0 P	19. SILVER	10.0 UP
8. CHROMIUM	90.0 P	20. SODIUM	71400.0 P
9. COBALT	[41.0]P	21. THALLIUM	2.0 UF ^N
10. COPPER	110.0 P	22. VANADIUM	[19.0]P
11. IRON	53300.0 P ^E	23. ZINC	210.0 P
12. LEAD	51.0 SF ^N (1:2)	PERCENT SOLIDS (%)	N/A
CYANIDE	NR		

FOOTNOTES : FOR REPORTING RESULTS STANDARD RESULT QUALIFIERS ARE USED AS DEFINED ON PAGE 2.

COMMENTS : This sample was a brown liquid that was colorless after ICP digestion procedures and colorless after furnace digestion procedures. Pb was analyzed at a 1:2 dilution. Se was analyzed at a 1:10 dilution.


LAB MANAGER

MANCO LABS, INC.

0000208

Reporting Date: 2/2/88

Results of analysis on ^{TOX}~~Drinking Water~~ sample received 1/30/88

IPLE ID :

MANCO ID: 88-EW5341

PARAMETERS

TOX

RESULTS

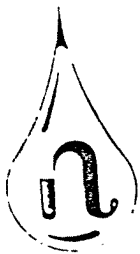
86

UNITS

ug/l

ALL RESULTS ARE EXPRESSED IN UG/L UNLESS OTHERWISE INDICATED

CONSTANCE M. GAIND
CHIEF EXECUTIVE OFFICER,
LABORATORY DIRECTOR



SAMPLE DATA

GW-2.18

ORGANICS ANALYSIS DATA SHEET

(PAGE 1)

SAMPLE NUMBER

Laboratory Name: NANCO LABORATORY INC.

Lab File ID No: >G0289

Sample Matrix: WATER

Data Release Authorized By: *Kathleen M. Kelly*

BUFFALO PUMPS

Case No: ENG.SCI.

QC Report No: N/A

Contract No: N/A

Date Sample Received: 01/30/88

GW-2.18

VOLATILE COMPOUNDS

Concentration: Low Medium (Circle One)

Date Extracted/Prepared: 02/03/88

Date Analyzed: 02/03/88

Conc/Dil Factor: 1 pH: 6.9

Percent Moisture: N/A

CAS
Numberug/l or ug/Kg
(Circle One)

74-87-3	Chloromethane	10.0 U
74-83-9	Bromomethane	10.0 U
75-01-4	Vinyl Chloride	10.0 U
75-00-3	Chloroethane	10.0 U
75-09-2	Methylene Chloride	15.0 B
67-64-1	Acetone	13.0 B
75-15-0	Carbon Disulfide	14.0
75-35-4	1,1-Dichloroethene	5.0 U
75-34-3	1,1-Dichloroethane	5.0 U
156-60-5	Trans-1,2-Dichloroethene	5.0 U
67-66-3	Chloroform	5.0 U
107-06-2	1,2-Dichloroethane	5.0 U
78-93-3	2-Butanone	10.0 U
71-55-6	1,1,1-Trichloroethane	5.0 U
56-23-5	Carbon Tetrachloride	5.0 U
108-05-4	Vinyl Acetate	10.0 U
75-27-4	Bromodichloromethane	5.0 U

CAS
Numberug/l or ug/Kg
(Circle One)

79-34-5	1,1,2,2-Tetrachloroethane	5.0 U
78-87-5	1,2-Dichloropropane	5.0 U
10061-02-6	Trans-1,3-Dichloropropene	5.0 U
79-01-6	Trichloroethene	5.0 U
124-48-1	Dibromochloromethane	5.0 U
79-00-5	1,1,2-Trichloroethane	5.0 U
71-43-2	Benzene	1.7 J
10061-01-5	cis-1,3-Dichloropropene	5.0 U
110-75-8	2-Chloroethylvinylether	10.0 U
75-25-2	Bromoform	5.0 U
591-78-6	2-Hexanone	10.0 U
108-10-1	4-Methyl-2-Pentanone	10.0 U
127-18-4	Tetrachloroethene	5.0 U
108-88-3	Toluene	5.0 U
108-90-7	Chlorobenzene	5.0 U
100-41-4	Ethylbenzene	5.0 U
100-42-5	Styrene	5.0 U
	Total Xylenes	5.0 U

Data Reporting Qualifiers

For reporting results to EPA, the following results qualifiers are used.

Additional flags or footnotes explaining results are encouraged. However, the definition of each flag must be explicit.

VALUE

If the result is a value greater than or equal to the detection limit, report the value.

U

Indicates compound was analyzed for but not detected. Report the minimum detection limit for the sample with the U (e.g. 10U based on necessary concentration dilution actions. (This is not necessarily the instrument detection limit.) The footnote should read U-Compound was analyzed for but not detected. The number is the minimum attainable detection limit for the sample.

J

Indicates an estimated value. This flag is used either when estimating a concentration for tentatively identified compounds where a 1:1 response is assumed or when the mass spectral data indicates the presence of a compound that meets the identification criteria but the result is less than the specified detection limit but greater than zero (e.g. 10J).

C

This flag applies to pesticide parameters where the identification has been confirmed by GC/MS. Single component pesticides greater than or equal to 10 ng/ul in the final extract should be confirmed by GC/MS.

B

This flag is used when the analyte is found in the blank as well as a sample. It indicates possible/probable blank contamination and warns the data user to take appropriate action.

OTHER

Other specific flags and footnotes may be required to properly define the results. If used, they must be fully described and such description attached to the data summary report.

ORGANIC ANALYSIS DATA SHEET
(PAGE 2)

LABORATORY NAME: NANCO LABS. INC.
CASE NO: ENGINEERING SCIENCE
BUFFALO PUMPS

SAMPLE NO.
GW-2.18

SEMIVOLATILE COMPOUNDS

Concentration: Low Medium (Circle One)
Date Extracted/Prepared: 2/01/88
Date Analyzed: 2/10/88
Conc/Dil Factor:-----> 2
Percent Moisture: N/A

GPC Cleanup: Yes _____ No XX _____
Separatory Funnel Extraction: Yes XX _____
Continuous Liquid - Liquid Extraction: Yes _____

