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Municipal Brownfields - B
Superfund - HW
Spills - SP
ERP - E
VCP - V
BCP - C

SUPPORTING DOCUMENTS FOR ENGINEERING INVESTIGATIONS AT INACTIVE HAZARDOUS WASTE SITES

Chemical Leaman Tank Lines Site No. 915014

City of Tonawanda Erie County

Prepared for:

New York State Department of Environmental Conservation

50 Wolf Road, Albany, New York 12233
Thomas C. Jorling, *Commissioner*

Division of Hazardous Waste Remediation
Michael J. O'Toole, Jr., *Director*

By:

Rust Environment & Infrastructure of New York, Inc.
in association with
TAMS CONSULTANTS, INC.

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March 1994

TABLE OF CONTENTS

Chapter **Page**

LIST OF FIGURES

LIST OF TABLES

APPENDICES

SUPPORTING DOCUMENTS

SECTION 1

References

LIST OF REFERENCES

A-1 Engineering-Science and Dames & Moore for NYSDEC. Phase I Investigation, Chemical Leaman Tank Lines, January 1986.

A-2 Federal Emergency Management Agency (FEMA). Flood Insurance Rate Map (FIRM), Town of Tonawanda (Panel 360260 0001-0009) revised November 12, 1982.

A-3 United States Department of Agriculture. Soil Survey of Erie County, New York, 1986.

A-4 Buehler, Edward, Jr., and Tesmer, Irving, H. eds. Geology of Erie County, New York. Buffalo, New York. Buffalo Society of Natural Sciences Bulletin: Volume 21, No. 3, 1963.

A-5 U.S. Geological Survey Topographic 7.5 Minute Quadrangle Maps, 1965, Buffalo, New York, northwest and Buffalo, New York, northeast; 1980 Tonawanda, New York, west and Tonawanda, New York, east.

A-6 La Sala, A.M., Groundwater Resources of the Erie-Niagara Basin, New York, 1986.

A-7 State of New York Official Compilation of Codes, Rules and Regulation, Department of State, Title 6C.

A-8 Settig, Marshall, Handbook of Toxic and Hazardous Chemicals and Carcinogens. Park Ridge, New Jersey: Noyles Publications, 1985.

A-9 Sax, N. Irving, eds. Dangerous Properties of Industrial Materials. New York, New York: Van Nostrand Reinhold Company, 1984.

A-10 New York State Department of Health, New York State Atlas of Community Water System Sources, 1982.

A-1

Engineering-Science and Dames & Moore for NYSDEC
Phase I Investigation
Chemical Leaman Tank Lines
January 1986

ENGINEERING INVESTIGATIONS AT INACTIVE HAZARDOUS WASTE SITES

PHASE I INVESTIGATION

Chemical Leaman — Site No. 915014

City of Tonawanda — Erie County

Date: January 1986

DEPARTMENT OF ENVIRONMENTAL CONSERVATION · NEW YORK STATE ·

Prepared for:

New York State Department of Environmental Conservation

50 Wolf Road, Albany, New York 12233
Henry G. Williams, *Commissioner*

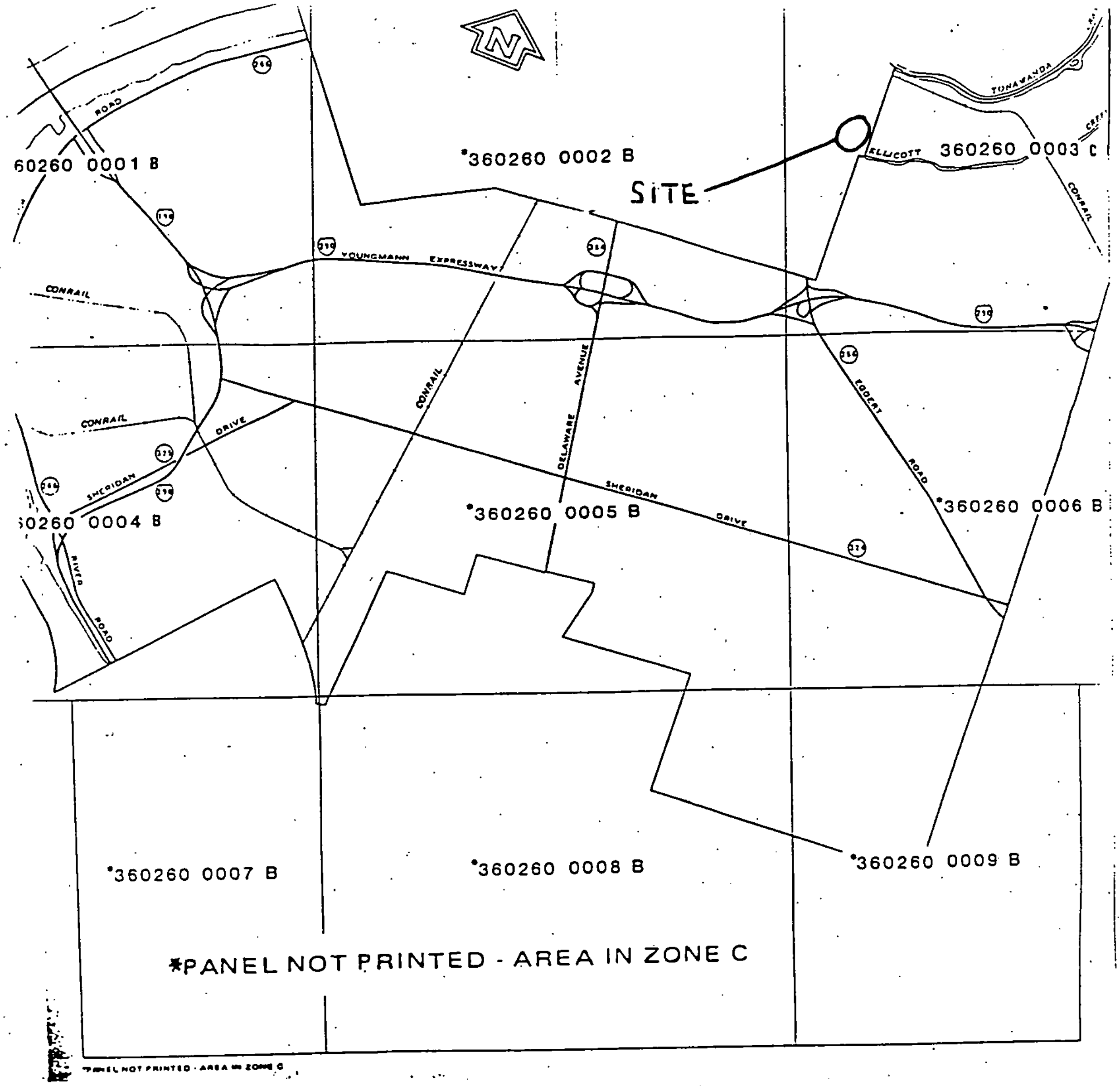
Division of Solid and Hazardous Waste
Norman H. Nosenchuck, P.E., *Director*

By:

ENGINEERING-SCIENCE
In Association With
DAMES & MOORE

A-2

Federal Emergency Management Agency (FEMA)
Flood Insurance Rate Map (FIRM)
Town of Tonawanda (Panel 360260 0001-0009)
revised November 12, 1982



NATIONAL FLOOD INSURANCE PROGRAM

FIRM
FLOOD INSURANCE RATE MAP

TOWN OF
TONAWANDA,
NEW YORK
ERIE COUNTY

PANELS: 1, 2, 3, 4, 5, 6, 7, 8, 9

MAP INDEX
PANEL PRINTED: 1, 3, 4

COMMUNITY-PANEL NUMBER
360260 0001- 0009

MAP REVISED:
NOVEMBER 12, 1982

Federal Emergency Management Agency

KEY TO MAP

	ZONE C
500-Year Flood Boundary	ZONE B
100-Year Flood Boundary	
Zone Designations* With Date of Identification e.g., 12/2/74	
100-Year Flood Boundary	ZONE B
500-Year Flood Boundary	ZONE C
Base Flood Elevation Line With Elevation In Feet**	513
Base Flood Elevation in Feet Where Uniform Within Zone**	(EL 987)
Elevation Reference Mark	RM7 x
River Mile	• M1.5

**Referenced to the National Geodetic Vertical Datum of 1929

*EXPLANATION OF ZONE DESIGNATIONS

ZONE	EXPLANATION
A	Areas of 100-year flood; base flood elevations and flood hazard factors not determined.
A0	Areas of 100-year shallow flooding where depths are between one (1) and three (3) feet; average depths of inundation are shown, but no flood hazard factors are determined.
AH	Areas of 100-year shallow flooding where depths are between one (1) and three (3) feet; base flood elevations are shown, but no flood hazard factors are determined.
A1-A30	Areas of 100-year flood; base flood elevations and flood hazard factors determined.
A99	Areas of 100-year flood to be protected by flood protection system under construction; base flood elevations and flood hazard factors not determined.
B	Areas between limits of the 100-year flood and 500-year flood; or certain areas subject to 100-year flooding with average depths less than one (1) foot or where the contributing drainage area is less than one square mile; or areas protected by levees from the base flood (Medium shading)
C	Areas of minimal flooding. (No shading)
D	Areas of undetermined, but possible, flood hazards.
V	Areas of 100-year coastal flood with velocity (wave action); base flood elevations and flood hazard factors not determined.
V1-V30	Areas of 100-year coastal flood with velocity (wave action); base flood elevations and flood hazard factors determined.

A-3

United States Department of Agriculture
Soil Survey of Erie County, New York, 1986

United States
Department of
Agriculture

Soil
Conservation
Service

In Cooperation with
the Cornell University
Agricultural
Experiment Station

Soil Survey of Erie County, New York


425 000 FEET
ERIE CANAL
NIAGARA
COUNTY
CONRAIL
190
265
SITE
CREEK
Uc
Ud
Us
Dp
Ge
Sw
Uv
Ug
Od
La
Cv

Cover crops and sod crops in the cropping system protect the surface from scour when flooding occurs. This nearly level soil is well suited to special crops that require irrigation and a stone-free plow layer.

This soil is also well suited to pasture and hay. Overgrazing can restrict plant growth and cause the loss of the pasture seeding. Proper stocking, rotation of pastures, yearly mowing, and deferment of grazing when the soil is wet are the main management concerns. Applications of lime are needed for optimum growth of pasture grasses.

The potential of this soil for wood crops is good. Only a small acreage is wooded. There are few limitations for timber production. Trees that require acid conditions do well on this soil.

Flooding is a serious limitation for most urban uses of this soil. Where the soil is used for septic tank absorption fields, pollution of the water supply can occur because of flooding and because the substratum is moderately to rapidly permeable. Some areas are well suited to recreational uses, such as athletic fields that require a gravel- and stone-free, nearly level site. This soil is an excellent source of topsoil.

This Tioga soil is in capability class I.

Uc—Udorthents, smoothed. These soils formed in deep manmade cuts or fills. Most of these areas are near industrial sites, urban developments, or construction sites. These soils consist of various kinds of excavated earthy material that has been stockpiled for use as fill or topdressing, soil and rock material that has been trucked from other areas and leveled, or soil deposits that are left in areas that have been excavated or deeply scalped. Fill material is variable in composition, but loamy, earthy material is dominant. In some places, the fill is mixed with slag or cinders around abandoned railroad yards. In other places, the earthy fill contains up to 10 percent concrete or asphalt and other trashy wastes.

This map unit is mainly nearly level or gently sloping. Some areas are steeper, particularly at the edge of cuts and along the sides of mounded fill. The areas are variable in shape, depending mostly on ownership boundaries. They range from 5 to 700 acres or more. The larger areas are in the city of Buffalo and adjacent suburbs near the larger industrial complexes.

Udorthents are too variable to have a typical profile, but in one of the more common profiles the surface layer is brown or grayish brown very gravelly loamy sand to silty clay loam 1 to 8 inches thick. The substratum is commonly light olive brown, brown, or dark yellowish brown and varies widely in texture from very gravelly loamy sand to silty clay.

Most areas are idle and support scattered weeds and grasses. A few areas have reverted to brush and tree saplings. Some areas, particularly around railroad yards, are used for urban development.

These Udorthents are mostly excessively drained to moderately well drained. Often the fill has been placed on very poorly drained to moderately well drained soils. Texture, stone content, soil reaction, and depth to bedrock vary considerably from one area to another. Bedrock, however, is usually at a depth of more than 5 feet. Depth to the seasonal high water table and permeability are variable and depend on topography, degree of compaction, soil texture, and other related factors.

These cut and fill areas are usually poorly suited to farm or recreational uses. Onsite investigation is essential to determine the feasibility of using areas for any purpose.

These Udorthents have not been assigned a capability subclass.

Ud—Urban land. This map unit is a miscellaneous area in which 80 percent or more of the soil surface is covered by asphalt, concrete, buildings, or other impervious structures. It includes parking lots, shopping and business centers, and industrial parks—in the cities of Buffalo and Lackawanna but also the business districts and adjacent shopping centers of villages in the suburban area near Buffalo. These areas generally range from 3 to 500 acres or more and are mostly nearly level to sloping.

Included in mapping are some landfills that have not been built upon or covered with asphalt. In many of these, several feet of fill has been placed over marshes and flood plains. The included areas range up to 3 acres.

It was not practical to examine and identify the soils underlying these impervious Urban land areas. Careful onsite investigation is necessary to determine the suitability and limitations of any abandoned areas for any proposed use. Some abandoned areas are suitable for asphalt-covered playgrounds or other recreation uses requiring a hard, impervious surface.

These Urban lands have not been assigned a capability subclass.

UeB—Urban land-Benson complex, 3 to 6 percent slopes. This complex is made up of gently sloping areas of Urban land and excessively drained and somewhat excessively drained Benson soils. Some areas of the Benson soils have been graded, scalped, or filled during urbanization. This complex is underlain by shallow limestone bedrock. These areas are generally about 5 to 100 acres. Slopes are long and gradual and are occasionally interrupted by ledges of rock outcrop.

A typical area of this complex is about 60 percent Urban land that is covered by concrete, asphalt, buildings, or other impervious surfaces; about 25 percent undisturbed Benson soils; and 15 percent other soils. Urban land and Benson soils occur together in such an and sidewalks, small yards, courtyards, areas between large buildings, and small traffic islands and circles. These undisturbed areas of Lima soils generally cover less than 1,000 square feet. Most building activity is on sites of demolished buildings.

Some of the undisturbed areas are subject to heavy foot traffic or are shaded by tall buildings. These areas are generally suited to lawns, shrubs, and vegetable gardens. A few of the larger areas are suited to parks or recreational uses. Onsite investigation is necessary to determine the suitability and limitations of this complex for any proposed use.

This Urban land-Lima complex has not been assigned a capability subclass.

Us—Urban land-Niagara complex. This complex consists of nearly level areas of Urban land and somewhat poorly drained Niagara soils. The Niagara soils formed in silty lake-laid deposits. This complex is on relatively flat landscapes in the city of Buffalo and its metropolitan area. Areas of this complex are 5 to over 800 acres and are oblong or irregular in shape. Slope ranges from 0 to 3 percent.

A typical area of this complex is about 60 percent Urban land that is mostly covered by concrete, asphalt, buildings, or other impervious surfaces; about 30 percent undisturbed Niagara soils; and 10 percent other soils.

Typically, these Niagara soils have a surface layer of dark brown silt loam about 11 inches thick. The subsoil extends to a depth of 27 inches. It is mottled, yellowish brown silt loam in the upper part and mottled, dark brown silt loam in the lower part. The substratum, to a depth of 60 inches, is mottled, dark brown silt loam and olive brown coarse silt, and it is very fine sand below 60 inches. In places the surface layer is loam or very fine sandy loam.

Included with this complex in mapping are areas of the deep, nearly level Raynham soils. Also included are Udorthents, smoothed, which are areas of deep fills or excavations. Areas of included soils are 1/4 acre to 3 acres.

The Niagara soils have a seasonal high water table in the upper part of the subsoil from December through May. Permeability of the Niagara soils is moderately slow, the available water capacity is high, and runoff is slow. There is generally no gravel, and bedrock is more than 5 feet deep. In unlimed areas, reaction ranges from strongly acid to neutral in the surface layer. Runoff is rapid from the relatively impermeable Urban land part of this complex.

The few areas of this Urban land-Niagara complex that are not built up include narrow plots between streets and sidewalks, small yards, courtyards, and small traffic islands and circles. These undisturbed areas are poorly suited to building because they are seasonally wet, have low strength, and generally cover less than 800 square feet. Many homes show signs of settling mainly because of low soil strength and frost heaving. Most building activity is on sites of demolished buildings.

Some of the undisturbed areas are subject to heavy foot traffic or are shaded by tall buildings. With subsurface drainage, these areas of Niagara soils produce better lawns, shrubs, and vegetable gardens. Because of seasonal wetness, most areas are not well suited to recreational uses. Onsite investigation is necessary to determine the suitability and limitations of this complex for any proposed use.

This Urban land-Niagara complex has not been assigned a capability subclass.

Ut—Urban land-Odessa complex. This complex consists of nearly level areas of Urban land and somewhat poorly drained Odessa soils. The Odessa soils formed in clayey lake-laid sediments. This complex is on relatively flat landscapes in the city of Buffalo and its metropolitan area. These areas are generally about 5 to 600 acres and are mostly irregular in shape. Slope ranges from 0 to 3 percent.

A typical area of this complex is about 60 percent Urban land that is mostly covered by concrete, asphalt, buildings, or other impervious surfaces; about 25 percent undisturbed Odessa soils; and 15 percent other soils. Urban land and Odessa soils occur together in such an intricate pattern that it was not practical to separate them in mapping.

Typically, these Odessa soils have a surface layer of very dark grayish brown silt loam about 9 inches thick. The subsoil extends to a depth of 22 inches. It is mottled, pinkish gray silty clay in the upper part and mottled, reddish brown silty clay in the lower part. The substratum to a depth of 60 inches is varved reddish brown, gray, reddish gray, and weak red silty clay. In places the surface layer is silty clay loam.

Included with this complex in mapping are small areas of the nearly level Rhinebeck and Lakemont soils. The Rhinebeck soils formed in gray color sediments, and the Lakemont soils are in a few depressions. Also included are Udorthents, smoothed, which are areas of deep fills or very deep cuts that have not been paved or built upon. Areas of included soils range up to 3 acres.

The Odessa soils have a perched seasonal high water table in the upper part of the subsoil from December through May. Permeability is slow or very slow in the Odessa soils. The available water capacity is moderate to high, and runoff is slow. Bedrock is at a depth of 5 feet or more. In most unlimed areas the surface layer is medium acid to neutral. Runoff is rapid from the relatively impermeable Urban land part of the complex.

This Urban land Odessa complex is not suited to farming because it is highly urbanized. The few areas of this complex that are not built up include narrow plots between streets and sidewalks, small yards, courtyards, and small traffic islands and circles. These undisturbed areas are poorly suited to building because they are

Included with this soil in mapping are small areas of the nearly level Galen soils and areas of the Minoa and Arkport soils. The somewhat poorly drained Minoa soils are in small depressions and in the bottom of narrow drainageways, and the well drained Arkport soils are on a few slight rises or knolls. In some areas, the loamy glacial till deposits are at a depth of more than 5 feet or less than 3-1/2 feet. Areas of included soils range from 1/2 acre to 2 acres.

In the spring this Galen soil has a seasonal high water table in the lower part of the subsoil. Permeability is moderate in the subsoil and slow in the substratum. The available water capacity is moderate, and runoff is slow to medium. Depth to bedrock is more than 5 feet, and there are generally no small rock fragments except in the substratum. Reaction ranges from strongly acid to neutral in the surface layer and from medium acid to neutral in the subsoil.

This soil is suitable for farming and for some urban uses. Most of the acreage is cultivated, is in hay or pasture, or is wooded. Some areas are idle, and some are in urban development.

This Galen soil is suited to most cultivated crops and is well suited to hay or pasture. Temporary spring wetness can delay planting of some crops. Erosion is a hazard on long slopes and in intensively cultivated areas. Open ditches need vegetative cover to prevent water and wind erosion. Keeping tillage to a minimum, using cover crops, tilling on the contour, plowing at the proper soil moisture content, and including sod crops in the cropping system help promote good tilth, control erosion, increase organic matter content, and improve crop yields. Subsurface drainage of wet spots improves the use of many fields. Because of the slowly permeable substratum, this soil is more difficult to drain than the other Galen soils that do not have a glacial till substratum. If tilth and high fertility levels are maintained, this gravel-free soil is suited to most crops grown in the county, including some vegetable and fruit crops. Some crops need irrigation in dry periods; however, this soil is somewhat more difficult to irrigate than the nearly level Galen soil. Overgrazing and grazing when the soil is wet are the major concerns of pasture management because they can cause the loss of the pasture grasses.

The potential of this soil for wood crops is good. There are few limitations for managing woodland stands on this soil. Placing logging trails across the slope reduces the hazard of trail gullying or erosion.

The temporary seasonal wetness, slow permeability in the substratum, instability of cut banks, moderate risk of frost damage, and moderate seepage are limitations for some urban uses of this Galen soil. Some areas are suitable for recreational uses, such as campsites and picnic areas. During excavation, the subsoil exposed in cut banks is quite erosive and unstable, especially if the soil is wet. Revegetating disturbed areas as soon as possible helps eliminate these problems. Because this soil has a glacial till substratum, soil strength is somewhat better than in the other Galen soils.

This Galen soil is in capability subclass IIw.

Ge—Getzville silt loam. This level to nearly level soil is deep and poorly drained and very poorly drained. It is on lowland plains of former glacial lakes, mainly in the northern part of the county. This soil formed in silty deposits underlain by sandy sediments at a depth of 15 to 36 inches. Slope ranges from 0 to 3 percent. Areas of this soil are irregular in shape or are roughly elongated where they parallel major and minor streams. Individual areas range from 3 to 200 acres or more, but areas of 5 to 40 acres are most common.

Typically, this soil has a surface layer of dark grayish brown heavy silt loam about 8 inches thick. The subsoil extends to a depth of 24 inches. It is mottled, light brownish gray light silty clay loam in the upper part grading to silt loam in the lower part. The substratum to a depth of 60 inches or more is mottled, dark brown fine sand.

Included with this soil in mapping are small intermingled areas of the Swormville, Minoa, and Raynham soils. The Swormville soils are similar to this Getzville soil but are somewhat poorly drained and are on slightly higher benches. The Minoa soils have a high sand content. The Raynham soils are silty throughout the profile. Some areas have inclusions of the clayey Rhinebeck soils that have sandy deposits 40 inches or more below the surface. A few areas have a mucky surface layer. Areas of included soils range up to 3 acres.

This Getzville soil has a high water table at or near the surface from November through June. Permeability is moderate or moderately slow in the surface layer and subsoil and moderately rapid in the substratum. The available water capacity is moderate to high, and runoff is slow. There is usually no gravel in the surface layer and subsoil. Depth to bedrock is 5 feet or more. Reaction is strongly acid to neutral in the surface layer and medium acid to neutral in the subsoil.