CAS Number		ug/l or ug/Kg (Circle One)	CAS Number		ug/l or ug/Kg (Circle One)
108-95-2	Phenol	20.0 U	83-32-9	Acenaphthene	20.0 U
111-44-4	bis(-2-Chloroethyl)Ether	20.0 U	51-28-5	2,4-Dinitrophenol	100.0 U
95-57-8	2-Chlorophenol	20.0 U	100-02-7	4-Nitrophenol	100.0 U
541-73-1	1,3-Dichlorobenzene	20.0 U	132-64-9	Dibenzofuran	20.0 U
106-46-7	1,4-Dichlorobenzene	20.0 U	121-14-2	2,4-Dinitrotoluene	20.0 U
100-51-6	Benzyl Alcohol	20.0 U	606-20-2	2,6-Dinitrotoluene	20.0 U
95-50-1	1,2-Dichlorobenzene	20.0 U	84-66-2	Diethylphthalate	20.0 U
95-48-7	2-Methylphenol	20.0 U	7005-72-3	4-Chlorophenyl-phenylether	20.0 U
39638-32-9	bis(2-chloroisopropyl)Ether	20.0 U	86-73-7	Fluorene	20.0 U
106-44-5	4-Methylphenol	20.0 U	100-01-6	4-Nitroaniline	100.0 U
621-64-7	N-Nitroso-Di-n-Propylamine	20.0 U	534-52-1	4,6-Dinitro-2-Methylphenol	100.0 U
67-72-1	Hexachloroethane	20.0 U	86-30-6	N-Nitrosodiphenylamine (1)	20.0 U
98-95-3	Nitrobenzene	20.0 U	101-55-3	4-Bromophenyl-phenylether	20.0 U
78-59-1	Isophorone	20.0 U	118-74-1	Hexachlorobenzene	20.0 U
88-75-5	2-Nitrophenol	20.0 U	87-86-5	Pentachlorophenol	100.0 U
105-67-9	2,4-Dimethylphenol	20.0 U	85-01-8	Phenanthrene	20.0 U
65-85-0	Benzoic Acid	100.0 U	120-12-7	Anthracene	20.0 U
111-91-1	bis(-2-Chloroethoxy)Methane	20.0 U	84-74-2	Di-n-Butylphthalate	52.0
120-83-2	2,4-Dichlorophenol	20.0 U	206-44-0	Fluoranthene	20.0 U
120-82-1	1,2,4-Trichlorobenzene	20.0 U	129-00-0	Pyrene	20.0 U
91-20-3	Naphthalene	20.0 U	85-68-7	Butylbenzylphthalate	20.0 U
106-47-8	4-Chloroaniline	20.0 U	91-94-1	3,3'-Dichlorobenzidine	40.0 U
87-68-3	Hexachlorobutadiene	20.0 U	56-55-3	Benzo(a)Anthracene	20.0 U
59-50-7	4-Chloro-3-Methylphenol	20.0 U	117-81-7	bis(2-Ethylhexyl)Phthalate	26.0 B
91-57-6	2-Methylnaphthalene	20.0 U	218-01-9	Chrysene	20.0 U
77-47-4	Hexachlorocyclopentadiene	20.0 U	117-84-0	Di-n-Octyl Phthalate	20.0 U
88-06-2	2,4,6-Trichlorophenol	20.0 U	205-99-2	Benzo(b)Fluoranthene	20.0 U
95-95-4	2,4,5-Trichlorophenol	100.0 U	207-08-9	Benzo(k)Fluoranthene	20.0 U
91-58-7	2-Chloronaphthalene	20.0 U	50-32-8	Benzo(a)Pyrene	20.0 U
88-74-4	2-Nitroaniline	100.0 U	193-39-5	Indeno(1,2,3-cd)Pyrene	20.0 U
131-11-3	Dimethyl Phthalate	20.0 U	53-70-3	Dibenz(a,h)Anthracene	20.0 U
208-96-8	Acenaphthylene	20.0 U	191-24-2	Benzo(g,h,i)Perylene	20.0 U
99-09-2	3-Nitroaniline	100.0 U			

(1) - Cannot be separated from diphenylamine

TABLE 2.0
30890-0092
ENGINEERING SCIENCE
EPA TCL PESTICIDES/PCB'S

Aqueous

All results reported as ug/L.

Sample Identification

<u>Dilution Factor</u>	<u>1.0</u> 1018	<u>1.0</u> 1018	<u>1.0</u> 1018	<u>1.0</u> 1018	<u>Lower Limits of Detection with no Dilution</u>
<u>Method Blank I.D.</u>	<u>-B01</u>	<u>-B01</u>	<u>-B01</u>	<u>-B01</u>	
<u>Compound</u>	<u>Method Blank</u>	<u>GW-1</u>	<u>GW-2</u>	<u>GW-3</u>	
alpha BHC	U	U	U	U	0.05
beta BHC	U	U	U	U	0.05
delta BHC	U	U	U	U	0.05
gamma BHC	U	U	U	U	0.05
Heptachlor	U	U	U	U	0.05
Aldrin	U	U	U	U	0.05
Heptachlor Epoxide	U	U	U	U	0.05
Endosulfan I	U	U	U	U	0.05
Diieldrin	U	U	U	U	0.10
4,4' DDE	U	U	U	U	0.10
Endrin	U	U	U	U	0.10
Endosulfan II	U	U	U	U	0.10
4,4' DDD	U	U	U	U	0.10
Endosulfan Sulfate	U	U	U	U	0.10
4,4' DDT	U	U	U	U	0.10
Methoxychlor	U	U	U	U	0.50
Endrin Ketone	U	U	U	U	0.10
alpha Chlordane	U	U	U	U	0.50
gamma Chlordane	U	U	U	U	0.50
Toxaphene	U	U	U	U	1.0
Aroclor - 1016	U	U	U	U	0.50
Aroclor - 1221	U	U	U	U	0.50
Aroclor - 1232	U	U	U	U	0.50
Aroclor - 1242	U	U	U	U	0.50
Aroclor - 1248	U	U	U	U	0.50
Aroclor - 1254	U	U	U	U	1.0
Aroclor - 1260	U	U	U	U	1.0

U - See Appendix for definition.

ORGANICS ANALYSIS DATA SHEET
(PAGE 4)

SAMPLE NUMBER

LABORATORY NAME :NANCO LABS.INC.
CASE NO: ENGINEERING SCIENCE
BUFFALO PUMPS

GW-2.18

Tentatively Identified Compounds

CAS Number	Compound Name	Fraction	RT or Scan Number	Estimated Concentration (ug/l or ug/Kg)
1 -----	UNKNOWN	VOA	10	55.0 J
2 -----	UNKNOWN	VOA	371	8.0 JB
3 -----				
4 -----				
5 -----	NONE FOUND	BN/A	-----	-----
6 -----				
7 -----				
8 -----				
9 -----				
10 -----				
11 -----				
12 -----				
13 -----				
14 -----				
15 -----				
16 -----				
17 -----				
18 -----				
19 -----				
20 -----				
21 -----				
22 -----				
23 -----				
24 -----				
25 -----				
26 -----				

INORGANIC ANALYSIS DATA SHEET
FORM I

0000004

SMPL NO. : GW-2.18

Lab Name : NANCO LABORATORIES, INC.

Customer Name: Engineering Science

SOW NO. N/A

Lab Receipt Date : 01/30/88

Lab Sample ID: 88-EW-5342

Date Reported: 2/22/88

Location ID: Buffalo Pumps

ELEMENTS IDENTIFIED AND MEASURED

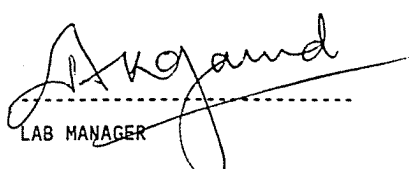
CONCENTRATION : LOW X MEDIUM
MATRIX : WATER X SOIL SLUDGE OTHER

UG/L OR MG/KG DRY WEIGHT (CIRCLE ONE)

1. ALUMINUM	64000.0 P <u>✓</u>	13. MAGNESIUM	184200.0 P
2. ANTIMONY	50.0 UP	14. MANGANESE	12900.0 P <u>E</u> (1:10)
3. ARSENIC	49.0 SF	15. MERCURY	0.2 U C.V.
4. BARIUM	430.0 P	16. NICKEL	96.0 P
5. BERYLLIUM	[2.4]P	17. POTASSIUM	7600.0 P
6. CADMIUM	4.0 UP <u>✓</u>	18. SELENIUM	30.0 UF <u>✓</u> (1:10)
7. CALCIUM	657900.0 P (1:10)	19. SILVER	10.0 UP
8. CHROMIUM	170.0 P	20. SODIUM	52600.0 P
9. COBALT	96.0 P	21. THALLIUM	2.0 UF <u>✓</u>
10. COPPER	280.0 P	22. VANADIUM	110.0 P
11. IRON	126600.0 P <u>E</u>	23. ZINC	480.0 P
12. LEAD	56.0 F <u>✓</u> (1:2)	PERCENT SOLIDS (%)	N/A
CYANIDE	NR		

FOOTNOTES : FOR REPORTING RESULTS STANDARD RESULT QUALIFIERS ARE USED AS DEFINED ON PAGE 2.

COMMENTS : This sample was a brown liquid that was colorless after ICP digestion procedures and colorless after furnace digestion procedures. Pb was analyzed at a 1:2 dilution. Ca, Mn, and Se were analyzed at a 1:10 dilution.