The suitability of this soil for farm and urban uses is very limited by prolonged wetness. Most areas of this soil are in woodland, or they are idle. A few areas are used for pasture, and a few areas are drained and cultivated.

Because of prolonged wetness, this Getzville soil is poorly suited to cultivated crops, unless drained. Draining this soil can be difficult because of its low position on the landscape. Properly drained, this gravel-free soil is suited to many crops. Tilth and structure deteriorate if the soil is plowed when it is wet. In drained areas, keeping tillage to a minimum, using cover crops, incorporating crop residues into the soil, tilling at the proper soil moisture level, and including sod crops in the cropping system help maintain tilth, increase organic matter content, and insure optimum crop yields. Because of the sandy substratum, drains do not have to be closely spaced.

This soil is suited to pasture if it is partially drained. Proper stocking, rotating crops, yearly mowing, and restricting grazing when the soil is wet are the main management needs. Grazing when the soil is wet causes compaction and puddling of the soil and the trampling of pasture plants, which reduce plant growth and can lead to the loss of pasture seeding.

Because of prolonged wetness, the potential of this soil for wood crops is poor. Wetness is a serious problem for the use of equipment. It also increases seedling mortality and limits the rooting depth of trees, which can cause them to uproot during windstorms. Seedlings that can withstand wet conditions are best suited to this soil.

The prolonged high water table, low soil strength, tendency of sidewalls of excavations to cave or slump, and high risk of frost damage very seriously limit urban uses of this soil. Overcoming the prolonged wetness is very difficult in most areas. Rare ponding or flooding is an additional hazard in a few areas. This soil is suited to dugout ponds, and most sites quickly refill if the water is used for irrigation. Many areas have excellent suitability for wildlife marshes.

This Getzville soil is in capability subclass IVw.

Ha—Halsey silt loam. This nearly level soil is deep and very poorly drained. It formed in gravelly glacial outwash deposits. This soil is in circular depressions on outwash plains and in oblong areas along drainageways and seep areas. Slope ranges from 0 to 3 percent. Areas of this soil range from 5 to 50 acres or more.

Typically, this soil has a surface layer of very friable, black silt loam about 8 inches thick. The subsoil is 17 inches thick. It is mottled, grayish brown gravelly silt loam in the upper part and mottled, gray very gravelly sandy loam in the lower part. The substratum to a depth of 50 or more inches is loose, gray, stratified gravel and sand.

Included with this soil in mapping are a few areas of the slightly better drained Red Hook soils on few small, slightly higher rises. Also included are small areas where clayey deposits are at a depth of less than 40 inches. Included drainageways are indicated by special symbols on the soil map. Areas of included soils range from 1/4 acre to 2 acres.

This Halsey soil has a high water table at or near the surface from September through June. It mostly limits rooting to the upper 10 to 12 inches of soil. Some areas are susceptible to ponding in the spring. Permeability is moderate or moderately slow in the subsoil and rapid or moderately rapid in the substratum. The available water capacity is moderate to high but is somewhat dependent on rooting depth. Runoff is slow to ponded. The surface layer has a high organic matter content. In unlimed areas, reaction ranges from medium acid through neutral in the surface layer and subsoil.

This soil is poorly suited to farming because there are few available outlets for drainage. With adequate drainage, it is suitable for most crops grown in the county. This soil is poorly suited to most urban uses because of wetness. Most of the acreage is idle, or it is wooded or pastured.

Without artificial drainage, this Halsey soil is not suited to cultivated crops, but where drained, it is especially productive for certain vegetable crops and for cash crops. In most areas, outlets for drainage are difficult to locate because the soil is low on the landscape. Open ditches, surface drainage, land shaping, or some combination of these with tile drainage is needed for adequate drainage. If this soil is drained and cultivated, using cover crops, keeping tillage to a minimum, and returning crop residue to the soil help maintain high organic matter content and promote good tilth.

This soil has limited suitability for pasture. Pasture plants should be able to tolerate long periods of wetness and restricted rooting depth. Grazing when the soil is wet is the major concern of pasture management. If the pasture is grazed when the soil is wet, compaction occurs and growth is restricted, which can lead to the loss of the pasture seeding. Land shaping can improve many areas for more productive pasture.

The potential of this soil for wood crops is low. The prolonged high water table severely limits the use of equipment for planting seedlings and harvesting timber. It also causes high seedling mortality and restricts rooting depth, which can result in trees uprooting during windstorms.

The prolonged high water table that is at or near the surface most of the year is a very serious limitation for most urban uses of this soil. Seepage and high risk of frost damage are also limitations for some uses. Many areas are well suited to wetland wildlife habitat. Some areas are excellent sites for dugout ponds.

This Halsey soil is in capability subclass IVw.

Hm—Hamlin silt loam. This deep and nearly level soil is well drained. It formed in silty alluvial deposits on the higher parts of flood plains along major streams in the county. The areas are generally oblong, and they parallel adjacent streams and creeks. Slope ranges from 0 to 3 percent. Areas of this soil range from 3 to 100 acres, but areas of 5 to 50 acres are most common.

Typically, this soil has a surface layer of very dark grayish brown silt loam about 8 inches thick. The subsoil extends to a depth of 42 inches. It is dark grayish brown silt loam in the upper part and brown silt loam in the lower part. The substratum to a depth of 65 inches or more is dark grayish brown silt loam.

Included with this soil in mapping are small areas of the Teel, Tioga, and Wayland soils. The Teel soils are similar to this Hamlin soil but are moderately well drained

A-4

Buehler, Edward, Jr., and Tesmer, Irving, H. eds.
Geology of Erie County, New York. Buffalo, New York.
Buffalo Society of Natural Sciences Bulletin
Volume 21, No. 3, 1963

GEOLOGY

OF

ERIE COUNTY

New York

By

Edward J. Buehler

Professor of Geology
State University of New York at Buffalo

and

Irving H. Tesmer

Professor of Geology
State University College at Buffalo

BUFFALO SOCIETY OF NATURAL SCIENCES
BULLETIN

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Surficial Geology

PHYSIOGRAPHY

Both the altitude and relief of the land surface tend to increase from north to south. The lowest elevation is 565 feet above sea level at the northern tip of Grand Island and the highest, 1,945 feet above sea level, is in Sardinia township, southeastern Erie County. On the basis of physiography the county may be divided into three parts: the flat Lake Tonawanda plain in the north, followed by the Lake Erie plain, and the Allegheny plateau in the south.

The Onondaga escarpment is a conspicuous topographic feature. This north-facing cliff, formed by the outcropping northern edge of the resistant Onondaga Limestone and Upper Silurian dolostone, can be traced from Buffalo eastward through Akron. In Erie County it seldom exceeds 40 feet in height. Some of the streams which cross the escarpment form waterfalls, but many of the smaller streams disappear in fissures and caves and reappear on the plain to the north.

Between the Onondaga escarpment and the parallel Niagara escarpment to the north is the Lake Tonawanda plain, so named because in late Pleistocene time it was occupied by now extinct Lake Tonawanda. This plain actually is a shallow east-west trending trough, 10 to 15 miles in width, which is drained along its axis by Tonawanda Creek.

The Lake Erie plain, so called because it was covered by glacial lakes ancestral to the present Lake Erie, is an area 6 to 12 miles in width between the Onondaga escarpment and the hilly region to the south. This plain is smooth or gently rolling and rises in elevation toward its southern border where much of it is 900 to 1,000 feet above sea level.

The southern third of the county lies within the maturely dissected Allegheny plateau, the northern border of which is sometimes referred to as the Lake Erie or Portage escarpment. The hilly topography of this region appears to be largely the result of stream erosion for there are no appreciable folds or faults. Glacial erosion has modified the shape of some of the larger valleys and has produced a general rounding of the topography. The amount of glacial drift is commonly so great as to obscure the topography of the underlying bedrock.

which continue eastward. Prominent Warren beaches are displayed at Buffalo Creek near Bullis Road. Blackmon (1956) provides an excellent account of strand lines on the East Aurora quadrangle.

Lake Grassmere which stood at an elevation of 640 feet and Lake Lundy which stood at 620 feet extended into Erie County. The beaches of these lakes, however, are scattered and difficult to correlate. Lake Lundy existed approximately 10,000 years ago.

Lake Tonawanda

As glacial ice retreats it inevitably leaves a train of small lakes. These become extinct as their outlets cut low enough to drain them. One of the largest of these in western New York was Lake Tonawanda, described by Kindle and Taylor (1913, p. 19). This lake occupied much of the area in Niagara and Erie counties which lies between the Niagara and Onondaga escarpments. It was formed as the level of Lake Lundy dropped and it drained northward over the Niagara escarpment at Lewiston, Lockport, Gasport, Medina, and Holley. The lake extended eastward from the Niagara River for a distance of about 50 miles to Holley. It was about 8 miles wide in a north-south direction and the maximum depth is estimated as approximately 35 feet. The present Oak Orchard Swamp is regarded as a remnant.

The shore line of Lake Tonawanda was traced by D'Agostino (1958). In Erie County the southern shore extended from Tonawanda through Brighton Village to Ellicott Creek just north of the junction of Forest Road and Millersport Highway. It continued eastward 1 mile north of Clarence Center and approximately 2.5 miles north of Akron.

In southern Erie County, Cuthbert (1937) by studies of topography and sedimentation outlined Lake Zoar which occupied part of the valley of Cattaraugus Creek.

Glacial Pavement and Striae

Glacial pavement and glacial striations are preserved on several outcrops of the Onondaga Limestone. The best displays are in the Federal Crushed Stone Company quarry, Cheektowaga. No systematic study of the orientation of striae has been made in this area.

Detailed Stratigraphy and Paleontology

Silurian System

Upper Silurian (Cayugan) Series

SALINA GROUP

TYPE REFERENCE: Dana (1863, pp. 246-251).

TYPE LOCALITY: Vicinity of Syracuse, New York, formerly known as Salina.

TERMINOLOGY: Approximately the same as the "Onondaga salt group" of early writers. The Salina Group included three formations: the Vernon Shale (oldest), Syracuse Formation, and Camillus Shale. Only the Camillus is seen in western New York. See Fisher (1960).

AGE: Late Silurian (Cayugan).

THICKNESS: In western New York, the Salina Group is about 400 feet thick, but this unit increases considerably in thickness to the east.

LITHOLOGY: The Salina Group in Erie County is largely shale but considerable amounts of gypsum and anhydrite are also present.

PROMINENT OUTCROPS: Outcrops are rare in Erie County. The uppermost portion can be seen at the base of Akron Falls.

CONTACTS: The lower contact is not exposed near Erie County and the contact with the overlying Bertie Formation is difficult to define precisely.

ECONOMIC GEOLOGY: The Camillus Shale of the Salina Group is a source of gypsum and anhydrite in Erie County. To the east, the Salina Group also includes salt beds.

PALEONTOLOGY: No fossils have been reported from the Salina Group of Erie County.

CAMILLUS SHALE

TYPE REFERENCE: Clarke (1903, pp. 18-19).

TYPE LOCALITY: Village of Camillus, Onondaga County, New York; Baldwinsville quadrangle.

TERMINOLOGY: See Alling (1928) and Leutze (1954).

AGE AND CORRELATION: Late Silurian (Cayugan). Equivalent to lower part of Brayman Shale in eastern New York.

THICKNESS: Approximately 400 feet.

LITHOLOGY: The Camillus varies from thin-bedded shale to massive mudstone. The color is gray or brownish gray but some beds show a tinge of red or green. According to Alling (1928, pp. 24-26), the Camillus at the type locality is a massive gray magnesian-lime mudrock. Gypsum and anhydrite are present in Erie County.

It is probable that during much of Late Silurian time the northeastern United States was a desert basin. Salt and gypsum were precipitated by evaporation of the shrinking inland Salina Sea.

PROMINENT OUTCROPS: The Camillus Shale extends across Erie County in an east-west trending belt approximately six to eight miles wide. This belt is largely lowland in which outcrops are rare. The top of the formation is exposed at Akron Falls (pl. 6, upper). A small section can be seen in the valley of Murder Creek north of Akron. Houghton (1914, pp. 7-8), Luther (1906, p. 8) and others report outcrops on Grand Island but these could not be located.

CONTACTS: The lower contact of the Camillus Shale is not exposed near Erie County. The contact with the overlying Bertie Formation is difficult to define.

ECONOMIC GEOLOGY: The Camillus Shale is an important source of gypsum. National Gypsum Company has a mine at Clarence Center, Certain-Teed Company at Akron, and United States Gypsum Company at Oakfield in neighboring Genesee County.

PALEONTOLOGY: No fossils have been reported from the Camillus Shale of Erie County. Apparently animal life could not survive in the "dead sea" environment of the time.

BERTIE FORMATION

TYPE REFERENCE: Chapman (1864, p. 190).

TYPE LOCALITY: Bertie township, Welland County, Ontario, Canada.

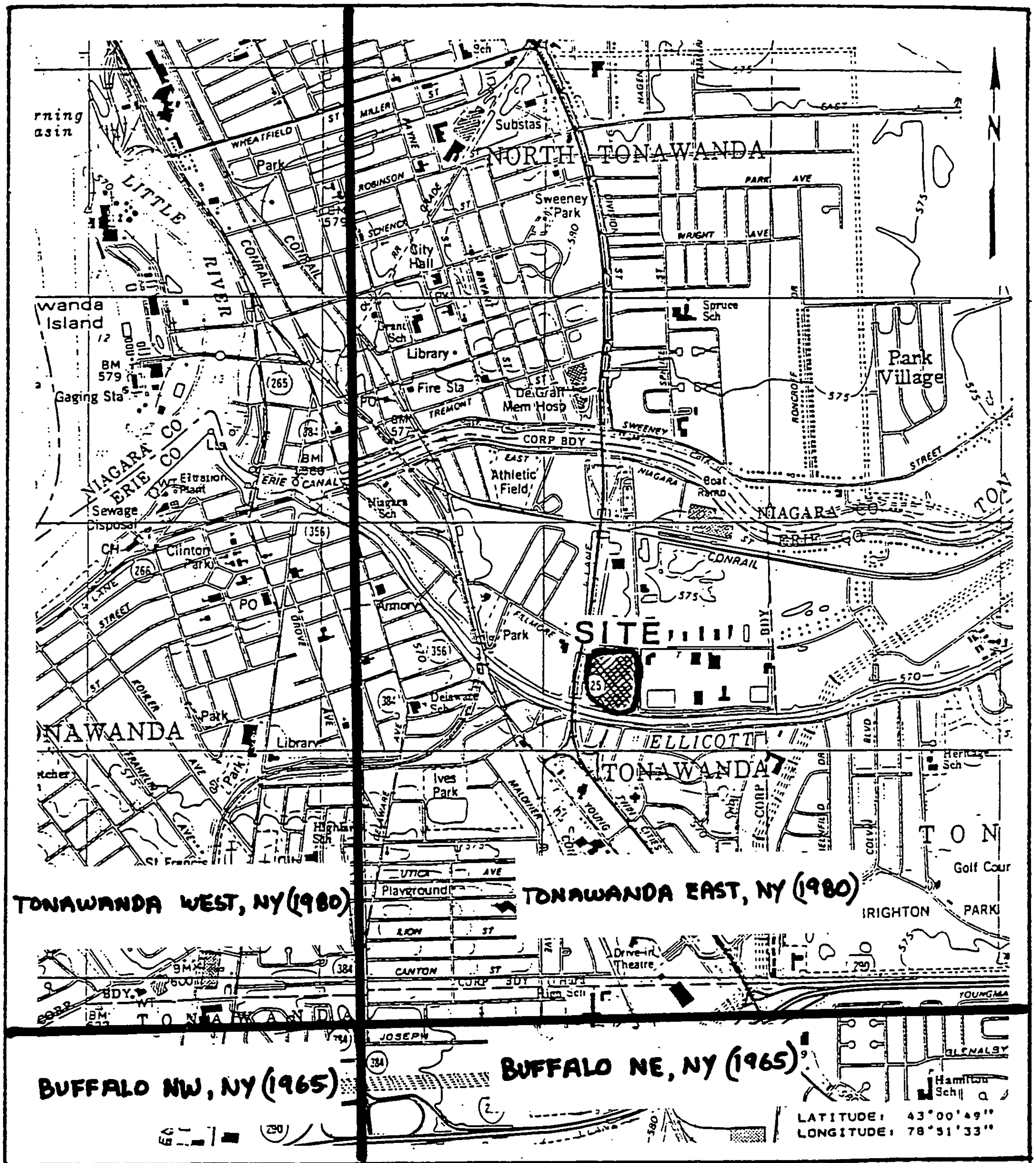
TERMINOLOGY: This unit is commonly called the Bertie Waterlime. Chadwick (1917) divided the Bertie into four units: the Oatka (oldest), Falkirk, Scajaquada, and Williamsville. The Williamsville Member was formerly called the "Buffalo cement bed" (see fig. 4).

AGE AND CORRELATION: Late Silurian (Cayugan). Equivalent to upper part of Brayman Shale in eastern New York.

THICKNESS: 50 - 60 feet total. Approximate figures for the members are Oatka 20 feet, Falkirk 20 feet, Scajaquada 8 feet, and Williamsville 6 feet.

A-5

**U.S. Geological Survey Topographic
7.5 Minute Quadrangle Maps, Buffalo, New York
northwest and Buffalo, New York, northeast, 1965
Tonawanda, New York, west and
Tonawanda, New York, east, 1980**



SCALE

0 1000 2000 3000 4000 FEET

REFERENCE: U.S.G.S 7.5' Topographic Map Tonawanda East, NY (1980), Tonawanda West, NY (1980), Buffalo NE, NY (1965) and Buffalo NW, NY-ONT. (1965) Quadrangles

FIGURE ES-1

SITE LOCATION MAP

CHEMICAL LEAMAN TANK LINES

A-6

LaSala, A.M., Groundwater Resources of the Erie-Niagara Basin New York, 1986

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

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

Many domestic-supply wells penetrate from 1 foot to a few feet into the soluble rocks and produce small but adequate yields. On the other hand, industrial wells that were intended to produce large supplies of water give a truer picture of the water-supply potential of the rocks. Data on industrial wells show that the Camillus Shale will yield as much as 1,200 gpm and the limestone unit as much as 300 gpm and probably more. But the data also show that the rocks produce low yields at places. This is shown by such wells as 301-848-1 which was drilled to obtain a large supply for an industry but which yielded only 30 gpm. The water-bearing zones obviously are unevenly distributed through the rocks. Factors that control the occurrence of the water-bearing zones cannot be evaluated at the present time to the extent necessary to predict exactly where the zones occur.

The Lockport Dolomite is the least productive unit of the soluble rocks. Within the Erie-Niagara basin yields of wells in the Lockport range from about 4 to 90 gpm. Depth of the wells range from 20 to 70 feet. Most of the deeper wells were drilled where the depth to bedrock is greatest. Domestic-supply wells generally are finished in the fracture zone at the rock surface or in a bedding joint within the uppermost 30 feet of the rock. It is usually not necessary to drill deeper into the Lockport if only a small supply is needed.

Drilling deeper in an attempt to intersect additional bedding-plane openings at depth would provide higher yields but, generally, at the expense of lower water levels and therefore higher pump lifts. Johnston (1964) collected data on a much larger number of wells along the outcrop belt of the Lockport Dolomite than were inventoried in the Erie-Niagara basin. He found that wells drawing water from the lower 40 feet of the Lockport (the northern part of the outcrop area) yield from 1/2 to 20 gpm and have an average yield of 7 gpm. Wells finished in the upper part of the Lockport (the southern part of the outcrop area) yield from 2 to 110 gpm and have an average yield of 31 gpm. Yields of as much as 50 or 100 gpm are possible from the Lockport in the Erie-Niagara basin but would be exceptional.

CAMILLUS SHALE

Bedding and lithology

The Camillus Shale lies above the Lockport Dolomite and crops out to the south of where the dolomite is exposed. Exposures of the Camillus Shale are rare in the Erie-Niagara basin because of the low relief of the outcrop area and the cover of glacial deposits. Geologists who have studied the Camillus in the study basin agree that it consists mostly of gray shale. (For example, see Buehler and Tesmer, 1963, p. 29-30.) Subsurface data, on the other hand, indicate that a considerable amount of gray limestone and dolomite is interbedded with the shale. Along with these carbonates, gypsum comprises a significant part of the Camillus Shale. Some of the gypsum beds are as much as 5 feet thick. Gypsum also occurs in the Camillus as thin lenses and veins. Table 1, which is a log compiled during construction of a mine slope, illustrates the occurrence of gypsum and the predominance of carbonate rocks in some parts of the Camillus.

Though the Camillus dips southward at approximately 40 feet to the mile, the dip is not uniform. Gypsum miners say the formation "rolls," to describe the gentle folding of its beds. The formation is marked by broad, low folds with amplitudes of a few feet and spacings of a few hundred feet between crests. The fold axes generally are east-west.

Water-bearing openings

The extensive beds of gypsum make the Camillus Shale unique among the shale formations of the basin. The importance of the gypsum lies in its solubility; gypsum is far more soluble than the enclosing rocks, whether shale, dolomite, or limestone. Where gypsum has been dissolved, openings exist for the passage and storage of water.

The effect of the solution of gypsum on the water-bearing properties of the Camillus Shale (and other rocks) can be readily appreciated. Where the topmost beds of the Camillus crop out at the base of the falls of Murder Creek at Akron, the Camillus seems to be an impermeable shale. If one judged the water-bearing properties of the Camillus on the basis of this outcrop alone, he would be wrong. Yields of water wells and drainage into gypsum mines prove that large volumes of water do move through the Camillus.

Clues to the nature of the water-bearing openings in the Camillus can be obtained by considering some of the circumstances where large volumes of water were obtained. About 1885, the Buffalo Cement Company located a 4-foot thick bed of gypsum only 43 feet below land surface by test drilling in Buffalo on Main Street near Williamsville. A shaft was sunk with the intention of beginning a subsurface mining operation, but when the gypsum was struck the shaft was flooded with ground water. The report is that "..... a pump with a capacity of 2,000 gallons per minute failed to make any impression upon it [the water] and the attempt was abandoned" (Newland and Leighton, 1920, 209-210).

In 1964, a gypsum mine near Clarence Center received an unexpected inflow of ground water. Several hundred gallons of water per minute continuously enters the mine at a place about midway down the entry slope. This water is pumped out by a drainage system diagrammatically shown in figure 6. Ordinarily, only small seeps occur in the remainder of the mine from roof bolts and small cracks in the roof. At a distance of more than a mile from the entry slope, the working face intersected an unplugged drill hole. Water poured into the mine at an alarming rate until the hole was plugged with much effort.

Large-yield wells, such as those at Tonawanda and North Tonawanda, obtain water from thin intervals of gypsum-bearing rock. The gypsum in the Camillus Shale obviously is related to the occurrence of large quantities of water. Gypsum is a highly soluble mineral and is

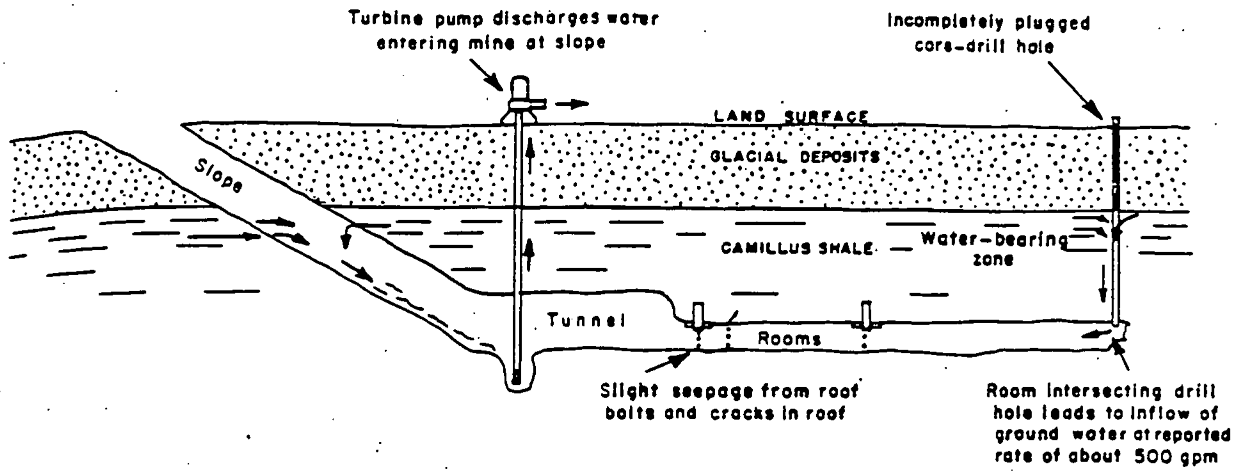


Figure 6.--Occurrence of ground water in the Camillus Shale at a gypsum mine near Clarence Center.

dissolved by circulating ground water faster than are the enclosing rocks. Very likely the openings in the Camillus that yield copious amounts of water were formed by the solution of gypsum by ground water. The water-bearing zones are mainly horizontal because most of the gypsum occurs in horizontal beds and thin zones of gypsiferous shale and dolomite. Only those gypsum zones actually exposed to circulating ground water can be widened by solution. The gypsum must be in contact with an open fracture through which the water can move. If no open fracture exists, the gypsum cannot be dissolved. The occurrence of ground water at the gypsum mine shown in figure 6 is a further illustration. The 4 1/2-foot thick bed that is mined at a depth of 66.9 feet (table 1) is dry because of the lack of vertical fractures to transmit water to it.

The solution-widened water-bearing zones occur at various depths and stratigraphic horizons in the Camillus. The existence of such zones is borne out by well data. For instance, wells 303-850-1 and -2 are 90 feet apart and obtain water from the same 2- to 3-foot thick zone at a depth of 67 to 68 feet. Such zones may be continuous for as much as 1 or 2 miles but information is not available on the extent of individual zones. The gypsum occurs principally in lenticular beds. The thicker beds may be 3 or 4 miles in lateral extent. The thinner beds can be expected to be much smaller in extent.

A zone of fracturing and solution extending several feet below the rock surface yields relatively small but sufficient water supplies for domestic use. This zone appears to be present throughout the area and is unrelated to stratigraphic position.

Hydrologic and hydraulic characteristics

The Camillus Shale forms a low topographic trough split down the axis by Tonawanda Creek. Ground water that enters the formation discharges mainly to the creek. Little water is discharged to the small, barely incised streams on the Camillus. These streams are dry much of the year.

Coefficients of transmissibility given in table 2 were computed for the Camillus Shale on the basis of specific capacities of wells penetrating a considerable thickness of the aquifer, by the method described by Walton (1962, p. 12-13).

Table 2.--Specific-capacity tests of wells finished in the Camillus Shale

Well number	Pumping rate (gpm)	Duration of pumping (hours) e: estimated	Drawdown (feet)	Specific capacity (gpm/ft)	Coefficient of transmissibility (gpd/ft)
a/ 258-853-1	1,090	e8	53	21	40,000
-2	90	--	22	4	7,000
258-855-1	500	e8	17	29	55,000
-2	1,000	e8	26	38	70,000
-3	1,500	e8	38	39	70,000
303-850-1	700	24	10	70	--
-2	660	e8	8	83	--

a/ Well also penetrates water-bearing zone in Lockport Dolomite.

The large specific capacities of wells 303-850-1 and -2 probably result in part from recharge induced from Sawyer Creek. Measurements of recovery of water levels in well 303-850-1 were made when well 303-850-2 was shut down after a year of continuous pumping. From these data, a coefficient of transmissibility of about 80,000 per foot and a coefficient of storage of 0.025 were computed. The computed transmissibility is about half the transmissibility that would have been indicated from specific capacity if recharge were not induced from Sawyer Creek.

Yields of wells

The Camillus Shale is by far the most productive bedrock aquifer in the area. Except in the vicinity of Buffalo and Tonawanda, where industrial wells produce from 300 to 1,200 gpm, no attempt has been made to obtain large supplies from the formation. However, the inflow of water to gypsum mines near Clarence Center and Akron indicate that large supplies are not necessarily restricted to the Buffalo and the Tonawanda area. Two examples of large flows of water encountered in gypsum mining have already been mentioned. Pumpage from gypsum mines near Clarence Center (including the mine mentioned previously) is substantial. The water pumped is discharged to Got Creek. On July 2, 1963, the creek had a flow of 2.1 mgd (million gallons per day) about half a mile downstream from the mines, that was due almost entirely to the pumpage. Water for industrial use is pumped from a flooded, abandoned gypsum mine at Akron. This pumpage, at a rate of 500 to 700 gpm, has had no appreciable effect on the water level in the mine.

Probably the larger solution openings are most common in discharge areas near Tonawanda Creek and its tributaries and near the Niagara River; the flow of ground water becomes concentrated as it approaches the streams to which it discharges. Other discharge areas, such as low-lying swampy areas and headwaters of small streams that have perennial flow, are likely places to drill wells.

LIMESTONE UNIT

Bedding and lithology

The term "limestone unit" in this report is applied to a sequence of limestone and dolomite overlying the Camillus Shale. The limestone unit includes the Bertie Limestone at the base, the Akron Dolomite, and the Onondaga Limestone at the top. The lithology and thickness of these units are shown in figure 7. The Bertie Limestone and the Akron Dolomite are Silurian in age and are separated from the overlying Onondaga Limestone of Devonian age by an unconformity or erosional contact.

The Bertie Limestone is mainly dolomite and dolomitic limestone but contains interbedded shale particularly in the thin-bedded lower part of the formation. The middle part is brown, massive dolomite, and the upper part is gray dolomite and shale whose beds are of variable thickness. The total thickness of the formation is about 55 feet (Buehler and Tesmer, 1963, p. 30-31).

The Akron Dolomite is composed of greenish-gray and buff dolomite beds varying from a few inches to about a foot in thickness. The upper contact of the Akron is erosional and is often marked by remnants of shallow stream channels. Thin lenses of sandy sediments lie in the bottoms of some channels. The thickness of the formation is generally between 7 and 9 feet (Buehler and Tesmer, 1963, p. 33-34).

Table 6.--Records of selected wells in the Erie-Niagara basin (Continued)

Well number	County	Owner	Year completed	Type of well	Depth of well (feet)	Diameter (inches)	Depth to bedrock (feet)	Water-bearing material	Altitude above sea level (feet)	Water level: Below land surface (feet)	Water level: Date	Method of lift	Estimated pumpage or flow (gallons per day)	Use	Remarks
258-815-1	Genesee	F. Peck	--	Drl	31	6	--	Shale	920	8.1	6-26-63	Sw	50	D	Anal; Iron; temp 49.0; yield 12 gpm (r).
258-822-1	do.	E. Lewis	1964	Drl	41.6	6	41.6	Sand	870	9.1	8-19-64	Sw	400	Ag	Anal; H_2S; yield 11 gpm (r).
258-827-1	do.	E. Powanski	1952	Drl	36.5	6	a34	Limestone	835	31.3	8-19-64	Jet	250	D	H_2S; yield 7 gpm (r).
258-833-1	Erie	B. Fields	1960	Drl	62.6	6	a13	do.	775	p22.7	8-18-64	Sub	300	D	Anal.
258-837-1	do.	R. Bowman	1956	Drl	76.2	6	a22	do.	740	19.4	8-18-64	Jet	300	D	Do.
258-843-1	do.	W. Voss	--	Drl	62	8	--	Camillus Shale	615	Flow	--	--	5,000	A	Anal; H_2S; temp 50.8, 8-14-64; flows about 5 gpm at LS.
258-853-1	do.	Linde Div., Union Carbide Corp.	1944	Drl	r375	8	87	Camillus Shale and Lockport Dolomite	600	r,p115	1944	Tur	--	U	H_2S; drilled to 130-ft depth in 1943 and deepened in 1944; "black" water entering from Lockport Dolomite after deepening made well unusable; yield 3,000 gpm (r); pumping test, 1,090 gpm, dd 53 ft.
-2	do.	do.	1944	Drl	r375	8	86	do.	600	r,p82	1944	Tur	--	U	H_2S; drilled to 157-ft depth in 1943 and deepened in 1944; water obtained at 90 ft from a gypsiferous zone in Camillus Shale and "black" water at 312 ft from the Lockport Dolomite which was first penetrated at 288 ft; yield from upper water-bearing zone 90 gpm, dd 22 ft; lower zone was not tested.
258-855-1	do.	Dunlop Tire & Rubber Co.	1943	Drl	r137	12	69	Camillus Shale	590	p36	10-27-52	Tur	--	I	H_2S; pumping rate 1,000 gpm (r); pumping test 500 gpm, swl 36 ft, dd 17 ft; this well and well 258-855-2 yield a combined total of 600,000 gpd.
-2	do.	do.	1943	Drl	r139.7	--	71	do.	590	p54.3	7-16-64	Tur	--	I	H_2S; pumping rate about 1,000 gpm (r); pumping test 1,000 gpm, swl 36 ft, dd 26 ft; this well and well 258-855-1 yield a combined total of 600,000 gpd.
-3	do.	do.	1952	Drl	r120	--	--	do.	592	p39	10-27-52	Tur	--	I	H_2S; pumping test 1,500 gpm, swl 39 ft, dd 38 ft.
259-809-1	Genesee	O-AT-KA Milk Products Cooperative, Inc.	1963	Drl	r60	20, 16	--	Sand and gravel	890	r15	4-27-62	Tur	1,000,000	I	Anal; screen, 13 1/8-inch diameter, 10 ft of 60-slot, 10 ft of 125-slot, from 40-60 ft; pumping rate about 1,200 gpm (r); pumping test 600 gpm, swl 15 ft, dd 1.5 ft (r).
-2	do.	City of Batavia	1963	Drl	r69	16	--	do.	890	14.0	5- 8-63	Tur	--	PS	Anal; H_2S; screen, 16-inch telescope, 125-slot, 52.9-69 ft; pumping rate 1,000 gpm.
-3	do.	do.	1962	Drl	54.1	8	--	do.	890	11.7	5- 6-63	--	--	T	Depth 61 ft (r); screen, 6-inch diameter, 100-slot, from 51-61 ft; pumping test 235 gpm, swl 18.3 ft, dd 0.5 ft (r); OW.
-4	do.	O-AT-KA Milk Products Cooperative, Inc.	1963	Drl	52.2	8	--	do.	890	p13.0	5- 7-63	--	--	T	
-5	do.	City of Batavia	1962	Drl	60.2	8	--	do.	890	13.7	5- 8-63	--	400,000	T	Depth 70 ft (r); screen, 6-inch diameter, 100-slot, from 60-70 ft; pumping test (r), 235-259 gpm, swl 18.5 ft, dd 0.5 ft after 24 hours discharge.
-6	do.	do.	1963	Drl	r75	16	--	do.	895	r14.2	5-27-63	Tur	--	PS	Screen, 16-inch diameter; test pumped at 1,000 gpm.
-7	do.	do.	1963	Drl	r60	8	--	do.	890	r13.7	2-15-62	--	400,000	X, T	H_2S (r); pumping test 200 gpm, swl 13.7 ft, dd 4.4 ft after 24 hours discharge.
259-817-1	do.	D. Beals	1960	Drl	r33	--	--	do.	865	r3	1960	Sw	100	D	Anal; H_2S; yield 4 gpm (r).
259-818-1	do.	Bitterman Bros., Inc.	--	Drl	18.3	12, 6	--	do.	--	6.6	9-17-63	Sw	--	C, D	
259-820-1	do.	A. Winters	1960	Drl	22.6	6	--	Limestone	880	7.4	9-17-63	Sw	500	C, D	
259-822-1	do.	J. Daley	1956	Drl	70	6	--	Sand	900	27.1	8-19-64	Jet	200	D	Anal; H_2S.

A-7

State of New York Official Compilation of Codes, Rules and Regulations Department of State, Title 6C

STATE OF NEW YORK

OFFICIAL COMPILATION

OF

CODES, RULES AND REGULATIONS

MARIO M. CUOMO
Governor

GAIL S. SHAFFER
Secretary of State

Published by
DEPARTMENT OF STATE
162 Washington Avenue
Albany, New York 12231

1/83

TABLE I (contd.)

Item No.	Waters Index Number	Name	Description	Map Ref. No.	Class	Standards
111	0-158-12-77-3 and trib. and 4 as shown on reference map	Tribs. of East Fork	Enter East Fork between Engine Creek, item no. 110, and source.	12	A	A(T)
112	0-158-12-78	Perry Brook	Enters Tonawanda Creek from south approximately 2.8 miles southwest of Johnsonburg.	12	A	A
113	0-185-12-79 and trib. and 80	Tribs. of Tonawanda Creek	Enter Tonawanda Creek between Perry Brook, item no. 112, and source.	12	A	A
114	0-158-13 and tribs. including P 22 as shown on reference map	Two Mile Creek	Enters Niagara River (East Channel) at Two Mile Creek Road in City of Tonawanda.	2,6	B	B
115	0-158-14 and tribs. as shown on reference map	Trib. of Niagara River	Enters Niagara River approximately opposite intersection of Ontario Street and Niagara Street, City of Buffalo.	6	D	D
116	0-158-15 portion as described including P 24 and P 25	Scajaquada Creek	Enters Niagara River approximately opposite intersection of Niagara Street and Tonawanda Street, City of Buffalo. Mouth to crossing of Main Street, City of Buffalo.	6	B	B

TABLE I (contd.)

Item No.	Waters Index Number	Name	Description	Map Ref. No.	Class	Standards
[illegible]	[illegible]	Scajaquada Creek	From crossing of Main Street, [illegible] to trib. 4 which	6	D	D

A-8

Settig, Marshall, Handbook of Toxic and Hazardous Chemicals and Carcinogens Park Ridge, New Jersey: Noyles Publications, 1985

Handbook of Toxic and Hazardous Chemicals and Carcinogens

Second Edition

Marshall Sittig

np

A-9

Sax, N. Irving, ed. Dangerous Properties of Industrial Materials. New York, New York Van Nostrand Reinhold Company, 1984

Dangerous Properties of Industrial Materials

Seventh Edition

Volume I

N. IRVING SAX

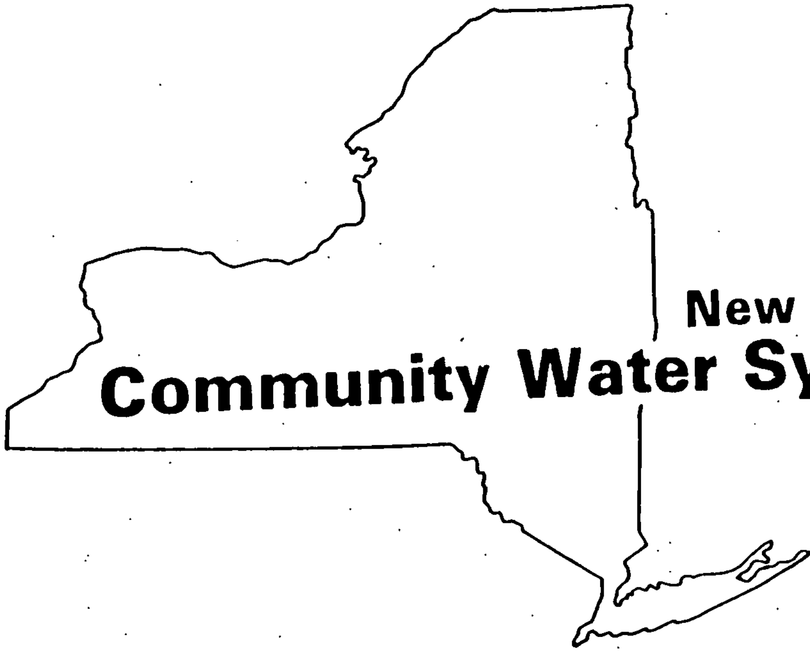
and

RICHARD J. LEWIS, SR.

VNR VAN NOSTRAND REINHOLD
NEW YORK

A-10

New York State Department of Health
New York State Atlas of
Community Water System Sources, 1982



New York State Atlas of

Community Water System Sources 1982

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

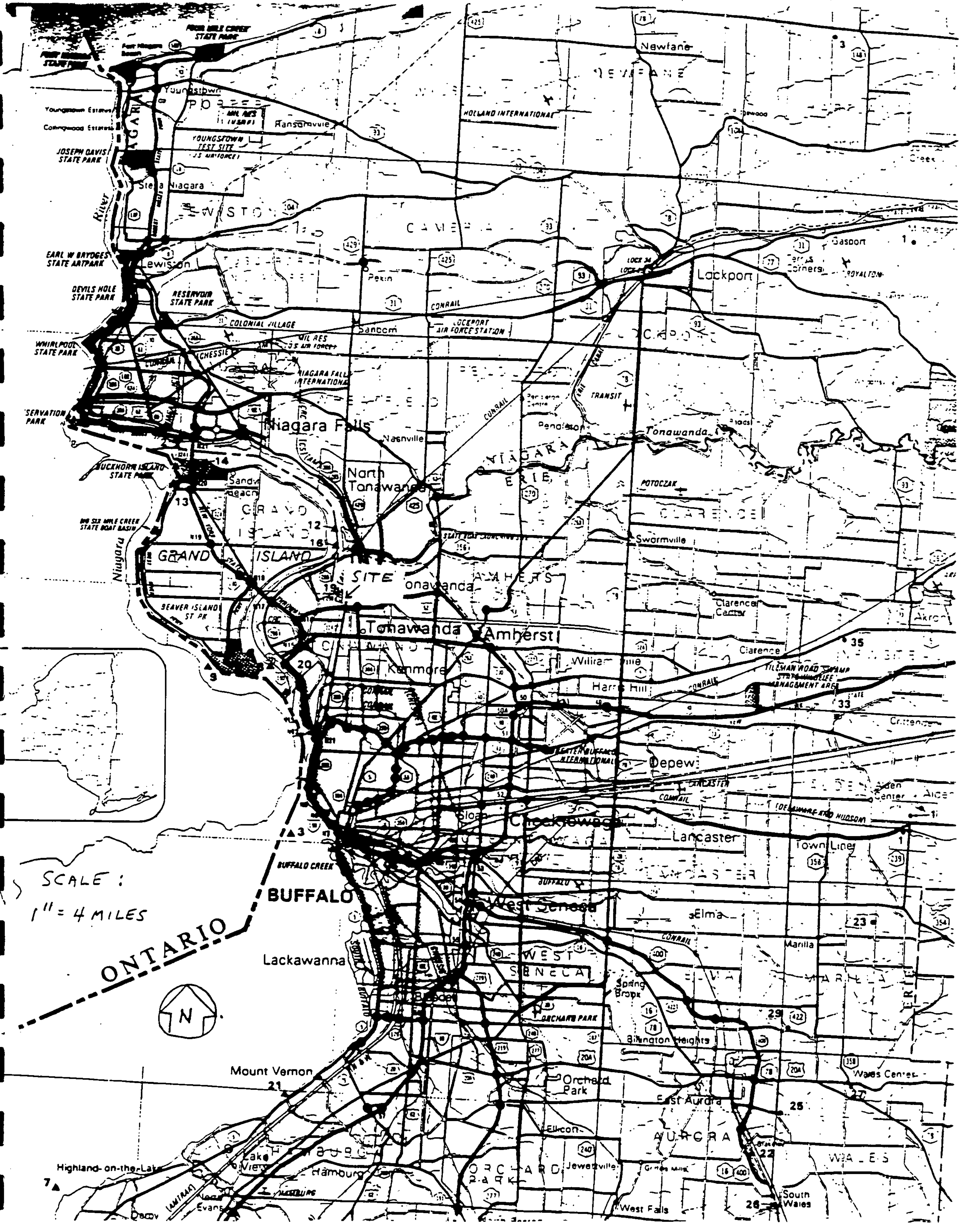
X = AFFECTED INTAKE

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	Caffee 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
X 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
X 16	North Tonawanda City (Niagara Co)		Niagara River - West Branch
17	Orchard Park Village	3671	Pipe Creek Reservoir
18	Springville Village	4169	Wells
X 19	Tonawanda City	18538	Niagara River - East Branch
20	Tonawanda Water District #1	91269	Niagara River
21	Wanakah Water Company	10750	Lake Erie
	Non-Municipal Community		
22	Aurora Mobile Park	125	Wells
23	Bush Gardens Mobile Home Park	270	Wells
24	Circle B Trailer Court	50	Wells
25	Circle Court Mobile Park	125	Wells
26	Creekside Mobile Home Park	120	Wells
27	Donnelly's Mobile Home Court	99	Wells
28	Gowanda State Hospital	NA	Clear Lake
29	Hillside Estates	160	Wells
30	Hunters Creek Mobile Home Park	150	Wells
31	Knox Apartments	NA	Wells
32	Maple Grove Trailer Court	72	Wells
33	Millgrove Mobile Park	100	Wells
34	Perkins Trailer Park	75	Wells
35	Quarry Hill Estates	400	Wells
36	Springville Mobile Park	114	Wells
37	Springwood Mobile Village	132	Wells
38	Taylors Grove Trailer Park	39	Wells
39	Valley View Mobile Court	42	Wells
40	Villager Apartments	NA	Wells

NIAGARA COUNTY

ID NO	COMMUNITY WATER SYSTEM
	Municipal Community
	Lockport City (See No 1:
1	Middleport Village. . .
	Niagara County Water Di (See No 13, Erie Co).
2	Niagara Falls City (See Erie Co). . . . . . .
	North Tonawanda City (S Erie Co). . . . . . .
	Non-Municipal Community
3	Country Estates Mobile



FOUR MILE CREEK STATE PARK
FORT NIAGARA STATE PARK
Youngstown
Youngstown Estates
Collingwood Estates
Ransomville
HOLLAND INTERNATIONAL
Newfane
NEWFANE
YOUNGSTOWN TEST SITE
JOSEPH DAVIS STATE PARK
Stella Niagara
LEWISTON
CAMBRIA
Gasport
ROYALTON
EARL W BRYDGES STATE ARTPARK
Lewiston
Pekin
Lockport
DEVILS HOLE STATE PARK
RESERVOIR STATE PARK
CONRAIL
COLONIAL VILLAGE
Sanborn
LOCKPORT AIR FORCE STATION
WHIRLPOOL STATE PARK
CHESSIE
NIAGARA FALLS INTERNATIONAL
LOCKPORT
TRANSIT
Pendleton
Niagara Falls
Nashville
Tonawanda
NIAGARA
ERIE
BUCKHORN ISLAND STATE PARK
Sandy Beach
North Tonawanda
POTOCZAK
GRAND ISLAND
CLARENCE
BEAVER ISLAND ST PK
SITE
Tonawanda
AMHERST
Swormville
Clarence Center
Akron
Amherst
Kenmore
Williamsville
Clarence
TILLMAN ROAD SWAMP STATE WILDLIFE MANAGEMENT AREA
Harris Hill
Crittenden
GREATER BUFFALO INTERNATIONAL
Depew
LANCASTER
Alden Center
DELAWARE AND HUDSON
Sloan
Cheektowaga
Lancaster
Town Line
BUFFALO CREEK
BUFFALO
West Seneca
Elma
SCALE: 1" = 4 MILES
ONTARIO
Marilla
Lackawanna
WEST SENECA
ELMA
MARILLA
Spring Brook
ORCHARD PARK
N
Billington Heights
Mount Vernon
Orchard Park
Wales Center
East Aurora
AURORA
Ellicott
WALES
Highland-on-the-Lake
Lake View
Hamburg
Jewettville
South Wales
West Falls
Evans
Decoy
AMTRAK

SECTION 2

Documents Cited

DOCUMENTS CITED

B-1 Groundwater Monitoring Analytical Results, 1981 and 1984.