LAB MANAGER

Reporting Date: 2/2/88

Results of analysis on ^{TOX} Drinking Water sample received 1/30/88

PLE ID :

PECO ID: 88-EW5342

PARAMETERS

TOX

RESULTS

ND*

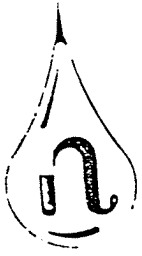
UNITS

ug/l

* min detection level = 25 ug/l
Dilution Factor (1:5)

ALL RESULTS ARE EXPRESSED IN UG/L UNLESS OTHERWISE INDICATED

CONSTANCE M. GAINO
CHIEF EXECUTIVE OFFICER,
LABORATORY DIRECTOR



SAMPLE DATA

GW-3.18

ORGANICS ANALYSIS DATA SHEET

(PAGE 1)

SAMPLE NUMBER

Laboratory Name: NANCY LABORATORY INC.

Lab File ID No: >G0290

Sample Matrix: WATER

Data Release Authorized By: *Kathleen M. Kelley*

BUFFALO PUMPS

Case No: ENG.SCI.

QC Report No: N/A

Contract No: N/A

Date Sample Received: 01/30/88

GW-3.18

VOLATILE COMPOUNDS

Concentration: Low Medium (Circle One)

Date Extracted/Prepared: 02/03/88

Date Analyzed: 02/03/88

Conc/Dil Factor: 1

pH: 6.9

Percent Moisture: N/A

CAS
Numberug/l or ug/Kg
(Circle One)CAS
Numberug/l or ug/Kg
(Circle One)

74-87-3	Chloromethane	10.0 U
74-83-9	Bromomethane	10.0 U
75-01-4	Vinyl Chloride	10.0 U
75-00-3	Chloroethane	10.0 U
75-09-2	Methylene Chloride	17.0 B
67-64-1	Acetone	21.0 B
75-15-0	Carbon Disulfide	15.0
75-35-4	1,1-Dichloroethene	5.0 U
75-34-3	1,1-Dichloroethane	5.0 U
156-60-5	Trans-1,2-Dichloroethene	5.0 U
67-66-3	Chloroform	5.0 U
107-06-2	1,2-Dichloroethane	5.0 U
78-93-3	2-Butanone	10.0 U
71-55-6	1,1,1-Trichloroethane	5.0 U
56-23-5	Carbon Tetrachloride	5.0 U
108-05-4	Vinyl Acetate	10.0 U
75-27-4	Bromodichloromethane	5.0 U

79-34-5	1,1,2,2-Tetrachloroethane	5.0 U
78-87-5	1,2-Dichloropropane	5.0 U
10061-02-6	Trans-1,3-Dichloropropene	5.0 U
79-01-6	Trichloroethene	5.0 U
124-48-1	Dibromochloromethane	5.0 U
79-00-5	1,1,2-Trichloroethane	5.0 U
71-43-2	Benzene	2.1 J
10061-01-5	cis-1,3-Dichloropropene	5.0 U
110-75-8	2-Chloroethylvinylether	10.0 U
75-25-2	Bromoform	5.0 U
591-78-6	2-Hexanone	10.0 U
108-10-1	4-Methyl-2-Pentanone	10.0 U
127-18-4	Tetrachloroethene	5.0 U
108-88-3	Toluene	5.0 U
108-90-7	Chlorobenzene	5.0 U
100-41-4	Ethylbenzene	5.0 U
100-42-5	Styrene	5.0 U
	Total Xylenes	5.0 U

Data Reporting Qualifiers

For reporting results to EPA, the following results qualifiers are used.

Additional flags or footnotes explaining results are encouraged. However, the definition of each flag must be explicit.

VALUE

If the result is a value greater than or equal to the detection limit, report the value.

U

Indicates compound was analyzed for but not detected. Report the minimum detection limit for the sample with the U (e.g. 10U based on necessary concentration dilution actions. (This is not necessarily the instrument detection limit.) The footnote should read U-Compound was analyzed for but not detected. The number is the minimum attainable detection limit for the sample.

J

Indicates an estimated value. This flag is used either when estimating a concentration for tentatively identified compounds where a 1:1 response is assumed or when the mass spectral data indicates the presence of a compound that meets the identification criteria but the result is less than the specified detection limit but greater than zero (e.g. 10J).

C

This flag applies to pesticide parameters where the identification has been confirmed by GC/MS. Single component pesticides greater than or equal to 10 ng/ul in the final extract should be confirmed by GC/MS.

B

This flag is used when the analyte is found in the blank as well as a sample. It indicates possible/probable blank contamination and warns the data user to take appropriate action.

OTHER

Other specific flags and footnotes may be required to properly define the results. If used, they must be fully described and such description attached to the data summary report.

ORGANIC ANALYSIS DATA SHEET
(PAGE 2)

LABORATORY NAME: NANCO LABS. INC.
CASE NO: ENGINEERING SCIENCE
BUFFALO PUMPS

SAMPLE NO.
GW-3.18

SEMIVOLATILE COMPOUNDS

Concentration: Low Medium (Circle One)
Date Extracted/Prepared: 2/01/88
Date Analyzed: 2/15/88
Conc/Dil Factor:-----> 2
Percent Moisture: N/A

GPC Cleanup: Yes _____ No XX
Separatory Funnel Extraction: Yes XX
Continuous Liquid - Liquid Extraction: Yes _____

CAS Number		ug/l or ug/Kg (Circle One)	CAS Number		ug/l or ug/Kg (Circle One)
			83-32-9	Acenaphthene	20.0 U
108-95-2	Phenol	20.0 U	51-28-5	2,4-Dinitrophenol	100.0 U
111-44-4	bis(-2-Chloroethyl)Ether	20.0 U	100-02-7	4-Nitrophenol	100.0 U
95-57-8	2-Chlorophenol	20.0 U	132-64-9	Dibenzofuran	20.0 U
541-73-1	1,3-Dichlorobenzene	20.0 U	121-14-2	2,4-Dinitrotoluene	20.0 U
106-46-7	1,4-Dichlorobenzene	20.0 U	606-20-2	2,6-Dinitrotoluene	20.0 U
100-51-6	Benzyl Alcohol	20.0 U	84-66-2	Diethylphthalate	20.0 U
95-50-1	1,2-Dichlorobenzene	20.0 U	7005-72-3	4-Chlorophenyl-phenylether	20.0 U
95-48-7	2-Methylphenol	20.0 U	86-73-7	Fluorene	20.0 U
39638-32-9	bis(2-chloroisopropyl)Ether	20.0 U	100-01-6	4-Nitroaniline	100.0 U
106-44-5	4-Methylphenol	20.0 U	534-52-1	4,6-Dinitro-2-Methylphenol	100.0 U
621-64-7	N-Nitroso-Di-n-Propylamine	20.0 U	86-30-6	N-Nitrosodiphenylamine (1)	20.0 U
67-72-1	Hexachloroethane	20.0 U	101-55-3	4-Bromophenyl-phenylether	20.0 U
98-95-3	Nitrobenzene	20.0 U	118-74-1	Hexachlorobenzene	20.0 U
78-59-1	Isophorone	20.0 U	87-86-5	Pentachlorophenol	100.0 U
88-75-5	2-Nitrophenol	20.0 U	85-01-8	Phenanthrene	20.0 U
105-67-9	2,4-Dimethylphenol	20.0 U	120-12-7	Anthracene	20.0 U
65-85-0	Benzoic Acid	100.0 U	84-74-2	Di-n-Butylphthalate	54.0
111-91-1	bis(-2-Chloroethoxy)Methane	20.0 U	206-44-0	Fluoranthene	20.0 U
120-83-2	2,4-Dichlorophenol	20.0 U	129-00-0	Pyrene	20.0 U
120-82-1	1,2,4-Trichlorobenzene	20.0 U	85-68-7	Butylbenzylphthalate	20.0 U
91-20-3	Naphthalene	20.0 U	91-94-1	3,3'-Dichlorobenzidine	40.0 U
106-47-8	4-Chloroaniline	20.0 U	56-55-3	Benzo(a)Anthracene	20.0 U
87-68-3	Hexachlorobutadiene	20.0 U	117-81-7	bis(2-Ethylhexyl)Phthalate	25.0 B
59-50-7	4-Chloro-3-Methylphenol	20.0 U	218-01-9	Chrysene	20.0 U
91-57-6	2-Methylnaphthalene	20.0 U	117-84-0	Di-n-Octyl Phthalate	20.0 U
77-47-4	Hexachlorocyclopentadiene	20.0 U	205-99-2	Benzo(b)Fluoranthene	20.0 U
88-06-2	2,4,6-Trichlorophenol	20.0 U	207-08-9	Benzo(k)Fluoranthene	20.0 U
95-95-4	2,4,5-Trichlorophenol	100.0 U	50-32-8	Benzo(a)Pyrene	20.0 U
91-58-7	2-Chloronaphthalene	20.0 U	193-39-5	Indeno(1,2,3-cd)Pyrene	20.0 U
88-74-4	2-Nitroaniline	100.0 U	53-70-3	Dibenz(a,h)Anthracene	20.0 U
131-11-3	Dimethyl Phthalate	20.0 U	191-24-2	Benzo(g,h,i)Perylene	20.0 U
208-96-8	Acenaphthylene	20.0 U			
99-09-2	3-Nitroaniline	100.0 U			