B-2 Lagoon Sludges Analytical Results, 1980 and 1982.

B-3 Inspection Report, Erie County Department of Environment and Planning, March 1979.

B-4 Chemical Leaman Tank Lines Description of Operations, NYSDEC Phase I Report, 1986.

B-5 History of Waste Management at the Chemical Leaman Tank Lines Facility, NYSDEC Phase I Report, 1986.

B-6 List of Products Handled by Chemical Leaman Tank Lines Facility.

B-7 Interview with Former CLTL Site Manager, NYSDEC Phase I Report, 1986.

B-8 Analytical Results of Samples Collected During NUS FIT Inspection, conducted in May 1987.

B-9 Lagoon Closure Report, June 1990.

B-10 Summary Report Prepared by Glenn M. May, Region 9 NYSDEC, April 1990.

B-11 Area Population Figures, The Buffalo News, January 25, 1991.

B-12 Boring Logs CLTL Wells, August 1981.

B-13 Bedrock Depths at Two Sites Near CLTL.

B-14 Interview with Art Haller, CLTL.

B-15 Interview with Glenn May, NYSDEC, Region 9.

B-16 Letter from Greg G. Ecker, NYSDEC Region 9, Bureau of Wildlife.

B-17 Letter from James A. Rakitsky, CLTL, to Mark Mateunas, NYSDEC, Central.

B-1

Groundwater Monitoring Analytical Results
1981 and 1984

SAMPLING DATE ______ 1981
December 1981

DECEMBER 1981

PARAMETER	UP GRADIENT WELL #1	DOWN GRADIENT WELL #2	DOWN GRADIENT WELL #3	DOWN GRADIENT WELL #4	REMARKS
	B-1	B-2	B-3	B-4	
INDICATORS OF CONTAMINATION					
a. pH	7.59	7.49	7.17	- -	
	7.51				
	7.50				
	7.59				
avg.	7.52				
b. Specific Conductance µmhos/cm	1980	2230	1530	1110	
	1970				
	1970				
	1990				
avg.	1977.5				
c. Total Organic Carbon mg/l	73	79	51	19	
	66				
	61				
	41				
avg.	60.25				
d. Total Organic Halogen µg/l	<.5	<.5	<.5	<.5	
	<.5				
	<.5				
	<.5				
avg.	<.5				
INDICATORS OF QUALITY					
a. Chloride mg/l	350.	266	120	[illegible]	
b. Iron mg/l	42	28	34	7.4	
c. Phenols mg/l	.016	.020	.050	<.01	
d. Sodium mg/l	270	390	230	[illegible]	
e. Sulfate mg/l	590	320	160	266	
[illegible] mg/l	1.0	0.99	0.97	0.49	
SUITABILITY FOR DRINKING					
a. Metals					
(1) Arsenic mg/l	.014	.037	.016	<.01	
(2) Barium mg/l	.18	.12	.11	.12	
(3) Cadmium mg/l	<.01	<.01	<.01	<.01	
(4) Chromium mg/l	.06	.05	<.01	<.01	
(5) Lead mg/l	<.03	<.03	<.03	<.03	
(6) Mercury mg/l	<.004	<.004	<.004	<.004	
(7) Selenium mg/l	<.006	<.006	<.006	<.006	
(8) Silver mg/l	<.01	<.01	<.01	<.01	
b. Pesticides/Herbicides					
(1) Endrin µg/l	<.01	<.01	<.01	<.01	
(2) Lindane µg/l	<.01	<.01	<.01	<.01	
(3) Methoxychlor µg/l	<.02	<.02	<.02	<.02	
(4) Toxaphene µg/l	<.1	<.1	<.1	<.1	
(5) 2,4-D µg/l	<.1	.27	.18	<.1	
(6) 2,4,5-TP Silvex µg/l	<.05	<.05	<.05	<.05	
c. Other					
(1) Fluoride mg/l	.36	.44	.54	.24	
(2) Nitrate mg N/l	.11	<.1	.22	.12	
(3) Turbidity NTU	140	120	60	[illegible]	
(4) Coliform colonies/100 ml	3.6	<3	<3	23	
d. Radiation					
(1) Radium pCi/l	2.1±0.2	0.9±0.6	0.7±0.7	7.0±0.2	
(2) Gross Alpha pCi/l	<2	<2	<2	<2	

MARCH 1982

SAMPLING DATE ~~March~~ 1982 March

PARAMETER	UP GRADIENT WELL 1	DOWN GRADIENT WELL 2	DOWN GRADIENT WELL 3	DOWN GRADIENT WELL 4	REMARKS
INDICATORS OF CONTAMINATION					
a. pH	7.33	7.34	7.22	7.16	
	7.38				
	7.32				
	7.29				
avg.	7.33				
b. Specific Conductance µmhos/cm	1,820	2,140	1730	1090	
	1,860				
	1,870				
	1,800				
avg.	1,860				
c. Total Organic Carbon mg/l	40	46	54	16	
	35				
	35				
	40				
avg.	37.5				
d. Total Organic Halogen mg/l	<0.5	<0.5	<0.5	<0.5	
	<0.5				
	<0.5				
	<0.5				
avg.	<0.5				
INDICATORS OF QUALITY					
a. Chloride mg/l	330	260	160	32	
b. Iron	2.5	5.6	9.9	48	
c. Phenols	0.010	0.014	0.044	0.012	
d. Sodium	190	320	260	140	
e. Sulfate	240	210	160	220	
Manganese	2.0	0.09	0.63	13	
SUITABILITY FOR DRINKING					
a. Metals mg/l					
(1) Arsenic	<0.005	<0.005	<0.005	0.014	
(2) Barium	0.25	0.60	0.17	0.33	
(3) Cadmium	<0.01	<0.01	<0.01	<0.01	
(4) Chromium	<0.01	<0.01	<0.01	0.039	
(5) Lead	<0.03	<0.03	0.03	0.04	
(6) Mercury	<0.0008	<0.0008	<0.0008	<0.0008	
(7) Selenium	<0.005	<0.005	<0.005	<0.005	
(8) Silver	0.019	0.013	<0.005	<0.005	
b. Pesticides/Herbicides					
(1) Endrin mg/l	<0.01	<0.01	<0.01	<0.01	
(2) Lindane	<0.01	<0.01	<0.01	<0.01	
(3) Methoxychlor	<0.05	<0.05	<0.1	<0.05	
(4) Toxaphene	<0.1	<0.1	<0.2	<0.3	
(5) 2,4-D	<1	2	<1	<1	
(6) 2,4,5-TP Silvex	<0.5	1	<.5	<0.5	
c. Other					
(1) Fluoride mg/l	0.34	2.39	0.50	0.72	
(2) Nitrate	0.17	0.17	0.25	0.57	
(3) Turbidity NTU	50	37	50	560	
(4) Coliform #/100ml	<3	<3	<3	7	
d. Radiation					
(1) Radium	<2	<2	<2	<2	
(2) Gross Alpha	<2	<2	<2	<2	

MAY 1982

Sampling Date May 1982

PARAMETER	UP GRADIENT WELL 1	DOWN GRADIENT WELL 2	DOWN GRADIENT WELL 3	DOWN GRADIENT WELL 4	REMARKS
INDICATORS OF CONTAMINATION					
a. pH	7.28	7.38	7.28	7.34	
	7.27				
	7.26				
	7.28				
avg.	7.27				
b. Specific Conductance µmhos/cm	2,120	2,420	1,690	1150	
	2,150				
	2,150				
	2,160				
avg.	2,145				
c. Total Organic Carbon mg/l	32	79	72	19	
	29				
	26				
	29				
avg.	29				
d. Total Organic Halogen µg/l	<0.5	<0.5	<0.5	<0.5	
	<0.5				
	0.59				
	0.62				
avg.	<0.5				
INDICATORS OF QUALITY					
a. Chloride mg/l	360	320	160	47	
b. Iron mg/l	5.6	10	9.5	300	
c. Phenols mg/l	0.027	0.029	0.025	0.020	
d. Sodium mg/l	290	500	430	290	
e. Sulfate mg/l	230	110	78	200	
f. Manganese mg/l	1.2	0.22	0.65	1.5	
SUITABILITY FOR DRINKING					
a. Metals					
(1) Arsenic mg/l	<0.005	<0.005	<0.005	<0.005	—
(2) Barium mg/l	0.1	0.1	0.1	0.6	
(3) Cadmium mg/l	<0.01	<0.01	<0.01	<0.01	—
(4) Chromium mg/l	<0.01	0.038	<0.01	0.106	
(5) Lead mg/l	0.06	0.13	<0.03	0.05	
(6) Mercury mg/l	<0.0005	<0.0005	<0.0005	<0.0005	—
(7) Selenium mg/l	<0.005	<0.005	<0.005	<0.005	—
(8) Silver mg/l	<0.03	<0.03	<0.03	<0.03	—
b. Pesticides/Herbicides					
(1) Endrin µg/l	<0.02	<0.02	<0.02	<0.02	
(2) Lindane µg/l	<0.01	<0.01	<0.01	<0.01	
(3) Methoxychlor µg/l	<0.05	<0.05	<0.05	<0.05	
(4) Toxaphene µg/l	<0.1	<0.1	<0.1	<0.1	
(5) 2,4-D µg/l	<2	<10	<4	<3	
(6) 2,4,5-TP Silvex µg/l	<1	<5	<3	<1	
c. Other					
(1) Fluoride mg/l	0.29	0.55	0.79	0.27	
(2) Nitrate mg N/l	<0.05	0.05	<0.05	<0.05	
(3) Turbidity NTU	620	850	120	1,500	
(4) Coliform colonies/100 ml	<3	<3	<3	<3	
d. Radiation					
(1) Radium pCi/l	<2	<2	<2	<2	
(2) Gross Alpha pCi/l	30±17 *	43±36 *	<2	53±17 *	* [illegible]

SAMPLING DATE SEPT 1982

SEPTEMBER 1982

PARAMETER	UP GRADIENT WELL 1	DOWN GRADIENT WELL 2	DOWN GRADIENT WELL 3	DOWN GRADIENT WELL 4	REMARKS
1. INDICATORS OF CONTAMINATION					
a. pH	7.11	7.34	7.54	7.38	
Standard Units	7.13				
	7.11				
	7.10				
avg.	7.11				
b. Specific Conductance	2180	2990	[illegible]	1610	
µmhos/cm	2180				
	2160				
	2180				
avg.	2175				
c. Total Organic Carbon	28	72	[illegible]	<1	
mg/l	30				
	34				
	30				
avg.	30.50				
d. Total Organic Halogen	<0.5	<0.5	[illegible]	<0.5	
mg/l as Chloride, [illegible]	<0.5				
Standard	<0.5				
	<0.5				
avg.	<0.5				
2. INDICATORS OF QUALITY					
a. Chloride mg/l	350	320	310	77	
b. Iron mg/l	5.1	5.9	72	50	
c. Phenols mg/l	0.020	0.032	0.025	0.019	
d. Sodium mg/l	700	1,000	1500	730	
e. Sulfate mg/l	220	94	88	272	
f. Manganese mg/l	1.3	0.10	0.91	0.91	
3. SUITABILITY FOR DRINKING					
a. Metals					
(1) Arsenic mg/l	<0.004	<0.004	[illegible]	<0.004	
(2) Barium mg/l	1.8	1.8	1.2	1.4	
(3) Cadmium mg/l	<0.004	<0.004	[illegible]	<0.004	
(4) Chromium mg/l	<0.004	0.016	[illegible]	0.004	
(5) Lead mg/l	<0.005	<0.005	[illegible]	0.007	
(6) Mercury mg/l	<0.0005	<0.0005	[illegible]	<0.0005	
(7) Selenium mg/l	<0.005	<0.005	[illegible]	<0.005	
(8) Silver mg/l	<0.02	<0.02	[illegible]	<0.02	
b. Pesticides/Herbicides					
(1) Endrin µg/l	<0.01	<0.01	<0.01	<0.01	
(2) Lindane µg/l	<0.01	<0.01	<0.01	<0.01	
(3) Methoxychlor µg/l	<0.05	<0.05	<0.05	<0.05	
(4) Toxaphene µg/l	<0.1	<0.1	<0.1	<0.1	
(5) 2,4-D µg/l	<2	<4	<2	<1	
(6) 2,4,5-TP Silvex µg/l	<1	<2	<1	<0.5	
c. Other					
(1) Fluoride mg/l	0.30	0.45	99	0.31	
(2) Nitrate mg N/l	0.07	<0.05	<0.05	0.08	
(3) Turbidity NTU	83	52	45	57.0	
(4) Coliform colonies/100ml	<1	<1	<1	<1	
d. Radiation					
(1) Radium	<2	<2	<2	<2	
(2) Gross Alpha	<2	<2	<2	<2	

ANALYTICAL RESULTS

CHEMICAL LEAMAN TANK LINES, INC.

Report Date: 3/23/83
Date Received: 3/1/83

PARAMETER	UNITS OF MEASURE	SAMPLE IDENTIFICATION (DATE) W-1 (3/1/83)	W-2 (3/1/83)	W-3 (3/1/83)	W-4 (3/1/83)
pH	Standard Units	7.14	7.04	7.16	7.08
		7.15	7.08	7.17	7.10
		7.18	7.08	7.18	7.11
		7.19	7.09	7.19	7.13
Specific Conductance (25°C)	umhos/cm	1,730	2,110	1,690	990
		1,740	2,120	1,700	1,000
		1,750	2,130	1,710	1,000
		1,770	2,160	1,730	1,040
Total Organic Carbon	mg/l	49	63	57	21
		52	64	59	26
		66	86	79	29
		88	96	83	32
Halogenated Organic Scan (ECD)	µg/l as Chlorine; Lindane Standard	0.41	<0.2	<0.2	0.88
		0.43	<0.2	<0.2	1.1
		0.88	0.24	0.28	2.2
		1.3	0.32	0.98	3.1
Water Level	Feet from top of well casing	7.25	8.29	9.42	5.17

COMMENTS: Samples were collected by RECRA personnel on March 1, 1983. Analyses were performed according to U.S. Environmental Protection Agency methodologies where applicable.

Halogenated organic scan (ECD) results are used for screening purposes only and are not designed for qualification or quantification of any specific organic compound. Results are calculated based upon the response factor ar chlorine content of Lindane but do not imply either the presence or absenc Lindane itself. Halogenated organic scan results do not include volatile organic constituents.

The values reported as "less than" (<) indicate the working detection limi for the particular sample and/or parameter.

FOR RECRA ENVIRONMENTAL LABORATORIES ______________

DATE 3/23/83

RECRA ENVIRONMENTAL LABORATORIES

ANALYTICAL RESULTS

CHEMICAL LEAMAN TANK LINES, INC.

Report Date: 9/28/83
Date Received: 8/22/83

PARAMETER	UNITS OF MEASURE	SAMPLE IDENTIFICATION (DATE)			
		W-1 (8/22/83)	W-2 (8/22/83)	W-3 (8/22/83)	W-4 (8/22/83)
pH	Standard Units	7.10	7.20	7.52	7.16
		7.09	7.25	7.48	7.17
		7.14	7.21	7.49	7.21
		7.12	7.24	7.51	7.19
Specific Conductance (25°C)	µmhos/cm	1,700	2,400	2,230	1,520
		1,680	2,020	2,230	1,650
		1,900	2,330	2,250	1,500
		1,710	2,090	2,230	1,210
Total Organic Carbon	mg/l	51	60	68	47
		75	60	68	58
		78	74	68	46
		58	54	74	51
Halogenated Organic Scan (ECD)	µg/l as Chlorine; Lindane Standard	0.18	0.12	0.11	0.08
		0.25	0.15	0.14	0.09
		0.31	0.16	0.14	0.14
		0.31	0.26	0.19	0.15
Chloride	mg/l	303	300	200	55
Sulfate	mg/l	250	90	140	290
Total Recoverable Phenolics	mg/l	0.016	0.042	0.074	0.011
Total Iron	mg/l	7.1	4.2	12	23
Total Manganese	mg/l	9.0	0.03	0.27	0.61
Total Sodium	mg/l	490	640	710	490

COMMENTS: Samples were collected by Recra personnel on August 22, 1983. Analyses were p formed according to U.S. Environmental Protection Agency methodologies where applicable.

Halogenated Organic Scan (ECD) results are used for screening purposes only anc are not designed for qualification or quantification of any specific organic compound. Results are calculated based upon the response factor and chlorine content of Lindane but do not imply either the presence or absence of Lindane itself. Halogenated Organic Scan (ECD) results do not include volatile organi constituents.

Results of the analyses for specific organic compounds are based upon the matct of retention times, between samples and standards, on a single gas chromatogr column.

Values reported as "less than" (<) indicate the working detection limit for t particular sample or parameter.

FOR RECRA ENVIRONMENTAL LABORATORIES Deborah J. Francis

RECRA ENVIRONMENTAL LABORATORIES

ANALYTICAL RESULTS

CHEMICAL LEAMAN TANK LINES INC.

Report Date: 9/25/84
Date Received: 9/5/84

PARAMETER	UNITS OF MEASURE	SAMPLE IDENTIFICATION (DATE) W-1 (9/5/84)	W-2 (9/5/84)	W-3 (9/5/84)	W-4 (9/5/84)
pH	Standard Units	8.14			
		8.23			
		8.26			
		8.16	8.08	8.09	8.11
Specific Conductance (25°C)	mhos/cm	1,670			
		1,630			
		1,920			
		1,930	2,120	2,170	1,570
Total Organic Carbon	mg/l	36			
		33			
		32			
		28	69	91	26
Halogenated Organic Scan (ECD)	g/l as Chlorine; Lindane Standard	<0.5			
		<0.5			
		<0.5			
		<0.5	<0.5	<0.5	<0.5
Total Iron	mg/l	4.75	5.53	8.71	7.12
Total Manganese	mg/l	0.679	1.48	0.285	0.550
Total Sodium	mg/l	219	425	495	336
Chloride	mg/l	259	251	149	58
Sulfate	mg/l	170	205	151	285
Total Recoverable Phenolics	mg/l	0.033	0.024	0.038	0.010

COMMENTS: Samples were collected by Recra personnel on 9/15/84. Analyses were performed according to U.S. Environmental Protection Agency methodologies where applicable.

Halogenated Organic Scan (ECD) results are used for screening purposes only and are not designed for qualification or quantification of any specific organic compound. Results are calculated based upon the response factor and chlorine content of Lindane but do not imply either the presence or absence of Lindane itself. Halogenated Organic Scan (ECD) results do not include volatile organic constituents.

Values reported as "less than" (<) indicate the working detection limit for the particular sample or parameter.

FOR RECRA ENVIRONMENTAL LABORATORIES Deborah J. Maria

DATE 9/25/84

B-2

Lagoon Sludges Analytical Results
1980 and 1982

ANALYSIS FOR

EP TOXICITY METALS

CHEMICAL LEAMAN TANK LINES

by

ADVANCED ENVIRONMENTAL SYSTEMS, INC.

Prepared by ____________________
Robert C. Wojcik
Operations Manager

November 21, 1980

LABORATORY REPORT

SCOPE OF WORK

Analysis of one lagoon bottom sludge sample for the eight EP metals.

METHODOLOGY

Extraction of the sample will be performed in accordance with Federal Register, Vol. 45, No. 98, May 19, 1980; Section 261.30, Appendix II.

Analysis of extract for arsenic, barium, cadmium, chromium, lead, mercury, silver and selenium will be performed in accordance with "Methods for the Analysis of Water and Wastes," Environmental Monitoring and Support Laboratory, Office of Research and Development U.S. EPA, Cincinnati, Ohio; EPA 600/4-79-020, March 1979.

LABORATORY REPORT

RESULTS

Table 1

Results of EP Toxicity Test for Metals
(Expressed in micrograms per liter or ppb)

Metal	Concentration	Maximum Allowable
Arsenic	31.	5,000.
Barium	<500.	100,000.
Cadmium	<50.	1,000.
Chromium	250.	5,000.
Lead	<360.	5,000.
Mercury	<0.5	200.
Selenium	13.	1,000.
Silver	<50.	5,000.

LABORATORY REPORT

QUALITY ASSURANCE

Precision

All metals were assayed in triplicate. Agreement for all were within the 95% confidence limits of ±5% recommended by EPA.

Accuracy

Table 2

Analysis of EPA Test samples or Spiked Samples for Measurement of Accuracy

Metal	Type	Original	Added	Expected	Reported	Acceptable Range for 95% Confidence Limit
Arsenic	EPA	-	-	61.	61.	46. - 81.
Barium	Spike	<500.	2500.	2500-3000	2850.	1875. - 4000.
Cadmium	EPA	-	-	32.	27.	24. - 43.
Chromium	Spike	250.	2500.	2750.	2770.	2062. - 3667.
Lead	Spike	<360.	2500.	2500-2860	2600.	1875. - 3810.
Mercury	EPA	-	-	4.4	4.4	2.0 - 7.0
Selenium	EPA	-	-	37.5	43.5	28. - 50.
Silver	Spike	<500.	100.	100-600.	100.	75. - 800.

DISCUSSION

All concentrations are well below maximum allowable concentration of contaminants for characteristics of EP Toxicity.

Analysis of quality control data demonstrates that precision and accuracy falls within the 95% confidence limits recommended by the U.S. EPA, Environmental Monitoring and Support Laboratory.

BUFFALO DIVISION
3695 BROADWAY, BUFFALO, N.Y. 14227

ENVIRONMENTAL LABORATORY
ANALYTICAL RESULTS

stomer Chemical Leaman Tank Lines, Inc.

RO Laboratory Number 20,512W-5292 Customer P.O. # 042-4963

te: Collected 7/12/82 Received 7/12/82 Reported 7/27/82

mpling Point/Description Dewatered Sludge - Lagoon #1

he above referenced material has been classified as

x Non-hazardous ______ Hazardous

s a result of testing for the following characteristics according to the procedures and otocols in 40CFR261.

Ignitability:	____ ignitable	____ non-ignitable	x not tested
Corrosivity:	____ corrosive	____ non-corrosive	x not tested
Reactivity:	____ reactive	____ non-reactive	x not tested
EP Toxicity:	____ toxic	x non-toxic	____ not tested

Hazardous Constituents (per 40CFR 261; Appendix VII)

1. ____________ 2. ____________
3. ____________ 4. ____________

RESULTS OF EP TOXICITY TEST

ontaminant	Allowed (mg/L)	Found (mg/L)	Contaminant	Allowed (mg/L)	Found (mg
rsenic	5.0 ✓	< 0.001	Silver	5.0 ✓	< 0.001
arium	100.0 ✓	0.390	Endrin	0.02 ✓	< 0.00002
admium	1.0 ✓	0.004	Lindane	0.40 ✓	< 0.00001
hromium	5.0 ✓	0.038	Methoxychlor	10.0 ✓	< 0.00002
ead	5.0 ✓	0.063	Toxaphene	0.5 ✓	< 0.0005
ercury	0.2 ✓	< 0.0002	2,4-D	10.0 ✓	< 0.0001
elenium	1.0 ✓	< 0.001	2,4,5-TP	1.0 ✓	< 0.0001

The above characteristics have been determined in accordance with 40CFR 261 and the EPA manual Test Methods for the Evaluation of Solid Waste; SW-846, Revision A; August 8, 1980.

Initial pH (5% slurry) = 8.95

Bernard J. Gniazda, Director
Environmental Laboratory

orm No. G-03/81

B-3

Inspection Report, Erie County Department of Environment and Planning, March 1979

COUNTY OF ERIE
DEPARTMENT OF ENVIRONMENT & PLANNING
DIVISION OF ENVIRONMENTAL CONTROL

MEMORANDUM

FROM Ronald D. Koczaja DATE March 9, 1979

TO FILE

SUBJECT Chemical Leamon Tank Lines, Incorporated
740 Fillmore Avenue
Tonawanda, New York

The above referenced truck terminal facility was inspected by the writer on March 7, 1979. Mr. James Wegrzyn, Terminal Manager, was interviewed. The object of the inspection was to determine the method of contaminated waste washwater disposal. Mr. McMahon, DEC, requested this action following review of the company's Part 364, Haulers Permit. The terminal is not listed as an approved waste disposal site on the permit.

Chemical Leaman is primarily engaged in the transport of a pure product from supplier to customer. On occasion the firm will be contracted to carry a waste to a disposal or processing facility or it is necessary to dispose of a product which does not meet a customer's specifications and cannot be recycled. The truck terminal is not a disposal site for any wastes generated or carried by the firm and therefore does not require Part 360 registration or inclusion on the Part 364 permit. Mr. Wegrzyn also reported that the firm has been exempted by the DEC from displaying Part 364 registration numbers on the tankers. Wastes are disposed of either off-site or through the City of Tonawanda sewerage system.

During discussions with Mr. Wegrzyn, it was learned that during the summer and fall of 1978, the New York State DEC was an intimate party in negotiations to determine how and what wastes would be allowed into the sewerage system. As a result of these negotiations, Chemical Leamon received a permit to discharge into the sewerage system, was required to segregate certain wastes, and install a separate disposal system for toxic and hazardous wastes. A list of 65 toxic materials (Federal Register, Volume 43, June 26, 1978 Appendix B) was used to determine which chemicals should be excluded from the discharge to the sewerage system.

A brief summary of the terminal operation is as follows: Tankers which have made a delivery and are received at the terminal may require cleaning. The content of the tanker is checked and the small amount of material that remains in the tanker is drained into 55 gallon drums which are cataloged by chemical. The tankers are then washed. Wash waters contaminated with a chemical contained on the list of 65 are directed to two holding tanks. One holding tank stores

- continued -

heavy metals, the other holds the remaining chemicals on the list. The holding tanks are equipped with level sensors which will indicate when the tank is in need of pumping. The toxic chemical contaminated washwater is then carted to Newco by Chemical Leaman for disposal. One tanker has been specifically designated by the firm to carry its own waste. Washwater not contaminated by any of the 65 toxic chemicals is discharged to the sewerage system after passing through 3 settling ponds and receiving pH adjustment. Mr. Wegrzyn reported the ponds were originally lined with clay but from observation it appears that most of the clay had been removed during pond cleaning. The natural soil which remains appeared to be a loose sandy mixture. Oil is removed at the first pond and is vacuumed off approximately once a year. The chemicals which are drained into drums are carted away to Newco by an outside hauler when a suitable number, approximately 30, has been collected.

Due to company policy, the writer was unable to obtain copies of correspondence generated during the negotiations with the DEC. Mr. Speed has agreed to forward copies to this office. These documents will include a procedure sheet detailing the methods used at the terminal to adequately separate and dispose of the waste. The only suggestion the writer has to off lowing theinspection of the facility and verbal description of the operation is that the connections to the pond and holding tank piping systems be labeled to preclude an inadvertent discharge through the wrong system. This recommendations will be forwarded to Mr. Wegrzyn.

RDR/jk

cc: Mr. Campbell
Mr. Voell
Mr. McMahon, NYSDEC

B-4

Chemical Leaman Tank Lines
Description of Operations
NYSDEC Phase I Report, 1986

ATTACHMENT "A"

CHEMICAL LEAMAN TANK LINES, INC.
Tonawanda, New York Facility

OPERATING DESCRIPTION

Chemical Leaman Tank Lines, Inc. is a common carrier transporting bulk chemical commodities by tank truck. At this terminal, Chemical Leaman operates both a tractor/trailer maintenance shop and an internal/external cleaning facility for the washing of tank trailers. The intent of our company's service is to safely and efficiently deliver all of the productload transported and to manage all waste generated in an environmentally-safe manner.

In order to perform our "common carrier" services according to present regulations, we may transport both dry and liquid chemical commodities and chemical wastes. Some of these materials may be classified as hazardous or have constituents which may be classified as hazardous.

After delivery of the product, tank trailers return to the terminal facility to be cleaned and inspected. A specific form is prepared for each trailer to be cleaned indicating the chemical commodity transported and any special handling instructions. Cleaning personnel follow written Company procedures for cleaning of each chemical product.

Any material remaining in the trailer is removed by draining the product into 55 gallon drums. These drums are categorized according to chemical waste groups for compatibility and disposed off-site at permitted facilities in accordance with governmental regulatory authorities. After draining of all possible product is accomplished, the trailer is cleaned using one or more of the following processes, depending upon the product transported:

- Hot water flushing
- Cold water flushing
- Caustic cleaning solution
- Solvent cleaning compound
- High temperature steam
- Hot water rinse

Tank trailers which have contained non-hazardous materials are normally cleaned using a caustic solution followed by a hot water rinse. The caustic cleaning solution is applied to the tank interior by means of a recirculatory system. After multiple recycling of the caustic solution, this material is expended and disposed off-site at permitted facilities. The rinsewaters following the caustic wash are discharged to the wastewater treatment facility.

Most hazardous chemical products are cleaned by a water flush followed by steam. The flush water and expended steam condensate and any chemical residue remaining in the tank is discharged to the wastewater treatment facility or to a 55 gallon drum for off-site disposal at a permitted facility.

The wastewater treatment facility consists of three ponds and a concrete holding tank in series. The ponds provide settling and natural aeration. The concrete holding tank is where pH adjustment, if needed, occurs. The effluent from the tank is pumped to a concrete manhole which eventually drains by gravity to city sewer system. In addition, two concrete holding tanks contain rinsewaters from odorous products.

B-5

History of Waste Management
at the Chemical Leaman Tank Lines Facility
NYSDEC Phase I Report, 1986

ATTACHMENT "B"

SITE OWNERSHIP HISTORY

1. Chemical Leaman Tank Lines, Inc. (CLTL) has owned site since 1959.

2. Site was basically undeveloped land prior to CLTL ownership. Previous owners have included railroad companies, real estate companies and private parties.

3. Corporate address for Tonawanda facility:

   Chemical Leaman Tank Lines, Inc.
   102 Pickering Way
   P. O. Box 200
   Lionville, PA 19353

4. Principal contact for corporation:

   Richard C. Littlepage
   Vice President, Operational Services

WASTE MANAGEMENT ACTIVITIES

I. History of Waste Management

A. Rinsewaters (99% water plus trace contaminants) from the cleaning process are discharged to the lagoon system. Operation of the system began in 1963. The lagoon system consists of three lagoons in series plus a concrete holding tank located after the last pond. Effluent is pumped from the holding tank at ± 25 GPM to a concrete manhole outside the shop bays of the terminal building. Effluent then drains by gravity to the City Sewer System. Lagoons provide settling and natural aeration and the concrete holding tank is where pH adjustment, if needed, and sampling take place.

B. In 1978, two concrete holding tanks were installed. Rinsewaters from the cleaning of priority pollutant products were sent to the holding tanks (one for organics; one for metals). Tanks were installed at the request of the City of Tonawanda to isolate any trace amounts of priority pollutants. Rinsewaters from the cleaning process (except priority pollutant rinses) were discharged to the lagoon system.

C. Currently, concrete holding tanks are used to contain rinsewaters from the cleaning of odorous products only. The remaining rinsewaters are discharged to the lagoon system or drums for off-site disposal depending on the product cleaned.

D. All pure product remaining in tank trailers after delivery is drained into drums and stored on the drum pad for eventual off-site disposal at a licensed TSD facility.

II. Physical Characteristics of Waste Disposal Facilities

A. Wastewater Holding Lagoons (3)

1. Storage capacity of each lagoon - approximately 160,000 gallons.

2. The three lagoons were cleaned out (dewatered and solids removed) once since they were installed between October 1977 and May 1978.

3. The lagoons were constructed in a natural clay layer. Clay layer in the area extends at least 25 feet below grade according to drilling logs. No synthetic liner material was used. Lagoons were constructed by excavating down into the ground approximately 10 feet from surface grade.

4. Wastewater in the lagoons is kept at a level of about 5 feet.

5. Wastes discharged to the lagoon system consist only of tank truck washings from the operations of the cleaning facility located at the site. No pure product is discharged to the lagoons.

6. Volume of Sludge Removed

   a. Between October 1977 to December 1977, 1,102.51 tons of waste sediment and soil were removed from surface impoundments.

   b. Between January 1978 to July 1978, 2,101.54 tons of waste sediment and soil were removed from surface impoundments.

7. Waste sediment and soil were taken to Newco - Chemical Waste Systems, Niagara Falls, NY (now called CECOS).

B. Chemical Storage Tanks

1. No chemical storage tanks for pure product waste at this site.

2. Two concrete holding tanks, 1,000 gallon capacity each, were intended to contain rinsewaters from the cleaning of priority pollutant products only. One tank held rinsewaters from trailers containing organic priority pollutants; the other tank held rinsewaters from trailers containing heavy metals. Currently, tanks are used to contain rinsewaters from the cleaning of odorous products only.

3. Volume in concrete holding tanks is kept at about 500 gallons or below.

4. Frequency of waste removed depends on operations; i.e., amount of trailers cleaned that previously carried priority pollutant products.

5. Waste is hauled off-site by CLTL.

6. Waste is disposed at a licensed TSD facility such as CECOS, Buffalo.

C. Drum Storage

1. Maximum amount stored on pad is 100 drums. Typically, between 10 - 60 drums are stored at one time.

2. Type of chemicals typically stored include fatty acids, fatty alcohols, resins, liquid plastics, latexes, petroleum oils, paints, glycols and caustic sludge.

3. Drum types are DOT specification.

4. Drums hauled off-site by CLTL.

5. Drums disposed at licensed TSD facilities such as CECOS, Niagara Falls, NY and Chem-Met, Wyandotte, MI.

III. Future Waste Management Plans

A. Lagoons to be Closed

1. Lagoons are to be dewatered.

2. Lagoon sludge to be solidified and removed.

3. Lagoon wastewater and sludge to be disposed at a licensed TSD facility.

B. Pretreatment system to be installed with final effluent to be discharged to the City Sewer System.

B-6

List of Products Handled by Chemical Leaman Tank Lines Facility

LIST OF PRODUCTS TYPICALLY CLEANED AT TONAWANDA FACILITY

Acetic acid
Acrylates
Adhesives
Alcohols
Aluminum sulfate
Ammonium nitrate
Aniline oil

Benzene
Butyl acetate
Butyl acrylate
Butyl amine
Butyl phenol

Calcium chloride
Caustic soda
p-Chlorotoluene
o-Chlorotoluene
Chlorobenzotrifluoride
Clay pellets
Cresol

Detergents
Dichlorotoluene
Diisobutylene
Dimethyl formamide

Epichlorohydrin
Ethyl acrylate
Ethyl hexyl chloroformate

Fatty acids
Fluorosilic acid
Formaldehyde
Fuel oil

Glycol

Hydrochloric acid

Latex
Lube oil

Methyl esters
Methylene diphenyl diisocyanate
Mineral spirits
Monoglycerides
Morpholine

Naphtha

Octyl phenol
Oil additives

Paint
Petroleum oil
Petroleum tar
Phenol
Phosphoric acid
Pine oil
Plasticizers
Plastics
Polyethylene glycol
Potassium silicate
Pyridine

Resin
Rosin

Silicate of soda
Sodium chlorite
Sodium hypochlorite
Sulfuric acid

Tall oil
Tar
Toluene
o-Toluidene

Varnish
Vinyl acetate

Zinc ammonium chloride
Zinc chloride

B-7

Interview with Former CLTL Site Manager
NYSDEC Phase I Report, 1986

INTERVIEW FORM

INTERVIEWEE/CODE: Mr Jim Wegrzyn

TITLE - POSITION: Manager, Terminal Operations

ADDRESS: 470 Fillmore Ave

CITY: Tonawanda / Erie County STATE: NY ZIP:

PHONE: (716) 695-1440 RESIDENCE PERIOD: TO:

LOCATION: Telephone Interview INTERVIEWER: S. Robert Steele

DATE/TIME: 4 March 1985 / 2:15 PM

SUBJECT: Chemical Leaman Tank Lines, Waste lagoons

REMARKS: Chemical Leaman has operated three (3) lagoons used to contain rinse water from the washing of tanker trucks used to transport chemicals and waste chemical residues. These lagoons have been in operation at the above listed address from approximately 1963 to the present. Following settling, the wastewater from the third lagoon discharges to the City of Tonawanda wastewater treatment plant. In 1978, the City of Tonawanda temporarily disallowed the discharge of wastewater from the Chemical Leaman lagoon to the public sewer system until the constituents in the wastewater were identified. Chemical Leaman is presently considering closing the lagoons by the end of 1985. The condition of the lagoon liner is unknown and routine inspections are not conducted to determine the condition of the liner(s).

I AGREE WITH THE ABOVE SUMMARY OF THE INTERVIEW:

SIGNATURE:

COMMENTS:

B-8

Analytical Results of Samples Collected During NUS FIT Inspection conducted in May 1987

02-8704-08-SR
REV. NO. 0

FINAL DRAFT
SITE INSPECTION REPORT
CHEMICAL LEAMAN TANK LINES
TONAWANDA, NEW YORK

PREPARED UNDER

TECHNICAL DIRECTIVE DOCUMENT NO. 02-8704-08
CONTRACT NO. 68-01-7346

FOR THE

ENVIRONMENTAL SERVICES DIVISION
U.S. ENVIRONMENTAL PROTECTION AGENCY

FEBRUARY 10, 1989

NUS CORPORATION
SUPERFUND DIVISION

SUBMITTED BY:

EDWARD L. LEONARD
PROJECT MANAGER

ANTHONY F. CULMONE JR.
SITE MANAGER

REVIEWED/APPROVED BY:

RONALD M. NAMAN
FIT OFFICE MANAGER

NUS CORPORATION

02-8704-08-SR
Rev. No. 0

POTENTIAL HAZARDOUS WASTE SITE
SITE INSPECTION REPORT
EXECUTIVE SUMMARY

Chemical Leaman Tank Lines
Site Name

NYD048386205
EPA Site ID Number

470 Filmore Avenue
Tonawanda, New York 14150
Address

02-8704-08
TDD Number

SITE DESCRIPTION

Chemical Leaman Tank Lines (CLTL) is a 1-acre site located in Tonawanda, Erie County, New York. CLTL transports bulk chemicals in tanker trucks throughout the country. This facility is used for tanker truck cleaning and has been operating since 1963. Also, a chemical waste disposal service was provided on a limited basis. Rinsate was pumped into a series of three unlined lagoons. From there, effluent flowed by gravity to the city of Tonawanda Wastewater Treatment Plant via the sanitary sewer system. A new treatment building is finished, and on-line. Backfilling of the lagoon was to have occurred in conjunction with the treatment plant hookup; however, this had not taken place as of May, 1987.

The site is located in an industrial park with residential areas to the south and west. The Ellicott Creek forms the southern border of the site. It supports waterfowl and is used for recreational activities (e.g., fishing and boating). The creek flows to the Niagara River.

Four monitoring wells were installed in 1981 and were tested by the U.S. Geological Survey (USGS). These results indicated concentrations of phenols, iron, and manganese exceeding the water quality standards for Class GA waters in New York State.

On May 12, 1987, NUS Corporation FIT 2 collected four groundwater samples, two surface water and corresponding sediment samples, one sewer sample, two soil samples, and three lagoon sediment samples. Analytical results indicate the following:

- Groundwater is contaminated with chlorobenzenes, benzene, phenol, dimethylphenol, a phthalate, and cobalt.

CONTINUED

Prepared by: Anthony F. Culmone Jr. **Date:** 1/20/89
of NUS Corporation

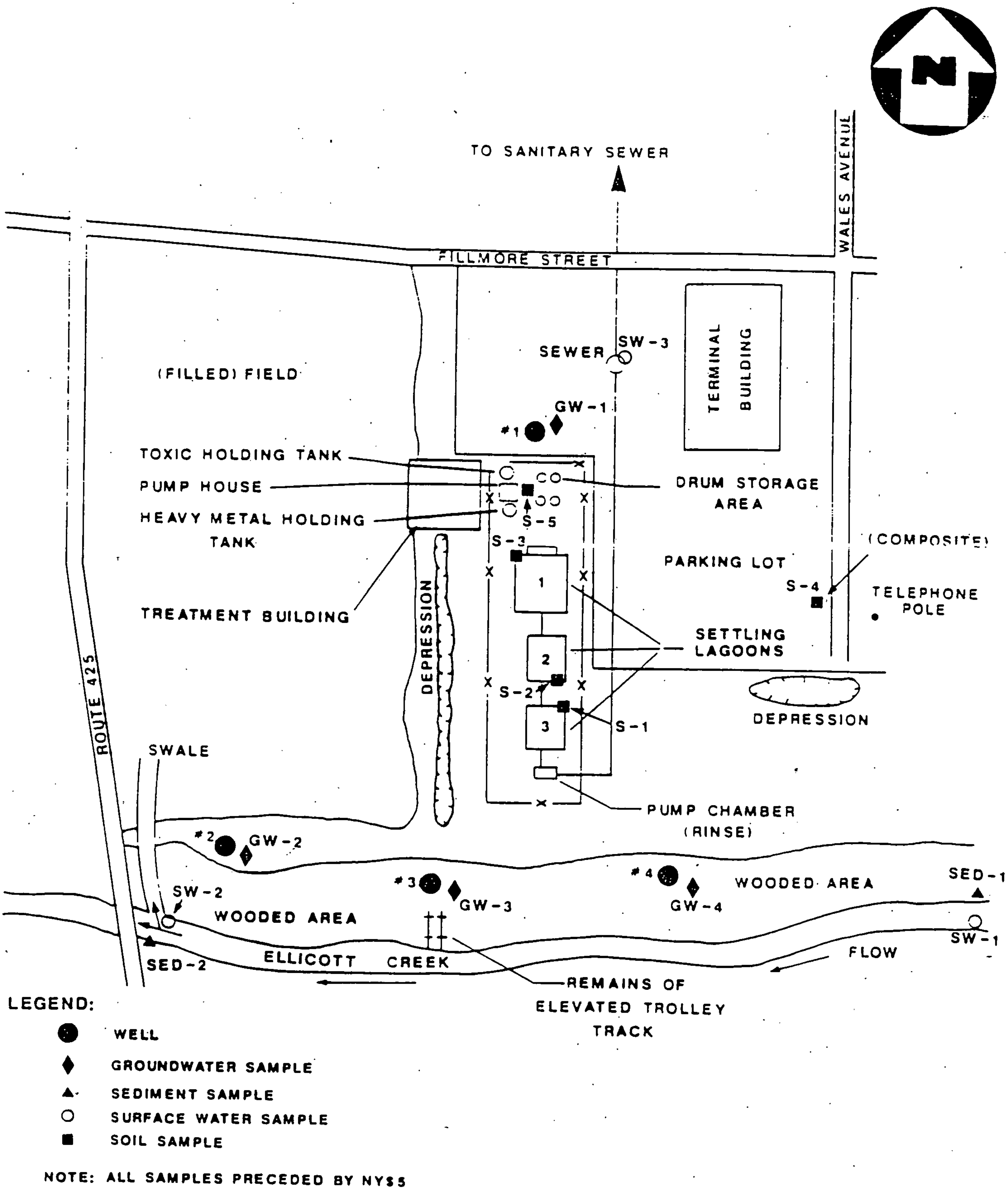
POTENTIAL HAZARDOUS WASTE SITE
SITE INSPECTION REPORT
EXECUTIVE SUMMARY

- The surface soils are contaminated with polynuclear aromatic hydrocarbons (PAHs), toluene, a phthalate, and N-nitrosodiphenylamine.

- The lagoon sediment samples are contaminated with PAHs, polychlorinated biphenyls (PCBs), phthalates, chlorobenzenes, benzene and substituted benzenes, trichloroethane, dichloroethane, and other volatile organics.

- Sediments from the Ellicott Creek contained PCBs in both upgradient and downgradient samples.

- The sewer sample was contaminated with phthalates, phenols, trichloroethane, trichloroethene, substituted benzenes, 2-methylnaphthalene, chromium, and lead.



SAMPLE LOCATION MAP
CHEMICAL LEAMAN
TANK LINES, TONAWANDA, N.Y.