(1) - Cannot be separated from diphenylamine

TABLE 2.0
30890-0092
ENGINEERING SCIENCE
EPA TCL PESTICIDES/PCB's

Aqueous

All results reported as ug/L.

Sample Identification

<u>Dilution Factor</u>	<u>1.0</u>	<u>1.0</u>	<u>1.0</u>	<u>1.0</u>	
	1018	1018	1018	1018	
<u>Method Blank I.D.</u>	<u>-B01</u>	<u>-B01</u>	<u>-B01</u>	<u>-B01</u>	
<u>Compound</u>	<u>Method Blank</u>	<u>GW-1</u>	<u>GW-2</u>	<u>GW-3</u>	<u>Lower Limits of Detection with no Dilution</u>
alpha BHC	U	U	U	U	0.05
beta BHC	U	U	U	U	0.05
delta BHC	U	U	U	U	0.05
gamma BHC	U	U	U	U	0.05
Heptachlor	U	U	U	U	0.05
Aldrin	U	U	U	U	0.05
Heptachlor Epoxide	U	U	U	U	0.05
Endosulfan I	U	U	U	U	0.05
Dieldrin	U	U	U	U	0.10
4,4' DDE	U	U	U	U	0.10
Endrin	U	U	U	U	0.10
Endosulfan II	U	U	U	U	0.10
4,4' DDD	U	U	U	U	0.10
Endosulfan Sulfate	U	U	U	U	0.10
4,4' DDT	U	U	U	U	0.10
Methoxychlor	U	U	U	U	0.50
Endrin Ketone	U	U	U	U	0.10
alpha Chlordane	U	U	U	U	0.50
gamma Chlordane	U	U	U	U	0.50
Toxaphene	U	U	U	U	1.0
Aroclor - 1016	U	U	U	U	0.50
Aroclor - 1221	U	U	U	U	0.50
Aroclor - 1232	U	U	U	U	0.50
Aroclor - 1242	U	U	U	U	0.50
Aroclor - 1248	U	U	U	U	0.50
Aroclor - 1254	U	U	U	U	1.0
Aroclor - 1260	U	U	U	U	1.0

U - See Appendix for definition.

ORGANICS ANALYSIS DATA SHEET
(PAGE 4)

SAMPLE NUMBER

LABORATORY NAME :NANCO LABS.INC.
CASE NO: ENGINEERING SCIENCE
BUFFALO PUMPS

GW-3.18

Tentatively Identified Compounds

CAS Number	Compound Name	Fraction	RT or Scan Number	Estimated Concentration (ug/l or ug/Kg)
1 -----	UNKNOWN	VOA	4	720.0 J
2 -----	UNKNOWN	VOA	96	27.0 JB
3 -----				
4 -----				
5 -----	UNKNOWN	BN/A	1165	22.0 J
6 -----	UNKNOWN	BN/A	1195	30.0 J
7 -----	UNKNOWN	BN/A	1252	33.0 J
8 -----	UNKNOWN	BN/A	1271	62.0 J
9 -----	UNKNOWN	BN/A	1302	56.0 J
10 -----	UNKNOWN	BN/A	1342	153.0 J
11 -----	UNKNOWN	BN/A	1351	55.0 J
12 -----	UNKNOWN	BN/A	1409	22.0 J
13 -----	UNKNOWN	BN/A	1531	37.0 J
14 -----	UNKNOWN	BN/A	1586	36.0 J
15 -----	UNKNOWN	BN/A	1638	29.0 J
16 -----				
17 -----				
18 -----				
19 -----				
20 -----				
21 -----				
22 -----				
23 -----				
24 -----				
25 -----				
26 -----				

INORGANIC ANALYSIS DATA SHEET
FORM I

0000005

SMPL NO. : GW-3.18

Lab Name : NANCO LABORATORIES, INC.

Customer Name: Engineering Science

SOW NO. N/A

Lab Receipt Date : 01/30/88

Lab Sample ID: 88-EW-5343

Date Reported:

2/22/88

Location ID: Buffalo Pumps

ELEMENTS IDENTIFIED AND MEASURED

CONCENTRATION : LOW ☒ X

MEDIUM

MATRIX : WATER ☒ X

SOIL

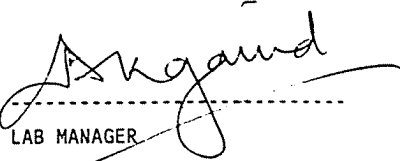
SLUDGE OTHER

☒ UG/ OR MG/KG DRY WEIGHT (CIRCLE ONE)

1. ALUMINUM	184800.0 P _N	13. MAGNESIUM	248500.0 P
2. ANTIMONY	50.0 UP	14. MANGANESE	13100.0 P _E (1:10)
3. ARSENIC	18.0 F (1:5)	15. MERCURY	0.2 U C.V.
4. BARIUM	5500.0 P	16. NICKEL	450.0 P
5. BERYLLIUM	9.0 P	17. POTASSIUM	17100.0 P
6. CADMIUM	4.0 UP _N	18. SELENIUM	30.0 UF _N (1:10)
7. CALCIUM	966900.0 P (1:10)	19. SILVER	10.0 UP
8. CHROMIUM	1600.0 P	20. SODIUM	70100.0 P
9. COBALT	260.0 P	21. THALLIUM	2.0 UF _N
10. COPPER	670.0 P	22. VANADIUM	420.0 P
11. IRON	433600.0 P _E	23. ZINC	19800.0 P (1:10)
12. LEAD	5400.0 P	PERCENT SOLIDS (%)	N/A
CYANIDE	NR		

FOOTNOTES : FOR REPORTING RESULTS STANDARD RESULT QUALIFIERS ARE USED AS DEFINED ON PAGE 2.

COMMENTS : This sample was a brown liquid that was colorless after ICP digestion procedures and colorless after furnace digestion procedures. As was analyzed at a 1:5 dilution. Ca, Mn, Se and Zn were analyzed at a 1:10 dilution.


LAB MANAGER

NAISCO LABS, INC.

0000210

Reporting Date: 2/2/88

Results of analysis on ^{TOX} ~~Drinking Water sample~~ received 1/30/88

FILE ID :

NAISCO ID: 88-EW5343

PARAMETERS

TOX

RESULTS

ND**

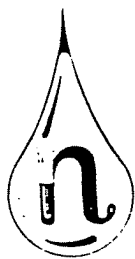
UNITS

ug/l

** min detection level 5ug/l

ALL RESULTS ARE EXPRESSED IN UG/L UNLESS OTHERWISE INDICATED

CONSTANCE M. GAIND
CHIEF EXECUTIVE OFFICER,
LABORATORY DIRECTOR



SAMPLE DATA

Trip Blank

ORGANICS ANALYSIS DATA SHEET

(PAGE 1)

SAMPLE NUMBER

Laboratory Name: NANCO LABORATORY INC.

Lab File ID No: >G0292

Sample Matrix: WATER

Data Release Authorized By:

BUFFALO PUMPS

Case No: ENG.SCI.

QC Report No: N/A

Contract No: N/A

Date Sample Received: 01/30/88

TRIP BLANK

VOLATILE COMPOUNDS

Concentration: Low Medium (Circle One)

Date Extracted/Prepared: 02/03/88

Date Analyzed: 02/03/88

Conc/Dil Factor: 1

pH: 7.0

Percent Moisture: N/A

CAS Number	ug/l or ug/Kg (Circle One)	CAS Number	ug/l or ug/Kg (Circle One)
74-87-3	Chloromethane 10.0 U	79-34-5	1,1,2,2-Tetrachloroethane 5.0 U
74-83-9	Bromomethane 10.0 U	78-87-5	1,2-Dichloropropane 5.0 U
75-01-4	Vinyl Chloride 10.0 U	10061-02-6	Trans-1,3-Dichloropropene 5.0 U
75-00-3	Chloroethane 10.0 U	79-01-6	Trichloroethene 5.0 U
75-09-2	Methylene Chloride 18.0 B	124-48-1	Dibromochloromethane 5.0 U
67-64-1	Acetone 14.0 B	79-00-5	1,1,2-Trichloroethane 5.0 U
75-15-0	Carbon Disulfide 11.0	71-43-2	Benzene 2.8 J
75-35-4	1,1-Dichloroethene 5.0 U	10061-01-5	cis-1,3-Dichloropropene 5.0 U
75-34-3	1,1-Dichloroethane 5.0 U	110-75-8	2-Chloroethylvinylether 10.0 U
156-60-5	Trans-1,2-Dichloroethene 5.0 U	75-25-2	Bromoform 5.0 U
67-66-3	Chloroform 5.0 U	591-78-6	2-Hexanone 10.0 U
107-06-2	1,2-Dichloroethane 5.0 U	108-10-1	4-Methyl-2-Pentanone 10.0 U
78-93-3	2-Butanone 170.0	127-18-4	Tetrachloroethene 5.0 U
71-55-6	1,1,1-Trichloroethane 2.6 J	108-88-3	Toluene 5.0 U
56-23-5	Carbon Tetrachloride 5.0 U	108-90-7	Chlorobenzene 5.0 U
108-05-4	Vinyl Acetate 10.0 U	100-41-4	Ethylbenzene 5.0 U
75-27-4	Bromodichloromethane 5.0 U	100-42-5	Styrene 5.0 U
			Total Xylenes 5.0 U

Data Reporting Qualifiers

For reporting results to EPA, the following results qualifiers are used.

Additional flags or footnotes explaining results are encouraged. However, the definition of each flag must be explicit.

VALUE

If the result is a value greater than or equal to the detection limit, report the value.

U

Indicates compound was analyzed for but not detected. Report the minimum detection limit for the sample with the U (e.g. 10U based on necessary concentration dilution actions. (This is not necessarily the instrument detection limit.) The footnote should read U-Compound was analyzed for but not detected. The number is the minimum attainable detection limit for the sample.

J

Indicates an estimated value. This flag is used either when estimating a concentration for tentatively identified compounds where a 1:1 response is assumed or when the mass spectral data indicates the presence of a compound that meets the identification criteria but the result is less than the specified detection limit but greater than zero (e.g. 10J).

C

This flag applies to pesticide parameters where the identification has been confirmed by GC/MS. Single component pesticides greater than or equal to 10 ng/ul in the final extract should be confirmed by GC/MS.

B

This flag is used when the analyte is found in the blank as well as a sample. It indicates possible/probable blank contamination and warns the data user to take appropriate action.

OTHER

Other specific flags and footnotes may be required to properly define the results. If used, they must be fully described and such description attached to the data summary report.

ORGANICS ANALYSIS DATA SHEET
(PAGE 4)

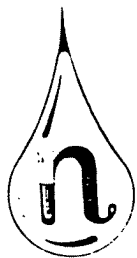
LABORATORY NAME :NANCO LABS.INC.
CASE NO: ENGINEERING SCIENCE
BUFFALO PUMPS

SAMPLE NUMBER

TRIP BLANK

Tentatively Identified Compounds

CAS Number	Compound Name	Fraction	RT or Scan Number	Estimated Concentration (ug/l or ug/Kg)
1 -----	UNKNOWN	VOA	4	620.0 J
2 -----	UNKNOWN	VOA	23	58.0 J
3 109999	FURAN, TETRAHYCLORO	VOA	126	15.0 J
4				
5				
6				
7				
8				
9				
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26				



SAMPLE DATA

Field Blank

ORGANICS ANALYSIS DATA SHEET

(PAGE 1)

SAMPLE NUMBER

Laboratory Name: NANCO LABORATORY INC.

Lab File ID No: >G0291

Sample Matrix: WATER

Data Release Authorized By: *Kathleen M. Kelly*

BUFFALO PUMPS

Case No: ENG.SCI.

QC Report No: N/A

Contract No: N/A

Date Sample Received: 01/30/88

FIELD BLANK

VOLATILE COMPOUNDS

Concentration: Low Medium (Circle One)

Date Extracted/Prepared: 02/03/88

Date Analyzed: 02/03/88

Conc/Dil Factor: 1

pH: 7.0

Percent Moisture: N/A

CAS umber		ug/l or ug/Kg (Circle One)	CAS Number		ug/l or ug/Kg (Circle One)
74-87-3	Chloromethane	10.0 U	79-34-5	1,1,2,2-Tetrachloroethane	5.0 U
74-83-9	Bromomethane	10.0 U	78-87-5	1,2-Dichloropropane	5.0 U
5-01-4	Vinyl Chloride	10.0 U	10061-02-6	Trans-1,3-Dichloropropene	5.0 U
5-00-3	Chloroethane	10.0 U	79-01-6	Trichloroethene	5.0 U
75-09-2	Methylene Chloride	16.0 B	124-48-1	Dibromochloromethane	5.0 U
7-64-1	Acetone	13.0 B	79-00-5	1,1,2-Trichloroethane	5.0 U
5-15-0	Carbon Disulfide	8.0	71-43-2	Benzene	2.5 J
5-35-4	1,1-Dichloroethene	5.0 U	10061-01-5	cis-1,3-Dichloropropene	5.0 U
75-34-3	1,1-Dichloroethane	5.0 U	110-75-8	2-Chloroethylvinylether	10.0 U
36-60-5	Trans-1,2-Dichloroethene	5.0 U	75-25-2	Bromoform	5.0 U
7-66-3	Chloroform	5.0 U	591-78-6	2-Hexanone	10.0 U
107-06-2	1,2-Dichloroethane	5.0 U	108-10-1	4-Methyl-2-Pentanone	10.0 U
78-93-3	2-Butanone	10.0 U	127-18-4	Tetrachloroethene	5.0 U
1-55-6	1,1,1-Trichloroethane	5.0 U	108-88-3	Toluene	5.0 U
5-23-5	Carbon Tetrachloride	5.0 U	108-90-7	Chlorobenzene	5.0 U
108-05-4	Vinyl Acetate	10.0 U	100-41-4	Ethylbenzene	5.0 U
75-27-4	Bromodichloromethane	5.0 U	100-42-5	Styrene	5.0 U
				Total Xylenes	5.0 U

Data Reporting Qualifiers

For reporting results to EPA, the following results qualifiers are used.

Additional flags or footnotes explaining results are encouraged. However, the definition of each flag must be explicit.

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I the result is a value greater than or equal to the detection limit, report the value.

U

Indicates compound was analyzed for but not detected. Report minimum detection limit for the sample with the U (e.g. 10U) based on necessary concentration dilution actions. (This is not necessarily the instrument detection limit.) The footnote should read U-Compound was analyzed for but not detected. The number is the minimum attainable detection limit for the sample.

J

Indicates an estimated value. This flag is used either when estimating a concentration for tentatively identified compounds where a 1:1 response is assumed or when the mass spectral data indicates the presence of a compound that meets the identification criteria but the result is less than the specified detection limit but greater than zero (e.g. 10J).