NOT TO SCALE

FIGURE 3

NUS CORPORATION

TABLE I (CONT'D)

SAMPLE DESCRIPTIONS
CHEMICAL LEAMAN TANK LINES (CLTL)
CASE #7278
5/20/87

Sample ID Number	Sample Type	Traffic Report #	Federal Express Airbill Number	Time	Location
NYS5-GW3	Groundwater	Organic BJ330 Inorganic MBJ411	3498026291 3498026033	1630	Collected at well #3.
NYS5-GW4	Groundwater	Organic BJ330 Inorganic MBJ412	3498026291 3498026033	1140	Collected at well #4 located closest to Wales Avenue.
NYS5-SW1	Surface water	Organic BJ331 Inorganic MBJ413	3498026291 3498026033	1225	Collected from norther bank of Ellicott Creek near intersection of Wales Avenue and Vick Street.
NYS5-SED1	Sediment	Organic BJ325 Inorganic MBJ407	3498026022 3498026033	1235	Collected from same location as NYS5-SW1.
NYS5-SW2	Surface water	Organic BJ326 Inorganic MBJ414	3498026291 3498026033	1110	Collected from northern bank of Ellicott Creek. Located approximately 1 feet east of swale.
NYS5-SED2	Sediment	Organic BJ326 Inorganic MBJ332	3498026022 3498026033	1120	Collected 5 feet upstrea from NYS5-SW2 location.
NYS5-SW3	Surface water	Organic BJ333 Inorganic MBJ415	3498026291 3498026033	1503	Collected from sewer located on western side of terminal building.
YS5-BL	Aqueous Trip Blank	Organic BJ320	3498026291	—	Collected from U.S. EPA labs, Edison, N.J.

TABLE 1

SAMPLE DESCRIPTIONS
CHEMICAL LEAMAN TANK LINES (CLTL)
CASE #7278
5/20/87

ample Number	Sample Type	Traffic Report #	Federal Express Airbill Number	Time	Location
YS5-S1	Soil	Organic BJ318 Inorganic MBJ401	3498026022 3498026033	0952	Collected from lagoon #3 at northeastern corner.
YS5-S2	Soil	Organic BJ321 Inorganic MBJ403	3498026022 3498026033	1006	Collected from lagoon #2 from midpoint on the southern bank. Taken 1.5 feet up from liquid's edge.
YS5-S3	Soil	Organic BJ322 Inorganic MBJ404	3498026022 3498026033	1020	Collected from Lagoon #1 at northwest corner.
S5-S4	Soil	Organic BJ323 Inorganic MBJ405	3498026022 3498026033	1407	Collected as a composite sample from a 10 feet x 10 feet section of the CLTL parking lot. This was located 50 yards west of a telephone pole #NM16, NYT4 on Wales Avenue and approximately 100 yards south of the terminal building.
S5-S5	Soil	Organic BJ324 Inorganic MBJ406	3498026022 3498026033	1340	Collected at northwest corner of drum storage area. Located approximately 12 inches north of fence corner and 5 feet east of northeast corner of treatment building.
YS1-GW1	Groundwater	Organic BJ319 Inorganic MBJ402	3498026291 3498026033	1349	Collected at well #1 located in parking lot of CLTL.
S5-GW2	Groundwater	Organic BJ328 Inorganic MBJ410	3498026291 3498026033	1425	Collected at well #2 located closest to Rt. 425.

ANALYTICAL DATA
NAME: CHEMICAL LEAMAN TANK LINES
SAMPLING DATE: 5/12/87
CASE NUMBER: 7278

INORGANICS

SAMPLE NUMBER	NYS5-BL1	NYS5-GW1	NYS5-GW2	NYS5-GW3	NYS5-GW4	NYS5-SW1	NYS5-SW2	NYS5-SW3	NYS5-SED1	NYS5-SED2	NYS5-S1	NYS5-S2	NYS5-S3	NYS5-S4	NYS5-S5
TRAFFIC REPORT NUMBER	MBJ416	MBJ402	MBJ410	MBJ411	MBJ412	MBJ413	MBJ414	MBJ415	MBJ407	MBJ408	MBJ401	MBJ403	MBJ404	MBJ405	MBJ406
MATRIX	WATER	WATER	WATER	WATER	WATER	WATER	WATER	WATER	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
UNITS	UG/L	UG/L	UG/L	UG/L	UG/L	UG/L	UG/L	UG/L	MG/KG	MG/KG	MG/KG	MG/KG	MG/KG	MG/KG	MG/KG
Aluminum	[28]	26700	8250	42000	16300	259	1000	5180	3850	5460	2590	1010	8550	1670	2280
Antimony						164						44E			
Arsenic		20	[9.0]	106	20					4.6E	4E	4.7E	12E	[1.3]	[1.3]
Barium		262	907	488	[131]		[49]	314	[29]	[40]	76	147	74	[21]	[26]
Beryllium															
Cadmium						<18		7.5	Q	Q	Q	Q	Q	Q	Q
Calcium	[193]	304,000	202,000	563,000	186,000	[263]	20800	158,000	11800	17300	16800	11900	76400	172,900	165,700
Chromium		44	13	59	27	43		381	16E	10E	70E	24E	51E		6.8E
Cobalt				56		[33]									
Copper		108	33	232	75	33		811	39	21	22	42	36		
Iron		69400	34300	201,000	44500	101	1570	14200	9100	12900	5840	2730	15200	5130	5510
Lead		80	28	200	38	9	8	370	Q	Q	Q	Q	Q	Q	Q
Magnesium		82600	63900	121,000	50200		22000	44900	3580	4900	3970	3150	17900	46700	51900
Manganese		2590	472	4080	1460	[7.0]	78	846	114	334	173	70	503	733	638
Mercury									Q	Q	Q	Q	Q	Q	Q
Nickel		63		229	40	69	[24]	133	[13]	[10]	22	[6.5]	[9.9]		
Potassium		[3330]	[3490]	[4720]	[2760]	[1060]	[2970]	5520	[893]	[1190]	[369]	[401]	1890	[394]	[461]
Selenium	Q	Q	Q	Q	Q	Q	Q	Q			[0.9]	[0.9]		[0.7]	[0.8]
Silver						54									
Sodium		213,000	417,000	240,000	101,000		45400	74500	[233]	[137]	[689]	[782]	[330]		
Thallium															
Vanadium		[34]		56	[34]	[48]			[9.5]	[10]			[11]		
Zinc		339	89	741	160			2700	73E	109E	1160E	481E	283E	252E	74E

NOTES TO INORGANICS DATA:

Blank space - compound analyzed for but not detected

Q - analysis did not pass QA/QC requirements

[]- compound present above the instrument detection limit, but below the contract-specified detection limit.

B - compound found in laboratory blank as well as the sample and indicates possible/probable blank contamination

E - value estimated due to interference

NR- analysis not required

ANALYTICAL DATA
NAME: CHEMICAL LEAMAN TANK LINES
SAMPLING DATE: 5/12/87
CASE NUMBER: 7278

VOLATILES

SAMPLE NUMBER	NYS5-BL1	NYS5-GW1	NYS5-GW2	NYS5-GW3	NYS5-GW4	NYS5-SW1	NYS5-SW2	NYS5-SW3	NYS5-SED1	NYS5-SED2	NYS5-S1	NYS5-S2	NYS5-S3	NYS5-S4	NYS5-S5
TRAFFIC REPORT NUMBER	BJ320	BJ319	BJ328	BJ329	BJ330	BJ331	BJ332	BJ333	BJ325	BJ326	BJ318	BJ321	BJ322	BJ323	BJ324
MATRIX	WATER	WATER	WATER	WATER	WATER	WATER	WATER	WATER	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
UNITS	UG/L	UG/L	UG/L	UG/L	UG/L	UG/L	UG/L	UG/L	UG/KG	UG/KG	UG/KG	UG/KG	UG/KG	UG/KG	UG/KG
CONC./DILUTION FACTOR	1	20	83	100	100	10	3.3	10	1	1	1	MED-1.01	1	1	1
Chloromethane												350J			
Bromomethane												250J			
Vinyl Chloride												230J			
Chloroethane															
Methylene Chloride								82			5	Q			
Acetone	14	2600B	12000	13000	14000	1300B	480B	1200B			150	Q	35		
Carbon Disulfide															
1,1-Dichloroethene															
1,1-Dichloroethane											31				
Trans-1,2-Dichloroethene		280											40		
Chloroform	Q	84JB	320JB	400JB	400JB	41JB	Q	42JB				Q			
1,2-Dichloroethane															
2-Butanone											98	Q	17		
1,1,1-Trichloroethane								130			130	970	18		
Carbon Tetrachloride															
Vinyl Acetate															
Bromodichloromethane															
1,1,2,2-Tetrachloroethane															
1,2-Dichloropropane															
Trans-1,3-Dichloropropene															
Trichloroethene								83							
Dibromochloromethane															
1,1,2-Trichloroethane															
Benzene				570							J				
Cis-1,3-Dichloropropene															
2-Chloroethylvinylether															
Bromoform															
2-Hexanone												Q			
4-Methyl-2-Pentanone											11				
Tetrachloroethene															
Toluene								40J			85	990	14	15	
Chlorobenzene											Q		18		
Ethylbenzene											27	320J	55		
Styrene											26	2100B	37		
Total Xylenes											75	1000			

NOTES TO ORGANICS DATA:

Blank space - compound analyzed for but not detected

Q - analysis did not pass QA/QC requirements

J - compound present above the instrument detection limit, but below the contract-specified detection limit.

B - compound found in laboratory blank as well as the sample, and [illegible]

ANALYTICAL DATA
NAME: CHEMICAL LEAMAN TANK LINES
SAMPLING DATE: 5/12/87
CASE NUMBER: 7278

SEMI-VOLATILES

SAMPLE NUMBER	NYS5-BL1	NYS5-GW1	NYS5-GW2	NYS5-GW3	NYS5-GW4	NYS5-SW1	NYS5-SW2	NYS5-SW3	NYS5-SED1	NYS5-SED2	NYS5-S1	NYS5-S2	NYS5-S3	NYS5-S4	NYS5-S5
TRAFFIC REPORT NUMBER	BJ320	BJ319	BJ328	BJ329	BJ330	BJ331	BJ332	BJ333	BJ325	BJ326	BJ318	BJ321	BJ322	BJ323	BJ324
MATRIX	WATER	WATER	WATER	WATER	WATER	WATER	WATER	WATER	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
UNITS	UG/L	UG/L	UG/L	UG/L	UG/L	UG/L	UG/L	UG/L	UG/KG	UG/KG	UG/KG	UG/KG	UG/KG	UG/KG	UG/KG
CONC./DILUTION FACTOR	1	1	1	1	1	1	1	100	MED-1	MED-1	MED-2	MED-10	MED-1	MED-1	MED-1
Phenol				23				2900							
Bis(2-Chloroethyl)Ether															
2-Chlorophenol															
1,3-Dichlorobenzene				J											
1,4-Dichlorobenzene					10										
Benzyl Alcohol															
1,2-Dichlorobenzene					J										
2-Methylphenol															
Bis(2-Chloroisopropyl)Ether															
4-Methylphenol								480J							
N-Nitroso-Di-n-Propylamine															
Hexachloroethane															
Nitrobenzene															
Isophorone															
2-Nitrophenol															
2,4-Dimethylphenol			J	J											
Benzoic Acid			J					180J					96000		
Bis(2-Chloroethoxy)Methane															
2,4-Dichlorophenol															
1,2,4-Trichlorobenzene													12000J		
Naphthalene											6200J	210,000	5800J		
4-Chloroaniline															
Hexachlorobutadiene															
4-Chloro-3-Methylphenol															
2-Methylnaphthalene								3200			49000	1,300,000	5800J		
Hexachlorocyclopentadiene															
2,4,6-Trichlorophenol															
2,4,5-Trichlorophenol															
2-Chloronaphthalene															
2-Nitroaniline															
Dimethyl Phthalate		J				J									
Acenaphthylene															
3-Nitroaniline															
Acenaphthene													1400J		
2,4-Dinitrophenol															
4-Nitrophenol															
Dibenzofuran															
2,4-Dinitrotoluene															
2,6-Dinitrotoluene															
Diethylphthalate	J	Q				Q									
4-Chlorophenylphenyl ether															
Fluorene													980J		
4-Ni[illegible]ine													[illegible]		

ANALYTICAL DATA
NAME: CHEMICAL LEAMAN TANK LINES
SAMPLING DATE: 5/12/87
CASE NUMBER: 7278

PESTICIDES/PCBs

SAMPLE NUMBER	NYS5-BL1	NYS5-GW1	NYS5-GW2	NYS5-GW3	NYS5-GW4	NYS5-SW1	NYS5-SW2	NYS5-SW3	NYS5-SED1	NYS5-SED2	NYS5-S1	NYS5-S2	NYS5-S3	NYS5-S4	NYS5-S5
TRAFFIC REPORT NUMBER	BJ320	BJ319	BJ328	BJ329	BJ330	BJ331	BJ332	BJ333	BJ325	BJ326	BJ318	BJ321	BJ322	BJ323	BJ324
MATRIX	WATER	WATER	WATER	WATER	WATER	WATER	WATER	WATER	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
UNITS	UG/L	UG/L	UG/L	UG/L	UG/L	UG/L	UG/L	UG/L	UG/KG	UG/KG	UG/KG	UG/KG	UG/KG	UG/KG	UG/KG
CONC./DILUTION FACTOR	1	1	1	1	1	1	1	5	1	1	1	20	5	5	5
Alpha-BHC															
Beta-BHC															
Delta-BHC															
Gamma-BHC (Lindane)															
Heptachlor															
Aldrin															
Heptachlor Epoxide															
Endosulfan I															
Dieldrin															
4,4'-DDE															
Endrin															
Endosulfan II															
4,4'-DDD															
Endosulfan sulfate															
Endrin Aldehyde															
4,4'-DDT															
Methoxychlor															
Endrin Ketone															
Chlordane															
Toxaphene															
Aroclor-1016															
Aroclor-1221															
Aroclor-1232															
Aroclor-1242															
Aroclor-1248												32,000			
Aroclor-1254															
Aroclor-1260									80J	50J		27,000			

NOTES TO ORGANICS DATA:
Blank space - compound analyzed for but not detected
Q - analysis did not pass QA/QC requirements
J - compound present above the instrument detection limit, but below the contract-specified detection limit.
B - compound found in laboratory blank as well as the sample, and indicates possible/probable blank contamination
NR - analysis not required

ANALYTICAL DATA
NAME: CHEMICAL LEAMAN TANK LINES
SAMPLING DATE: 5/12/87
CASE NUMBER: 7278

SEMI-VOLATILES

SAMPLE NUMBER	NYS5-BL1	NYS5-GW1	NYS5-GW2	NYS5-GW3	NYS5-GW4	NYS5-SW1	NYS5-SW2	NYS5-SW3	NYS5-SED1	NYS5-SED2	NYS5-S1	NYS5-S2	NYS5-S3	NYS5-S4	NYS5-S5
TRAFFIC REPORT NUMBER	BJ320	BJ319	BJ328	BJ329	BJ330	BJ331	BJ332	BJ333	BJ325	BJ326	BJ318	BJ321	BJ322	BJ323	BJ324
MATRIX	WATER	WATER	WATER	WATER	WATER	WATER	WATER	WATER	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
UNITS	UG/L	UG/L	UG/L	UG/L	UG/L	UG/L	UG/L	UG/L	UG/KG	UG/KG	UG/KG	UG/KG	UG/KG	UG/KG	UG/KG
CONC./DILUTION FACTOR	1	1	1	1	1	1	1	100	MED-1	MED-1	MED-2	MED-10	MED-1	MED-1	MED-1
4,6-Dinitro-2-Methylphenol															
N-Nitrosodiphenylamine															3700J
4-Bromophenylphenyl ether															
Hexachlorobenzene													3800J		
Pentachlorophenol															
Phenanthrene												Q	5100J	1400J	850J
Anthracene													2500J		
Di-n-Butylphthalate								120J			47000	23,000J	1700J		
Fluoranthene													6600J	3100J	1100J
Pyrene											3600J	12000J	6200J	7300J	810J
Butylbenzylphthalate															
3,3'-Dichlorobenzidine															
Benzo(a)Anthracene															
Bis(2-Ethylhexyl)Phthalate	J							2200	Q	Q	780,000B	2900000B	14000JB	8100JB	28000B
Chrysene													3400J	9300J	Q
Di-n-Octyl Phthalate				J				320J			67000	200,000			
Benzo(b)Fluoranthene														Q	Q
Benzo(k)Fluoranthene															
Benzo(a)Pyrene														Q	Q
Indeno(1,2,3-cd)Pyrene														3800J	860J
Dibenzo(a,h)Anthracene															
Benzo(ghi)Perylene														5300	

NOTES TO ORGANICS DATA:

Blank space - compound analyzed for but not detected

Q - analysis did not pass QA/QC requirements

J - compound present above the instrument detection limit, but below the contract-specified detection limit.

B - compound found in laboratory blank as well as the sample, and indicates possible/probable blank contamination

NR - analysis not required

B-9

Lagoon Closure Report, June 1990

ecology and environment, inc.
BUFFALO CORPORATE CENTER
368 PLEASANTVIEW DRIVE, LANCASTER, NEW YORK 14086, TEL. 716/684-8060
International Specialists in the Environment

June 18, 1990

Glenn M. May
Junior Engineering Geologist
New York State Department of
Environmental Conservation
600 Delaware Avenue
Buffalo, New York 14202-1073

Re: Chemical Leaman Impoundment Closure, Tonawanda, New York
New York State Department of Environmental Conservation
Site No. 915014

Dear Mr. May:

As per your request at our April 18, 1990, meeting, this letter summarizes all of the post-excavation soil samples collected by Ecology and Environment, Inc. (E & E) from the impoundments at the Chemical Leaman Tank Lines, Inc. (CLTL) terminal in Tonawanda, New York, between September 1, 1988, and October 26, 1989. All of the samples listed in Table 1 were collected by E & E personnel and analyzed at E & E's Analytical Services Center (ASC) according to the procedures set forth in "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods," SW-846, Third Edition, U.S. EPA, 1986. Relevant quality control and quality assurance procedures as outlined in the July 1988 Closure Plan and Soil Sampling Plan were followed during sampling and analysis.

With respect to the post-excavation soil samples collected from within the three impoundments, those on 10-20-88, 11-29-88, 12-01-88, 12-07-88, and 10-26-89 were collected as per the July 1988 Soil Sampling Plan. In these cases, discrete samples were collected at the locations shown in Figures B-1 and B-2 (see Appendix B) using precleaned, dedicated, stainless steel spoons. The discrete samples were archived at E & E's ASC, and one composite was analyzed. The composite sample consisted of a portion of each of the discrete samples, which were carefully homogenized in a precleaned aluminum tray. At Chemical Leaman's request, additional samples from depth were collected on 07-21-89 and 07-26-89, from impoundments 1 and 2, respectively. These samples were collected using precleaned stainless steel hand augers, and composited in a fashion similar to that described above. On 07-21-89, the discrete as well as the composite samples were analyzed. During the post-excavation sampling phase, E & E acted primarily as sampling technicians, providing little consultation regarding the backfilling process.

Appendix A to this letter contains a site history summary for the Tonawanda terminal. Included in Appendix A are eight tables, six of which summarize the analytical results of the post-excavation soil samples. Tables A-1 through A-6 represent a comparison between the earliest and the most recent composited surface soil samples collected. Since E & E sampled impoundment 3 only once, Tables A-5 and A-6 compare E & E data of 12-01-88 to the NUS data of 05-20-87 (NUS Corporation 1989). Tables A-1 through A-4 compare E & E data for the dates shown. Tables A-1, A-3, and A-5 contain compounds for which action levels were proposed in the July 1988 Closure Plan. These action levels are listed alongside the analytical results. Table A-7 summarizes the analytical results of the groundwater samples collected on 08-02-89, prior to the final excavation of impoundment 2. Table A-8 summarizes the recent water level data.

Appendix B to this letter contains pertinent figures. Figure B-1 represents an aerial view of the three impoundments indicating approximate discrete sampling locations on the impoundment bottoms. These discrete samples were composited into one sample for analysis. Figure B-2 is an elevation view of the three impoundments showing the approximate impoundment bottom both prior to and following the excavation. Also included on Figure B-2 are the approximate locations of discrete samples taken from the sidewalls of the impoundments. Four discrete sidewall samples, one from each wall, were composited with the impoundment bottom samples. Figure B-3 is a map of the site showing the impoundment positions relative to the on-site buildings and four existing monitoring wells.

Appendix C to this letter contains a list of pertinent references.

Should you have any questions or require any further information, please contact me or Scott McCone, Project Director, at 716-684-8060.

Sincerely,

Richard M. Watt

Richard M. Watt
Project Manager

RMW/jb
[AD]CE4060:D2996

Attachments

cc: S. McCone, CE4 File
J. Rakitsky, R. Barnard

Table 1

SUMMARY OF POST-EXCAVATION SAMPLES ANALYZED FOR CLTL TONAWANDA IMPOUNDMENTS

Date	Sample ID	Description
10-20-88	CE-SS-L1-001	Composite of the surface soil samples from impoundment 1.
11-29-88	CE-SS-001 Comp	Composite of the surface soil samples from impoundment 1.
12-01-88	CE-SS-010C-L3	Composite of the surface soil samples from impoundment 3.
12-07-88	CE-SS-010C-L2	Composite of the surface soil samples from impoundment 2.
07-21-89	CE-S-011-L1	Surface soil sample (0-6") from impoundment 1.
	CE-S-012-L1	Surface soil sample (0-6") from impoundment 1.
	CE-S-013-L1	Surface soil sample (0-6") from impoundment 1.
	CE-S-014-L1	Surface soil sample (0-6") from impoundment 1.
	CE-S-015-L1	Surface soil sample (0-6") from impoundment 1.
	CE-S-016-L1	Surface soil sample (0-6") from impoundment 1.
	CE-S-017-L1	Surface soil sample (0-6") from impoundment 1.
	CE-S-018-L1	Surface soil sample (0-6") from impoundment 1.
	CE-S-019-L1	Surface soil sample (0-6") from impoundment 1.
	CE-S-020C-L1	Composite of the above 9 samples.
	CE-SS-021-L1	Subsurface soil sample (1.5') from impoundment 1.
	CE-SS-022-L1	Subsurface soil sample (2.0') from impoundment 1.
	CE-SS-023-L1	Subsurface soil sample (2.0') from impoundment 1.
	CE-SS-024-L1	Subsurface soil sample (2.0') from impoundment 1.
	CE-SS-025-L1	Composite of the above 4 samples.
07-26-89	CE-010-L2	Composite of the surface soil samples (0-6") from impoundment 2.
	CE-020-L2	Composite of the subsurface soil samples (18-24") from impoundment 2.
08-02-89	B-1	Groundwater sample from well B1.
	B-2	Groundwater sample from well B2.
	B-3	Groundwater sample from well B3.
	B-4	Groundwater sample from well B4.
10-26-89	CE-0306-L2	Composite of the surface soil samples from impoundment 2.

(AD)CE4060:D2996, #3418, PM = 16

Source: Ecology and Environment, Inc. 1990.