C

This flag applies to pesticide parameters where the identification has been confirmed by GC/MS Single component pesticides greater than or equal to 10 ng/ul in the final extract should be confirmed by GC/MS

B

This flag is used when the analyte is found in the blank as well as a sample. It indicates possible/probable blank contamination and warns the data user to take appropriate action.

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ORGANICS ANALYSIS DATA SHEET
(PAGE 4)

LABORATORY NAME :NANCO LABS.INC.
CASE NO: ENGINEERING SCIENCE
BUFFALO PUMPS

SAMPLE NUMBER

FIELD BLANK

Tentatively Identified Compounds

CAS Number	Compound Name	Fraction	RT or Scan Number	Estimated Concentration (ug/L or ug/Kg)
1 -----	UNKNOWN	VOA	4	1700.0 J
2 -----	UNKNOWN	VOA	18	40.0 J
3 -----	UNKNOWN	VOA	86	17.0 J
4 -----	UNKNOWN	VOA	97	29.0 JB
5 -----	UNKNOWN	VOA	371	7.0 JB
6				
7				
8				
9				
10				
11				
12				
13				
14				
15				
16				
17				
18				
19				
20				
21				
22				
23				
24				
25				
26				

Field Sampling Records

FIGURE 6.4
FIELD SURFACE SAMPLING RECORD

B-1.18

Site Buffalo Pump

NYSDEC Site No. _____

Date: 1/11/88

Samplers: Wm Hilly of Engine Science
M. Legak of Rochester Drilling

SAMPLING:

Time 2:20 _____ a.m.
X p.m.

Sample Type: Waste and soil

Sampling Method: Split Spoon

Depth of Sample: 0-1

Description of Sampling Point:

Drainage Direction: _____

Upstream From: _____

Downstream From: _____

Physical Appearance/Odor: Black silt & Sand some gravel

Wildlife Observed: none

Sampling Description:

Suspended Matter: _____

Color/Stain: Black

Odor: none

Other: _____

Texture: Sandy silt

Analyze for: TOX, metals & Organics

Refrigerated:

Date: 1/11/88 Time _____ a.m.
6:30 p.m.

Field Tests:

Temperature (C°/F°) _____ Weather Fair

pH _____

Conductivity _____

Comments: Refusal at one foot after 6 attempts

FIGURE 6.1
FIELD SAMPLING RECORD

to BUFFALO Pumps Site No. 54012-19 Date: 10/12/88
Well B-1

Samplers: Mark Chavira of ES
Bill Bradford of ES

Initial Static Water Level.
(from top of well protective casing)

Acuation:

ing: Submersible _____ Centrifugal _____ 2" Casing: _____ ft. of water x .16 = _____ gals.
Airlift _____ Positive Displacement _____ 3" Casing: _____ ft. of water x .36 = _____ gals.
Bailed _____ Times 4" Casing: _____ ft. of water x .65 = _____ gals.

Well Volume Calculation:

Depth to Intake from top of protective well casing _____
Volume of Water removed _____ Gals. (> 3 Well Volumes)

Sampling: Time 1300 _____ a.m.
_____ p.m.

Sampler
Bottle Type: Stainless Steel spoon _____
Teflon _____
From Pos. Dis. Pump Discharge Tube _____
Other _____

No. of Bottles
Filled I.D. No. Analyses

Trip Blank
Field Blank - Wash/Atmospheric. (circle one)
~~Field Sample~~ Soil 1 B-1 (0'-1') Rest / P.C.B.

Physical Appearance and Odor Fine, Brown sandy silt w/ brick, glass, metal
& clinkers

Refrigerate: Date 10/12/88 Time _____

Field Tests:

Temperature (C°/F°) _____
pH _____
Spec. Conduc (umhos/cm) _____

Weather _____

Comments Soil Sample, composite from D'-1'

FIGURE 6.4
FIELD SURFACE SAMPLING RECORD

B2.18

Site Buffalo Pump NYSDEC Site No. _____ Date: 1/11/88

Samplers: Wm Lilley of Engineering Science
Mike Legare of Rockate Drilling

SAMPLING: Time 3:20 a.m.
X p.m.

Sample Type: Soil and waste

Sampling Method: Split Spoon

Depth of Sample: 0-7'

Description of Sampling Point:

Drainage Direction: _____

Upstream From: _____

Downstream From: _____

Physical Appearance/Odor: Black sand and gray clayey silt
Strange waste decomposition odor

Wildlife Observed: none

Sampling Description:

Suspended Matter: _____

Color/Stain: Black

Odor: strange decomposition waste

Other: _____

Texture: sand & clay

Analyze for: Tex, metals and Organics

Refrigerated: _____

Date: 1/11/88 Time a.m.
6:30 p.m.

Field Tests:

Temperature (C°/F) _____ Weather Fair

pH _____

Conductivity _____

Comments: Clay layers mixed in waste and water table
at five feet.

FIGURE 6.1.
FIELD SAMPLING RECORD

Buffalo Pumps Site No. 57012-18 Date: 10-12-88
 Well Soil boring B-2
 Drillers: Mark Channing of ES
Bill Bradford of ES

Initial Static Water Level.
 (from top of well protective casing)

Location:
 Pumping: Submersible _____ Centrifugal _____ 2" Casing: _____ ft. of water x .16 = _____ gals.
 Airlift _____ Positive Displacement _____ 3" Casing: _____ ft. of water x .36 = _____ gals.
 Bailed _____ Times 4" Casing: _____ ft. of water x .65 = _____ gals.

Depth to Intake from top of protective well casing _____
 Volume of Water removed _____ Gals. (> 3 Well Volumes)

Sampling: Time 15:40 _____ A.M.
 _____ P.M.

Sander
 Bailer Type: Stainless Steel bucket auger _____
 Teflon _____
 From Pos. Dis. Pump Discharge Tube _____
 Other _____

No. of Bottles Filled	I.D. No.	Analyses
--------------------------	----------	----------

Trip Blank			
Field Blank - Wash/Atmospheric. (circle one)			
<u>Soil</u> Sample	<u>1</u>	<u>B-2 (0'-3.5') post/PCB</u>	
Visual Appearance and Odor <u>clay silt (0-2'), gravelly + sandy silt (2'-3')</u> <u>sandy fill (3-3.5') - all fill - rocky throughout</u> <u>no particular odor</u>			

Refrigerate: Date 10/12/88 Time _____

Field Tests:
 Temperature (C°/F°) _____
 pH _____
 Spec. Conduc (umhos/cm) _____

Weather _____

Comments Soil sample, composite taken from B-2
Refusal @ 3.5'

✓

FIGURE 6.4
FIELD SURFACE SAMPLING RECORD

B-3.18

Site Buffalo Pump NYSDEC Site No. _____ Date: 1/10/58

Samplers: W. Litley of Engineering Science
Mike Lagana of Reclamation Drilling

SAMPLING: Time 4:00 _____ a.m.
X p.m.

Sample Type: Soil & Waste

Sampling Method: Split Spoon

Depth of Sample: 0 - 4

Description of Sampling Point:
Drainage Direction: _____

Upstream From: _____

Downstream From: _____

Physical Appearance/Odor: Black to brown metallic
sand and fine gravel

Wildlife Observed: none

Sampling Description:
Suspended Matter: _____

Color/Stain: Black

Odor: none

Other: _____

Texture: Sandy fine gravel

Analyze for: Tox, metals, Organic

Refrigerated: _____ Date: 1/11/58 Time _____ a.m.
6:30 p.m.

Field Tests:
Temperature (C°/F°) _____ Weather Fair
pH _____
Conductivity _____

Comments: Appears to be metal waste behind plant

FIGURE 6.1.
FIELD SAMPLING RECORD

to Buffalo Pumps Site No. SY012.18 Date: 10-12-88
~~Well~~ Soil boring B-3
 by: Mark Chaurin of ES
Bill Bradford of ES

Static Water Level.
 (from top of well protective casing)

Location: _____ Well Volume Calculation:
 Pumping: Submersible _____ Centrifugal _____ 2nd Casing: _____ ft. of water x .16 = _____ gals.
 Airlift _____ Positive Displacement _____ 3rd Casing: _____ ft. of water x .36 = _____ gals.
 Bailed _____ Times 4th Casing: _____ ft. of water x .65 = _____ gals.