APPENDIX A

CHEMICAL LEAMAN TANK LINES, INC.
SITE HISTORY AND ANALYTICAL RESULTS

SITE HISTORY

Chemical Leaman Tank Lines, Inc. (CLTL) transports bulk chemical products by tank truck. The Tonawanda facility serves as a tractor/trailer maintenance shop and as an internal/external tank truck cleaning facility. From 1963 to 1978, wastewater consisting of rinsate and steam condensate from the empty tank trailers was discharged to the three surface impoundments for treatment (aeration, settling, and pH correction) prior to discharge via the sanitary sewer system to the Tonawanda Wastewater Treatment Plant. These practices were modified in 1978 as part of an agreement with NYSDEC. The accumulated solids in impoundments 1 and 2 were dewatered and 3,200 tons of sludge were excavated and removed for off-site disposal. Following excavation, wastewaters containing heavy metals or priority pollutants were collected separately in two 1,000-gallon storage tanks. Between 1978 and 1987, discharges to the surface impoundments were limited to nonpriority pollutant wastewaters. In July 1987, a new wastewater pretreatment facility was installed on site and all input to the impoundments, save natural precipitation, ceased.

In September 1988, CLTL began the closure process of these impoundments as outlined in E & E's July 1988 Closure Plan. E & E acted in an advisory capacity during the initial stages of this process. The closure process began by dewatering the impoundments. This water was treated at the on-site wastewater pretreatment facility prior to discharge to the Tonawanda Wastewater Treatment Plant. Following dewatering, the residual sludge was solidified via the addition of Posilime. This solidified sludge and some of the underlying soil was then excavated and transported to an appropriate industrial landfill. The stability of the sludge was monitored prior to transportation and landfilling. A representative from E & E was on site throughout this process during the months of September and October 1988. During this period, a total of 173 truck loads, of 19 to 20 cubic yards each, was excavated by Sterling Environmental Services and transported by Hazmat Environmental Group.

3,287 to 3,460 cubic yards of materi

Following the initial post-excavation sampling by E & E, additional soil was removed from impoundments 1 and 2 by Sterling Environmental and Bush Trucking. Twenty-seven additional truck loads of 20 cubic yards each of this material was transported and landfilled in December 1989 by Buffalo Fuel Company, Tonawanda Tank Transport Service, and Hazmat.

The three impoundments were excavated as deeply as possible below the water table as shown in Figure B-2. Further excavation was impossible due to the rapid intrusion of groundwater into the impoundments as well as the possibility of collapse of the walls of the impoundments and the undermining of CLTL's parking area and wastewater pretreatment facility. The impoundments have subsequently been backfilled to prevent the undermining of the surrounding area, pending a groundwater investigation. The results of the initial and final post-excavation samples are shown in Tables A-1 through A-6. These tables represent all of the detected compounds in each of the impoundments.

In August 1989, E & E sampled four on-site monitoring wells that were installed in August 1981 by Anderson Drilling Company, Inc. (Engineering-Science 1986). The analytical results, which are summarized in Table A-7, indicate that specific parameters from specific wells exceed the limits set forth by NYSDEC for Class GA water (6 NYCRR Part 703.5).

On May 1 and 16, 1990, E & E recorded water level measurements for each of the monitoring wells (B-1, B-2, B-3, and B-4) at the CLTL site. In addition, on May 16, 1990, E & E performed an elevation survey including each of the wells and two points on Ellicott Creek. Since the nearest USGS benchmark is greater than 1 mile from the site, a local, permanent reference datum was used. This reference datum was assigned an elevation of 570.00 feet in order to simulate actual local elevations. Water table and stream elevations are summarized in Table A-8.

This completes the summary of the work performed to date at the CLTL Tonawanda terminal in relation to the impoundment closure process.

Table A-1

POST-EXCAVATION SAMPLING RESULTS
COMPOUNDS WITH PROPOSED ACTION LEVELS
IMPOUNDMENT 1
CHEMICAL LEAMAN TANK LINES, INC.
(all values in mg/kg)

Chemical Constituent	10/20/88	11/29/88	E & E Action Level
Chlorinated Organic Compounds			
Methylene chloride	<1.0*B	0.069B	5
1,1,1-Trichloroethane	<1.0	1.7	5
Trans-1,2-dichloroethene	<1.0	0.099	5
Aroclor 1248 (PCB)	<0.4	<2.6	10
1,1-Dichloroethane	<1.0	<0.015*	5
Trichloroethene	17.0	3.0	5
Aromatic Compounds			
Toluene	3.8	1.7	100
Ethylbenzene	<1.0	1.2	100
Total Xylene	5.3	5.0	5
Naphthalene	8.2E	0.43**	5
2-Methylnaphthalene	17.0	0.95**	5
Benzoic acid	<1.6	<5.5	15
Phenol	<0.33*	2.3	4
Miscellaneous Organic Compounds			
Styrene	3.4	2.0	5
Di-n-octylphthalate	<0.33*	2.0	100
2-Butanone	<2.0	0.56	5
4-Methyl-2-pentanone	<2.0	<0.03*	5
Di-n-butylphthalate	1.9	18.0	100
Bis(2-ethylhexyl)phthalate	14.0B	24.0B	100
Metals			
Arsenic	10.1	13.4	15
Barium	30.3	45.4	100
Cadmium	1.54	15.6	25
Lead	5.54	22.0	100
Selenium	<1.70	<1.30	0.05

[AD]CE4060:D2996, #3420, PM = 24

*Compound present below measurable detection limit.
**Impoundment 1 resampled and analyzed only for these compounds on 07/21/89.
B = Compound detected in method blank.
E = Estimated value, exceeds calibrated range.

Source: Ecology and Environment, Inc. 1990.

Table A-2

POST-EXCAVATION SAMPLING RESULTS
DETECTED COMPOUNDS WITHOUT PROPOSED ACTION LEVELS
IMPOUNDMENT 1
CHEMICAL LEAMAN TANK LINES, INC.
(All values in mg/kg)

Chemical Constituent	10/20/88	11/29/88
Beryllium	<0.40	<0.53
Chromium	12.9	34.1
Copper	13.7	55.9
Cyanide	<1.00	<1.30
Nickel	10.6	22.9
Zinc	48.2	337
Tetrachloroethene	3.0	0.97
Chlorobenzene	2.8	2.1
1,4-Dichlorobenzene	20.0E	26.0
1,3-Dichlorobenzene	3.8	3.2
1,2-Dichlorobenzene	12.0E	20.0
1,2,4-Trichlorobenzene	210E	230E
Fluorene	0.72	16.0
Acenaphthene	0.76	15.0
N-nitrosodiphenylamine	<0.33	26.0
Phenanthrene	1.3	25.0
Anthracene	0.51	26.0
Fluoranthene	0.45	9.6
Pyrene	<0.33*	5.8
Benzene	<1.0	0.21
Butyl-benzyl-phthalate	5.8	3.0
Chloroform	<1.0	0.083
1,2-Dichloropropane	<1.0	0.23
Benzo(a)anthracene	<0.33*	2.2
Chrysene	<0.33*	2.8
Benzo(b)fluoranthene	<0.33*	2.3
Benzo(a)pyrene	<0.33*	1.2
Hexachlorobenzene	0.34	1.4
Pentachlorophenol	<1.6*	<5.5
2,4-Dimethylphenol	<0.33	<1.1*

[AD]CE4060:D2996, #3421, PM = 31

*Compound present below measurable detection limit.
E = Estimated value, exceeds calibrated range.

Source: Ecology and Environment, Inc. 1990.

Table A-3

POST-EXCAVATION SAMPLING RESULTS
COMPOUNDS WITH PROPOSED ACTION LEVELS
IMPOUNDMENT 2
CHEMICAL LEAMAN TANK LINES, INC.

(All values in mg/kg)

Chemical Constituent	12/07/88	10/26/89	E & E Action Level
Chlorinated Organic Compounds			
Methylene chloride	3.1B	2.2B	5
1,1,1-Trichloroethane	18.0	<1.0	5
Trans-1,2-dichloroethene	<1.0*	<1.0	5
Aroclor 1248 (PCB)	<2.6	<2.6	10
1,1-Dichloroethane	<1.0*	<1.0	5
Trichloroethene	77.0	2.7	5
Aromatic Compounds			
Toluene	39.0	1.5	100
Ethylbenzene	13.0	<1.0	100
Total Xylene	56.0	1.4	5
Naphthalene	97.0	1.4	5
2-Methylnaphthalene	200	4.3	5
Benzoic acid	<14.0	<4.0	15
Phenol	<14.0*	2.3	4
Miscellaneous Organic Compounds			
Styrene	<1.0	<1.0	5
Di-n-octylphthalate	<14.0	<0.82*	100
2-Butanone	<2.0	<2.0	5
4-Methyl-2-pentanone	<2.0	<2.0	5
Di-n-butylphthalate	26.0	<0.82*	100
Bis(2-ethylhexyl)phthalate	200B	4.9	100
Metals			
Arsenic	14.4	8.52	15
Barium	41.5	24.4	100
Cadmium	16.9	4.86	25
Lead	19.7	7.98	100
Selenium	<1.70	<0.50	0.05

[AD]CE4060:D2996, #3422; PM = 24

* = Compound present below measurable detection limit.
B = Compound detected in method blank.

Source: Ecology and Environment, Inc. 1990.

Table A-4

POST-EXCAVATION SAMPLING RESULTS
DETECTED COMPOUNDS WITHOUT PROPOSED ACTION LEVELS
IMPOUNDMENT 2
CHEMICAL LEAMAN TANK LINES, INC.

(All values in mg/kg)

Chemical Constituent	12/07/88	10/26/89
Beryllium	<0.7	<0.20
Chromium	104	25.9
Copper	66.2	15.7
Cyanide	<1.7	<1.0
Nickel	24.8	10.6
Zinc	1480	367
Tetrachloroethene	140	2.6
Chlorobenzene	37.0	1.3
1,4-Dichlorobenzene	32.0	<0.82*
1,3-Dichlorobenzene	<14.0*	<0.82
1,2-Dichlorobenzene	24.0	<0.82*
1,2,4-Trichlorobenzene	190	1.6
Acetone	NA	9.2B
Fluorene	22.0	<0.82*
Acenaphthene	22.0	<0.82*
N-nitrosodiphenylamine	58.0	<0.82*
Phenanthrene	26.0	<0.82*
Anthracene	<14.0*	<0.82*
Fluoranthene	<14.0*	<0.82*
Pyrene	<14.0*	<0.82*
Benzene	8.4	<1.0
Chloroform	<1.0*	<1.0
1,2-Dichloropropane	10.0	<1.0
1,1-Dichloroethene	<1.0*	<1.0
Hexachlorobenzene	<14.0*	<0.82
4-Methylphenol	NA	<0.82*
Dibenzofuran	NA	<0.82*

[AD]CE4060:D2996, #3423, PM = 29

*Compound present below measurable detection limit.
B = Compound detected in method blank.
NA = Compound not analyzed for.

Source: Ecology and Environment, Inc. 1990.

Table A-5

POST-EXCAVATION SAMPLING RESULTS
COMPOUNDS WITH PROPOSED ACTION LEVELS
IMPOUNDMENT 3
CHEMICAL LEAMAN TANK LINES, INC.

(All values in mg/kg)

Chemical Constituent	05/20/87 (NUS)	12/01/88	E & E Action Level
Chlorinated Organic Compounds			
Methylene chloride	0.005	0.062B	5
1,1,1-Trichloroethane	0.13	<0.012	5
Trans-1,2-dichloroethene	<0.005	0.063	5
Aroclor 1248 (PCB)	<0.08	<0.10	10
1,1-Dichloroethane	0.031	<0.012*	5
Trichloroethene	<0.005	0.044	5
Aromatic Compounds			
Toluene	0.085	0.18	100
Ethylbenzene	0.027	0.092	100
Total xylene	0.075	0.28	5
Naphthalene	6.2E	<0.42*	5
2-Methylnaphthalene	49.0	<0.42*	5
Benzoic acid	<96.0	<0.42	15
Phenol	<20.0	<0.42	4
Miscellaneous Organic Compounds			
Styrene	0.026	0.026	5
Di-n-octylphthalate	67.0	<0.42	100
2-Butanone	0.098	0.028	5
4-Methyl-2-pentanone	0.011	<0.024*	5
Di-n-butylphthalate	47.0	<0.42	100
Bis(2-ethylhexyl)phthalate	780B	1.1B	100
Metals			
Arsenic	4.0J	3.51	15
Barium	76.0	71.4	100
Cadmium	Q	<1.3	25
Lead	Q	10.8	100
Selenium	0.9E	<1.00	0.05

[AD]CE4060:D2996, #3425, PM = 25

*Compound present below measurable detection limit.
B = Compound detected in method blank.
Q = Analysis did not pass QA/QC requirements.
E = Estimated value, exceeds calibrated range.
J = Value estimated due to interference.

Source: Ecology and Environment, Inc. 1990.

Table A-6
POST-EXCAVATION SAMPLING RESULTS
DETECTED COMPOUNDS WITHOUT PROPOSED ACTION LEVELS
IMPOUNDMENT 3
CHEMICAL LEAMAN TANK LLINES, INC.

(All values in mg/kg)

Chemical Constituent	05/20/87 (NUS)	12/01/88
Beryllium	<1.5	0.447
Chromium	70J	24.0
Copper	22.0	21.0
Nickel	22.0	16.6
Zinc	1160J	72.8
Tetrachloroethene	<0.005	<0.012*
Chlorobenzene	Q	0.19
1,4-Dichlorobenzene	<20.0	0.62
1,2-Dichlorobenzene	<20.0	<0.42*
Pyrene	3.6E	<0.42
Benzene	0.002J	0.17
1,2-Dichloropropane	<0.005	0.014
Vinyl chloride	<0.01	<0.024*

[AD]CE4060:D2996, #3425, PM = 29

*Compound present below measurable detection limit.
E = Estimated value, exceeds calibrated range.
J = Value estimated due to interference.
Q = Analysis did not pass QA/QC requirements.

Source: Ecology and Environment, Inc. 1990.

Table A-7

GROUNDWATER SAMPLING RESULTS - 8/2/89
DETECTED COMPOUNDS WITH CLASS GA GROUNDWATER STANDARDS
CHEMICAL LEAMAN TANK LINES, INC.

(All values in ug/L)

Chemical Constituent	B1	B2	B3	B4	MCL+
Cyanide	<10	13	53	<10	200
Barium	130	330	169	57	1000
Arsenic	<5	<5	6	<5	25
Copper	20	<10	<10	<10	1000
Lead	6	<5	<5	<5	25
Nickel	20	<15	<15	<15	
Zinc	58	17	13	<10	5000
Vinyl chloride	320	<10	19	<10*	5
Methylene chloride	130TB	23TB	25TB	28TB	
Acetone	<50*TB	<10*TB	12TB	<10*TB	
1,1-Dichloroethane	<25	<5	<5*	<5	
Trans-1,2-dichloroethene	70	<5	<5	<5	
Trichloroethene	<25	<5	<5	<5*	10
Benzene	<25*	<5*	410	<5*	ND++
Tetrachloroethene	<25	<5	<5	<5*	
Toluene	<25*TB	<5*TB	5TB	5TB	50+++
Chlorobenzene	<25*	<5	29	11	
1,3-Dichlorobenzene	<10	<10	<10*	<10	
1,4-Dichlorobenzene	<10	<10	<10	<10*	
1,2-Dichlorobenzene	<10	<10	<10	<10*	
Isophorone	<10	<10*	<10	<10	
Di-n-butyl phthalate	<10	<10*	<10	<10	770
Bis (2-ethylhexyl) phthalate	<10*B	<10*B	<10*B	<10*B	
Phenol	<10*	<10*	<10*	<10	1

[AD]CE4060:D2996, #3426, PM = 21

*Compound present below measurable detection limit.
T = Compound detected in trip blank.
B = Compound detected in method blank.
+ = Maximum contaminant levels as per 6 NYCRR Part 703.5.
++ = Not detectable.
+++ = Guidance value from April 1, 1987, memo Daniel M. Barolo, Director, Division of Water, NYSDEC, to Bureau Directors, Regional Water Engineers, Section Chiefs.

Source: Ecology and Environment, Inc. 1990.

Table A-8

WATER TABLE AND STREAM ELEVATIONS
(All values in feet with respect to local monument)

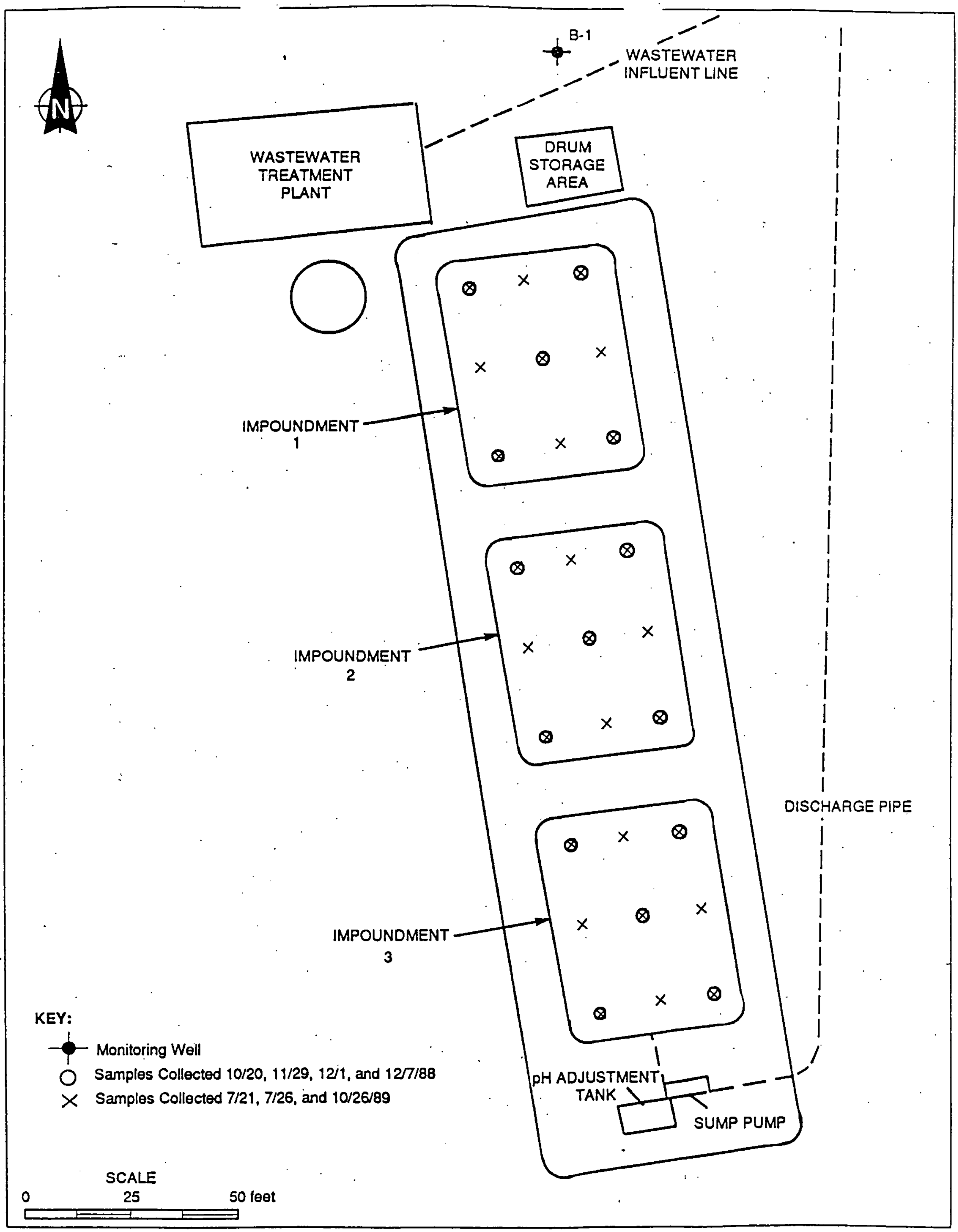
Station	05-01-90	05-16-90
B-1	565.84	566.18
B-2	564.59	564.72
B-3	565.30	565.93
B-4	566.15	567.43
Ellicott Creek due south of B-2		560.73
Ellicott Creek due south of Wales Ave.		560.69

[AD]CE4060:D2996, #3427, PM = 35

Source: Ecology and Environment, Inc. 1990.

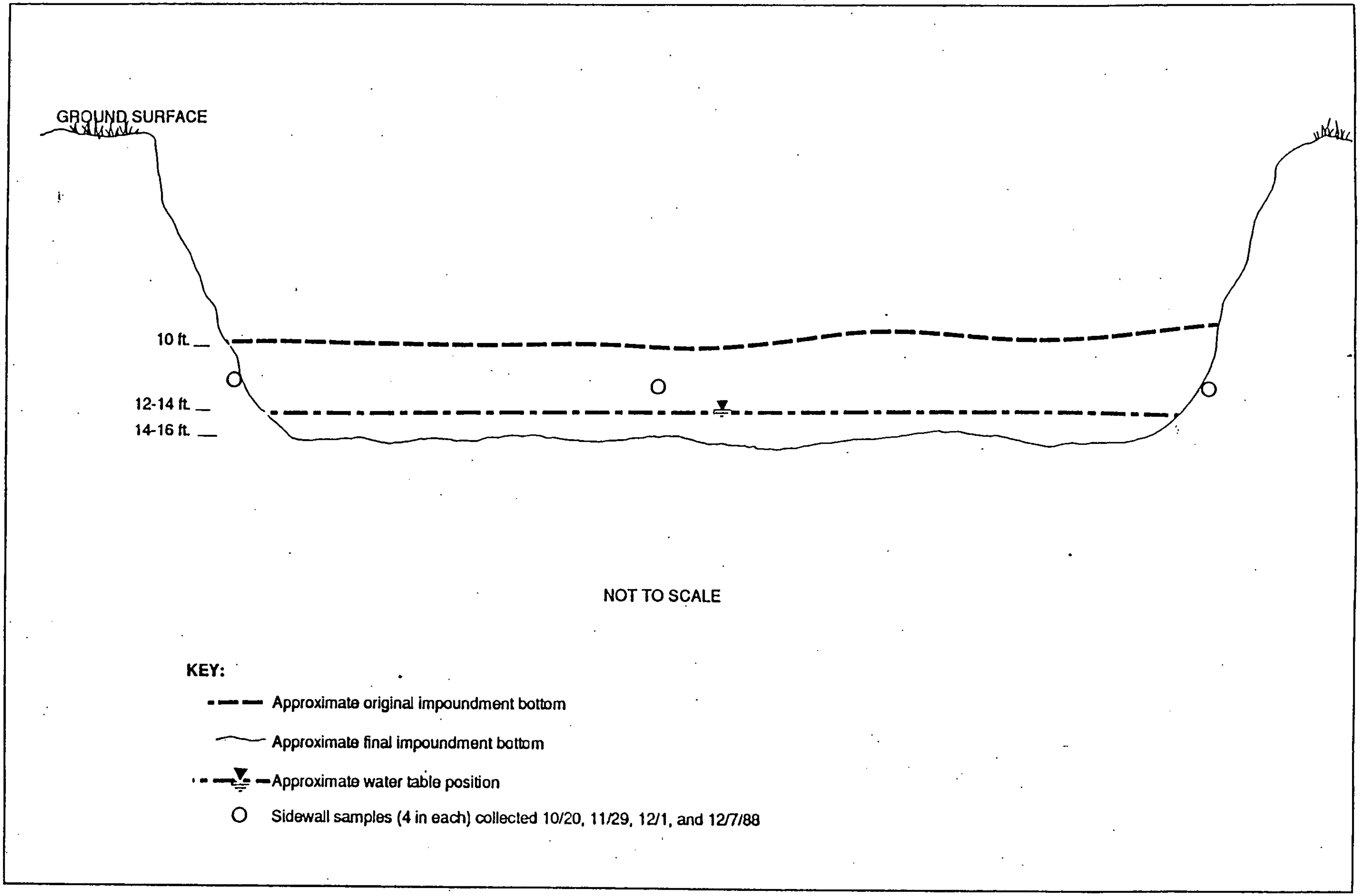
APPENDIX B

FIGURES



SOURCE: Ecology and Environment, Inc. 1990

Figure B-1
AERIAL VIEW OF IMPOUNDMENTS AND SAMPLING LOCATIONS
CHEMICAL LEAMAN TANK LINES, INC.