Depth to Intake from top of protective well casing _____
 Volume of Water removed _____ Gals. (> 3 Well Volumes)

Sampling: Time 15:40 _____ a.m.
 _____ p.m.

Sampler
 Sucker Type: Stainless Steel bucket auger _____
Teflon _____
From Pos. Dis. Pump Discharge Tube _____
Other _____

	No. of Bottles Filled	I.D. No.	Analyses
Blank			
Field Blank - Wash/Atmospheric. (circle one)			
Ground-water Sample	<u>2</u>	<u>B-3 (0'-4')</u>	<u>Pest/PCB</u>
Soil		<u>B-3 MS & MSD</u>	

Local Appearance and Odor Fill, brown, black tan course to fine gravel + silt
with brick, cinders, pieces of wood; water encountered
at 2 1/2 feet; No odor

Operator: Date 10/14/88 Time _____

Field Tests:
 Temperature (C°/F°) _____
 pH _____
 Spec. Conduc (umhos/cm) _____

Other _____

Comments Soil sample, composite from B-3
Taken from area approx 30' south of large
above ground storage tank in rear of building.

✓

FIELD SAMPLING RECORD

Site Buffalo Pumps NYSDEC Site No. 932044 Date: 5/12/88
 Well G6-1-18

Samplers: David Cameron of Engineering-Science
Clark Townsend of Engineering-Science

Initial Static Water Level. 5.30' TD=10'
 (from top of well PVC casing)

Evacuation: 65' Well Volume Calculation:
 Using: Submersible _____ Centrifugal _____ 2" Casing: 4.7 ft. of water x .16 = 1.04 gals.
 Airlift _____ Positive Displacement _____ 3" Casing: _____ ft. of water x .36 = _____ gals.
 Bailed ☒ 12 Times 4" Casing: _____ ft. of water x .65 = _____ gals.

Depth to Intake from top of protective well casing _____
 Volume of Water removed 3.12 Gals. (> 3 Well Volumes)

Sampling: Time 1550 _____ a.m.
 _____ p.m.

Bailer Type: Stainless Steel _____
 Teflon ☒ 3 feet
 From Pos. Dis. Pump Discharge Tube _____
 Other _____

	No. of Bottles Filled	I.D. No.	Analyses
Trip Blank	_____	_____	_____
Field Blank ~~Not~~ Atmospheric. (circle one)	<u>0</u>	_____	_____
Ground-water Sample	<u>6</u>	<u>G6-1-18</u>	<u>see label</u>

Physical Appearance and Odor _____

Refrigerate: Date 1/1/1 Time _____

Field Tests:
 Temperature (C°/F°) 6.1 _____
 pH 6.95 _____
 Spec. Conduc (umhos/cm) 1810 µs _____

Weather partly cloudy, 15°F

Comments Analyses: volatiles; semivolatiles; Pest, PCB's; Tox, metals

FIGURE 6.1
FIELD SAMPLING RECORD

Site BUFFALO PUMPS Site No. 54012.18 Date: 10/12/88
Well GW-1

Samplers: MARK CHAUVIN of ES
BILL BRADFORD of ES

Initial Static Water Level: 5.60' Top of PVC casing
(from top of well protective casing) Total Depth = 11.20'

EQUIPMENT:

Using: Submersible ☐ Centrifugal ☐
Airlift ☐ Positive Displacement ☐
Balled ☒ Times ☐

Well Volume Calculation:

2" Casing: 5.6 ft. of water x .16 = .90 gals.
3" Casing: ft. of water x .36 = gals.
4" Casing: ft. of water x .65 = gals.

.90 x 3 = 2.70 gal (3 volumes)

Depth to Intake from top of protective well casing
Volume of Water removed Gals. (> 3 Well Volumes)

Sampling: Time 1355 a.m.
X p.m.

Ballor Type: Stainless Steel
Teflon X
From Pos. Dis. Pump Discharge Tube
Other

No. of Bottles
Filled

I.D. No.

Analyses

Trip Blank	<u> </u>	<u> </u>	<u> </u>
Field Blank - Wash/Atmospheric. (circle one)	<u> </u>	<u> </u>	<u> </u>
Ground-water Sample	<u>4</u>	<u>GW-1</u>	<u>Pest/PCB/Ms/msd</u>

Physical Appearance and Odor Colorless, very slightly turbid, odorless

Refrigerate: Date Time

Field Tests:

Temperature (C°/F)
pH
Spec. Conduc (umhos/cm)

Weather Cool, Cloudy 40° wind from north at 0-5 mph

Comments

✓

FIELD SAMPLING RECORD

Site Buffalo Pumps NYSDEC Site No. 932044 Date: 1/27/88
Well GW-2-18

Samplers: David Cameron of Engineering Science
Clark Townsend of Engineering Science

Initial Static Water Level. 5.83' TD = 10'
(from top of well PVC casing)

Evacuation:

Using: Submersible _____ Centrifugal _____ 2" Casing: 6.27 ft. of water x .16 = 1.00 gals.
Airlift _____ Positive Displacement _____ 3" Casing: _____ ft. of water x .36 = _____ gals.
Bailed ✓ 8 11 Times 4" Casing: _____ ft. of water x .65 = _____ gals.

Depth to Intake from top of protective well casing _____
Volume of Water removed 2.0 Gals. (> 3 Well Volumes)

Sampling: 3.0 Time 1630 _____ a.m.
_____ p.m.

Bailer Type: Stainless Steel

Teflon

From Pos. Dis. Pump Discharge Tube

Other _____

No. of Bottles
Filled

I.D. No.

Analyses

Trip Blank

Field Blank - Wash Atmospheric. (circle one)

Ground-water Sample

6 GW-2-18 see below

Physical Appearance and Odor no odor - cloudy appearance

Refrigerate: Date 1/1/1 Time _____

Field Tests:

Temperature (C°/F°) 5.9

pH 7.08

Spec. Conduc (umhos/cm) 2.09 ms

Weather

partly cloudy ; 15°F

Comments

Analyses: volatiles; pest./PCB; semivolatiles; metals; TOX

FIGURE 6.1
FIELD SAMPLING RECORD

Site Buffalo Pumps Site No. 54012.18 Date: 10/12/83
Well GW-2

Samplers: Mark Chauvin of ES
Bill Bradford of ES

Initial Static Water Level. 8.49' TOPV
(from top of well protective casing) Total Depth = 11.81'

Equipment:

Using: Submersible ☐ Centrifugal ☐
Airlift ☐ Positive Displacement ☐
Bailed ☒ Times ☐

Well Volume Calculation:

2" Casing: 3.32 ft. of water x .16 = .53 gals.
3" Casing: ft. of water x .36 = gals.
4" Casing: ft. of water x .65 = gals.

Depth to Intake from top of protective well casing
Volume of Water removed 1 (Dry) Gals. (> 3 Well Volumes)

.53 x 3 = 1.59 gal (3 volumes)

Sampling: Time 1330 a.m.
X p.m.

Ballor Type: Stainless Steel
Teflon
From Pos. Dis. Pump Discharge Tube
Other

No. of Bottles Filled	I.D. No.	Analyses
<u>2</u>	<u>GW-2</u>	<u>Pest/PCB/</u>

Trip Blank
Field Blank - Wash/Atmospheric. (circle one)
Ground-water Sample

Physical Appearance and Odor Yellowish/Brown, turbid no odor

Refrigerate: Date Time

Field Tests:

Temperature (C°/°F)
pH
Spec. Conduc (umhos/cm)

Weather Cool, Partly Cloudy 40° wind 0-5 mph from north

Comments

✓

FIELD SAMPLING RECORD

Site Buffalo Pumps NYSDEC Site No. 932044 Date: 27.5.88
Well GW-3-18

Samplers: David Cameron of Engineering - Science
Clark Townsend of Engineering - Science

Initial Static Water Level. 3.98 TD = 10'
(from top of well PVC casing)

Evacuation:

Using: Submersible _____ Centrifugal _____ 2" Casing: 7.62 ft. of water x .16 = 1.2 gals.
Airlift _____ Positive Displacement _____ 3" Casing: _____ ft. of water x .36 = _____ gals.
Bailed X 13 Times 4" Casing: _____ ft. of water x .65 = _____ gals.

Depth to intake from top of protective well casing _____
Volume of Water removed 3.7 Gals. (> 3 Well Volumes)

Sampling: Time _____ X a.m.
_____ p.m.

Bailer Type: Stainless Steel _____
Teflon X
From Pos. Dis. Pump Discharge Tube _____
Other _____

No. of Bottles Filled I.D. No. Analyses

Trip Blank _____
Field Blank - Wash/Atmospheric. (circle one) _____
Ground-water Sample 6 GW-3-18 see below

Physical Appearance and Odor no odor, very cloudy

Refrigerate: Date 1/1/1 Time _____

Field Tests:

Temperature (C° ~~F~~) 5.5
pH 7.05
Spec. Conduc (umhos/cm) 1.38 MS

Weather Sunny 10°F

Comments Analyses: volatiles; semivolatiles; Pest, PCB's; Tox; Metals
Stickup = 1.6'
Paled dry.

FIGURE 6.1.
FIELD SAMPLING RECORD

Site Buffalo Pumps

Site No. 51012.18

Date: 10/12/84

Well GW-3

Samplers: Mark Chanvin
Bill Bradford

of ES
of ES

Initial Static Water Level. 5.46' TOPC

(from top of well protective casing)

Total Depth = 11.28'

Evacuation:

Using: Submersible _____ Centrifugal _____
Airlift _____ Positive Displacement _____
Bailed X _____ Times _____

Well Volume Calculation:

2" Casing: 5.82 ft. of water x .16 = .93 gals.
3" Casing: _____ ft. of water x .36 = _____ gals.
4" Casing: _____ ft. of water x .65 = _____ gals.

Depth to Intake from top of protective well casing _____

Volume of Water removed 2 Gals. (> 3 Well Volumes)

.93 x 3 = 2.79 gal (3 volumes)

Sampling:

Time 1330 hrs _____ A.M.
X P.M.

Bailer Type: Stainless Steel _____
Teflon X _____
From Pos. Dis. Pump Discharge Tube _____
Other _____

No. of Bottles
Filled

I.D. No.

Analyses

1p Blank
Field Blank - Wash/Atmospheric. (circle one)
Ground-water Sample

2 GW-3 Rest/PCB

Physical Appearance and Odor light yellowish/tan, slightly turbid, slight odor

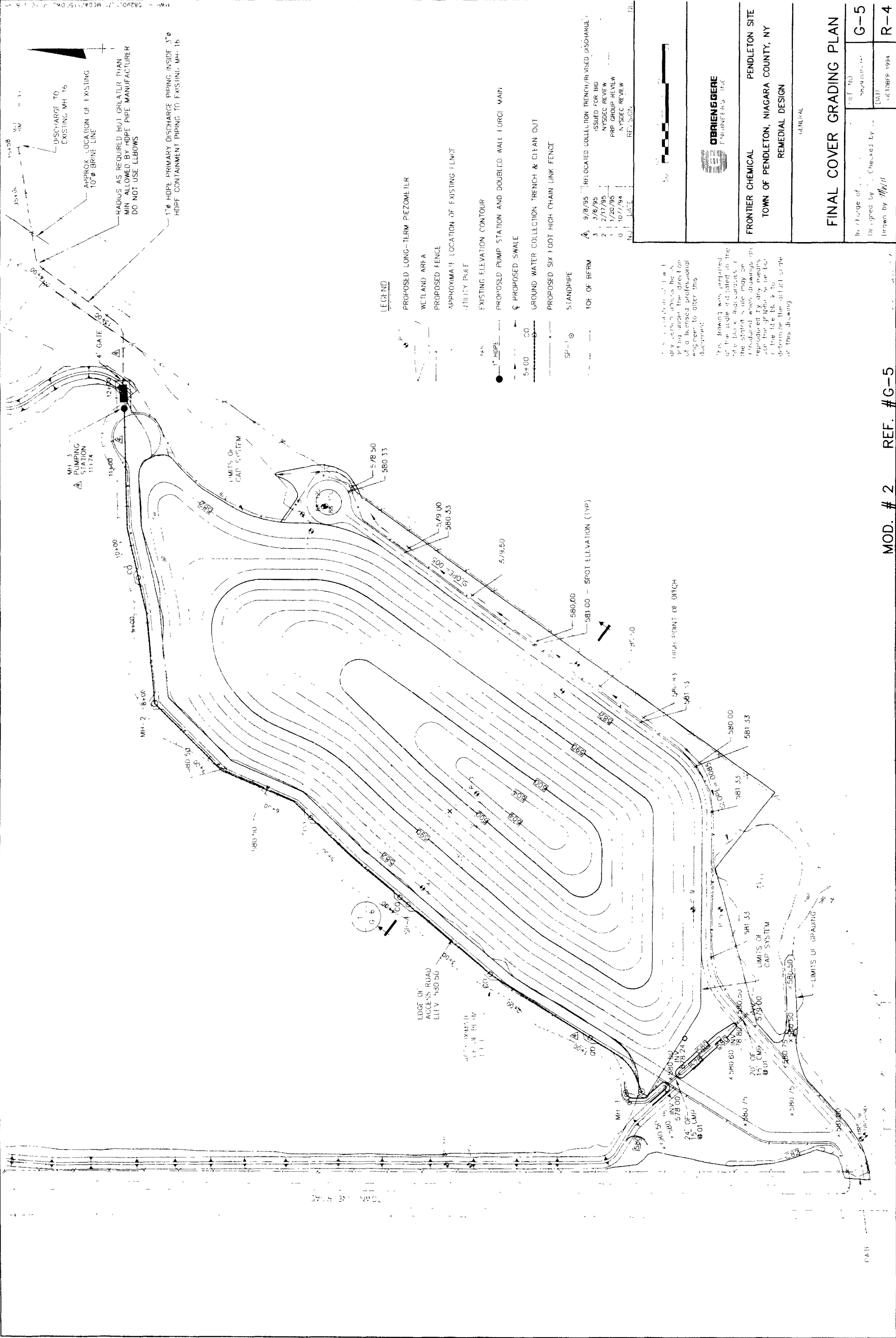
Refrigerate: Date _____ Time _____

Field Tests:

Temperature (C°/°F) _____
pH _____
Spec. Conduc (umhos/cm) _____

Weather Cool, Partly Cloudy 40° wind D-S mph from north

Comments _____



LEGEND

- PROPOSED LONG-TERM PIEZOMETER
- WETLAND AREA
- PROPOSED FENCE
- APPROXIMATE LOCATION OF EXISTING FENCE
- UTILITY POLE
- EXISTING ELEVATION CONTOUR
- PROPOSED PUMP STATION AND DOUBLED WALL FORCE MAIN
- GROUND WATER COLLECTION TRENCH & CLEAN OUT
- PROPOSED SIX FOOT HIGH CHAIN LINK FENCE
- STANDPIPE
- 10' OF BERM

1	9/8/95	RELOCATED COLLECTION TRENCH/REVISED DISCHARGE
2	3/6/95	ISSUED FOR BID
3	2/17/95	NYSDEC REVIEW
4	1/20/95	PRP GROUP REVIEW
5	10/1/94	NYSDEC REVIEW
6		REV. SIGN.

This drawing was prepared by a professional engineer and is not to be used for any other purpose without the written consent of the engineer.



FRONTIER CHEMICAL
TOWN OF PENDLETON, NIAGARA COUNTY, NY
REMEDIAL DESIGN

FINAL COVER GRADING PLAN		
Designed by	Checked by	DATE
Drawn by		