SOURCE: Ecology and Environment, Inc. 1990

Figure B-2
GENERALIZED ELEVATION VIEW OF IMPOUNDMENTS
CHEMICAL LEAMAN TANKS LINES, INC.

CE40602.PM3

APPENDIX C

REFERENCES

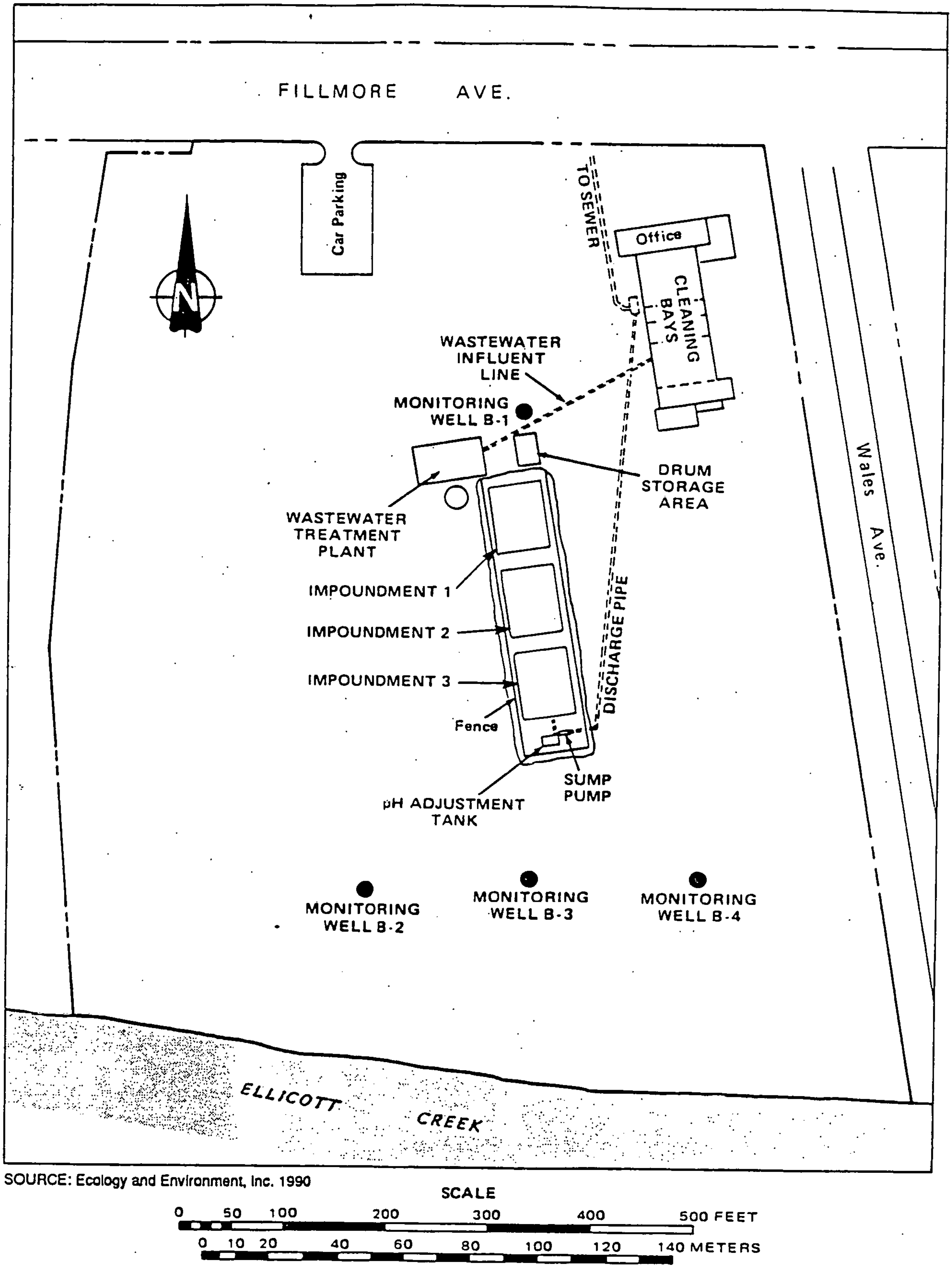


Figure B-3
SITE MAP WITH MONITORING WELL LOCATIONS
CHEMICAL LEAMAN TANK LINES, INC.

REFERENCES

Part 703.5 of Title 6 of the Official Compilation of Codes, Rules and Regulations of the State of New York.

Ecology and Environment, Inc., July 1988, "Closure Plan for Surface Impoundments, Chemical Leaman Tank Lines Facility," Tonawanda, New York.

__________, July 1988, "Soil Sampling Plan for Surface Impoundments, Chemical Leaman Tank Lines Facility," Tonawanda, New York.

Engineering-Science in association with Dames & Moore, January 1986, "Engineering Investigations at Inactive Hazardous Waste Sites in the State of New York," Phase I Investigations, Chemical Leaman Tank Lines, NYS Site No. 915014, prepared for Division of Solid and Hazardous Waste, NYSDEC.

NUS Corporation, Superfund Division, February 10, 1989, "Final Draft, Site Inspection Report, Chemical Leaman Tank Lines, Tonawanda, New York", prepared under Technical Directive Document No. 02-8704-08, Contract No. 68-01-7346, for the Environmental Services Division, U.S. Environmental Protection Agency.

__________, February 10, 1989, "Final Draft, Hazard Ranking System Report, Chemical Leaman Tank Lines, Tonawanda, New York," prepared under Technical Directive Document No. 02-8704-08, Contract No. 68-01-7346, for the Environmental Services Division, U.S. Environmental Protection Agency.

B-10

Summary Report Prepared by Glenn M. May, Region 9 NYSDEC, April 1990

A SUMMARY OF INVESTIGATION OF THE INACTIVE WASTE DISPOSAL SITE AT THE CHEMICAL LEAMAN TANK LINES FACILITY IN TONAWANDA, NEW YORK

SITE NUMBER 915014

Prepared by GLENN M. MAY

April 11, 1990

INTRODUCTION

The New York State Registry of Inactive Hazardous Waste Sites lists the Chemical Leaman Tank Lines facility at 470 Fillmore Avenue, City of Tonawanda, New York as a Class 2a site. The site is bordered by Fillmore Avenue to the north, Route 425 to the west, Ellicott Creek to the south, and Wales Avenues to the east (Figure 2-1). The areal extent of the facility is approximately 7 1/2 acres with the disposal area comprising about 1 acre of the total.

The major objective of this report is to discuss the current status of the Chemical Leaman site. This is done by summarizing previous site investigations and their results. Lastly, recommendations for additional site work are presented.

FACILITY OPERATIONS

Chemical Leaman Tank Lines, Inc. is a common carrier transporting bulk chemical products by tank truck from supplier to customer. The Tonawanda facility serves as a maintenance shop, a truck washing terminal and a pretreatment system for contaminated wastewaters. Following product delivery, empty tanks are returned to the facility where they are drained of any residual product. These chemicals are drummed and sent to a hazardous waste disposal facility. The tanks are then washed and rinsed with final rinse waters being stored in one of two holding tanks depending on its chemical content. One tank stores heavy metals, and the other is reserved for any chemicals that appear on the list of 65 Toxic Materials (see Appendix B).

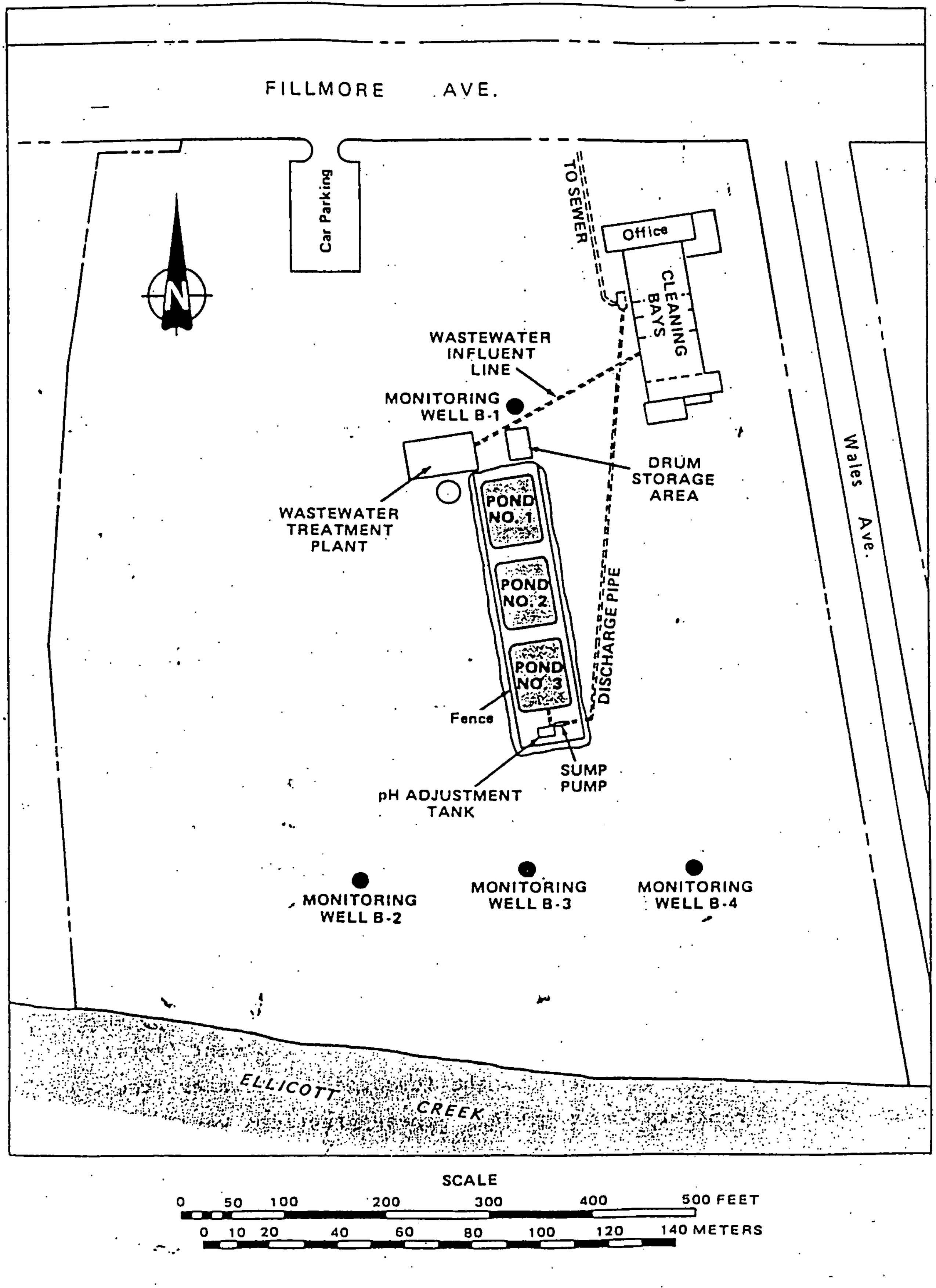


Figure 2—1 SITE MAP WITH MONITORING WELL LOCATIONS

Wastewater that is not contaminated by any of the 65 toxic chemicals is directed to three settling lagoons (Figure 2-1). The first and second lagoon separate heavy and light materials respectively. The middle layers, which are mostly water, are drained into the third lagoon where the pH is adjusted chemically before discharge to the Tonawanda sewer system. The heavy and light constituents are peridocially removed and sent to a hazardous waste disposal facility.

From 1963 to 1978, wastewater from the cleaning operations was discharged directly to the three settling lagoons. This includes wastewater containing any of the 65 toxic constituents.

PAST INVESTIGATIONS

A brief description of site history and previous investigations is summarized below. Analytical results are given in Tables 2-2 through 2-4.

1963 Began operation at the Fillmore Avenue site. At the truck terminal, trucks are cleaned with various solutions which enter three settling lagoons. Wastewater leaving the last lagoon enters the Tonawanda sewer system. Sludges are occasionally excavated and disposed of at Newco Landfill.

1978 Lagoon numbers 1 and 2 (Figure 2-1) are drained, the sludges are excavated, and disposed of at CECOS Landfill. Approximately 3,200 tons of sludge are excavated.

Chemical Leaman negotiates a new storage operations plan with the NYSDEC. A list of 65 toxic chemicals from the Federal Register (Appendix B) is used to determine which chemicals are exluded from discharge to the sewer systems. Contaminated waters (list of 65) are directed to two holding tanks for later disposal at a regulated landfill. Non-contaminated water is still passed through the three settling lagoons to the sewer systems.

1981 Four monitoring wells are installed; one upgradient and three downgradient. A groundwater monitoring program is initiated in accordance with 40 CRF Part 265.

1982 An EP Tox analysis of dewatered sludge indicates that this material is non-hazardous (Table 2-2). Groundwater sample analyses indicate that phenol, iron, lead, and manganese concentrations exceed water quality standards for Class GA waters (Table 2-4).

1983 Based on EP Tox and groundwater data EPA determines that the sludge in the settling lagoons is not a hazardous waste as defined by EPA.

1984 Site is listed as an inactive hazardous waste disposal site by NYSDEC.

1985 Phase I report is conducted. Preliminary HRS score is 5.57. Chemical Leaman has meetings with the NYSDEC about a proper RCRA closure on the settling lagoons.

1986 Numerous complaints reported of odors emanating from the Chemical Leaman facility. The odor is identified as an acrylate type. Chemical Leaman discontinues all internal cleaning of acrylate type products to eliminate odors. This course of action is approved by NYSDEC.

Chemical Leaman is building a new wastewater pretreatment plant (Figure 2-1). When complete, the settling ponds will no longer be used.

1987 Consent Order signed for completion of the wastewater pretreatment plant and for a complete closure of the settling lagoons.

NUS Corporation collects four groundwater samples, two surface water samples and corresponding sediment samples, one sewer sample, two soil samples, and three lagoon sediment samples. Analytical results indicate the following:

- Groundwater is contaminated with chlorobenzenes, benzene, phenol, dimethylphenol, a phthalate, and cobalt.
- The surface soils are contaminated with polynuclear aromatic hydrocarbons (PAHs), toluene, a Phthalate, and N-nitrosodiphenylamine.

- The lagoon sediment samples are contaminated with PAHs, polychlorinated biphenyls (PCBs), phthalates, chlorobenzenes, benzene and substituted benzenes, trichloroethane, dichloroethane, and other volatile organics.

- Sediments from Ellicott Creek contained PCBs in both the upgradient and downgradient samples.

- The sewer sample was contaminated with phthalates, phenols, trichloroethane, trichloroethene, substituted benzenes, 2-methylnapthalene, chromium and lead.

The groundwater and lagoon sediment results are given in Tables 2-4 and 2-3 respectively. An HRS score of 5.07 is calculated.

1988 Submittal of soil sampling and closure plans to NYSDEC. The excavation of the lagoons occurs between September 12 and October 15. The lagoons were excavated to a depth of 14' to 16' below surface grade. Analytical results of excavated material is given in Tables 2-5 through 2-7.

1989 Excavation and sampling complete. Groundwater results are given in Tables 2-8 and 2-9 and show a decline in concentration for all wells. In addition, chlorobenzene (0.029 ug/l), 1,3 - dichlorobenzene (less than 0.01 ug/l), 1,2 - dichlorobenze (less than 0.01 ug/l), isophorone (less than 0.01 ug/l) and di-n-butyl phthalate (less than 0.01 ug/l) were also detected.

SITE HYDROGEOLOGY

Four monitoring wells were installed on site by the Anderson Drilling Company in August of 1981. The depth of these wells range from 16.5 to 23.5 feet. The soil columns determined from these wells are as follows:

Soil Type	Depth (ft) Well B-1	Well B-2	Well B-3	Well B-4
Mixed fill/topsoil	0-2	0-8	0-0.3	0-1.5
Brown to gray silt and clay	-	8-18	0.3-8	1.5-8
Brown to gray fine sand	2-BOB	-	8-21.5	8-15
Red Clay	-	18-BOB	21.5-BOB	15-BOB
Bottom of Boring (BOB)	21.0	20.5	23.5	16.5

At other sites (e.g. Huntley Flyash Landfill) this clay can be as thick as 40 feet with hydraulic conductivities from 10^{-5} to 10^{-7}

Table 2-2

EP TOXICITY AND CHARACTERISTIC WASTE DATA FOR LAGOON SLUDGES, CLTL SITE†

Chemical Constituent	Maximum Contaminant Regulatory Limit††	11-21-80*	7-27-82**	Sludge Composite Pits 1, 2, 3 8-17-87***
EP Tox Arsenic	5.0	0.031	<0.001	<0.5
EP Tox Barium	100.0	<0.5	0.390	<5.0
EP Tox Cadmium	1.0	<0.05	0.004	<0.1
EP Tox Chromium	5.0	<0.250	0.038	<0.5
EP Tox Lead	5.0	<0.360	0.063	<0.5
EP Tox Mercury	0.2	<0.0005	<0.002	<0.0008
EP Tox Selenium	1.0	<0.013	<0.001	<0.5
EP Tox Silver	5.0	<0.05	<0.001	<0.5
EP Tox Endrin	0.02	--	<0.00002	--
EP Tox Lindane	0.4	--	<0.00001	--
EP Tox Methoxyclor	10.0	--	<0.00002	--
EP Tox Toxaphene	0.5	--	<0.0005	--
EP Tox 2,4,D	10.0	--	<0.0001	--
EP Tox 2,4,5-TP (Silvex)	1.0	--	<0.0001	--
Color	--	--	Dark gray	--
Moisture Content	--	--	40%	--
Specific Gravity	--	--	1.4 g/ml	--
Flash Point	--	--	>140°F	>140°F
Cyanides	--	--	<1.5 ppm	<1.0 ppm
Sulfides	--	--	18.4 ppm	1,000 ppm
pH	--	--	11.7	10.3

† = in mg/L unless otherwise noted.
†† = Maximum contaminant concentration for EP Toxicity (40 CFR, 261.24).
* = Advanced Environmental Systems, Inc.
** = ARO Corporation
*** = Ecology and Environment, Inc.
-- = Not determined

Source: Adapted from ES 1986.

Table 2-3

EPA ANALYTICAL DATA, MAY 1987, CLTL SITE

Chemical Constituent	Lagoon 1 Sediment (mg/kg)	Lagoon 2 Sediment (mg/kg)	Lagoon 3 Sediment (mg/kg)	Wastewater Discharge (mg/L)
Chlorinated Organic Compounds				
Methylene chloride	<0.005	**	0.05	0.082
1,1,1-trichloroethane	0.018	0.97	0.130	0.130
t-1,2-dichloroethene	0.040	<0.5	<0.005	<0.05
Aroclor 1248	<0.4	32	<0.080	<2.5
1,1-dichloroethane	<0.005	<0.5	0.031	<0.05
Trichloroethene	<0.005	<0.5	<0.005	0.083
Aromatic Compounds				
Toluene	0.014	0.990	0.085	0.040*
Ethylbenzene	0.018	0.32	0.027	<0.05
Total xylene	<0.005	1	0.075	<0.05
Napthalene	<5.8	210	<6.2	1.0
2-methylnapthalene	<5.8	1,300	49	3.2
Benzoic acid	96	<960	<96	0.180*
Alkylbenzene	21	--	--	--
Phenol	<20	<200	<20	2.9
Miscellaneous Organic Compounds				
Styrene	0.037	<2.1	26	<0.50
di-n-octylphthalate	<20	200	67	0.32*
2-butanone	0.017	--	98	<0.10
4-methyl-2-pentanone	<20	1	0.011	<0.10
di-n-butylphthalate	<1.4	23	47	0.120*
bis(2-ethylhexyl)phthalate	<14	<2,900	<780	2.2
Metals				
Arsenic	0.012*	0.0047*	0.0004*	<0.005
Barium	0.074	0.147	0.076	0.314
Cadmium	--	--	--	0.0075
Chromium	0.051*	0.024*	0.070*	0.381
Lead	--	--	--	0.370
Mercury	--	--	--	<0.0002
Selenium	<0.0005	0.0009*	0.0009*	--
Silver	0.0027	<0.0023	<0.0031	<0.01
Zinc	0.283	0.481*	1.16*	2.7
Iron	15.2	2.73	5.84	14.2

* = Estimated value. Concentration below specified limit.
** = Methylene chloride found in method blank for Lagoon 2 sediment.
-- = No detection limit specified.

Source: EPA 1987.

Table 2-4

GROUNDWATER MONITORING DATA FOR SELECTED PARAMETERS, CLTL SITE*

Chemical Constituent	Class GA Water Std. in NYS	Well B-1 (Upgradient)	Well B-2	Well B-3	Well B-4
September 1982**					
Phenol	0.001	0.020	0.032	0.025	0.019
TOC	--	28	72	80	41
Iron	0.3	5.1	5.9	73	50
Lead	0.025	<0.005	<0.005	0.005	0.007
Manganese	0.3	1.3	0.10	0.91	0.91
May 1982**					
Phenol	0.001	0.027	0.039	0.025	0.020
TOC	--	32	79	72	19
Iron	0.3	5.6	10.0	9.5	300
Lead	0.025	0.06	0.13	<0.03	0.05
Manganese	0.3	1.2	0.22	0.65	1.5
March 1982**					
Phenol	0.001	0.018	0.014	0.044	0.012
TOC	--	40	46	54	16
Iron	0.3	2.5	5.6	9.9	48
Lead	0.025	<0.03	<0.03	0.03	0.04
Manganese	0.3	2.0	0.09	0.63	13
December 1981**					
Phenol	0.001	0.016	0.020	0.050	<0.01
TOC	--	42	74	51	14
Iron	0.3	73	28	34	0.4
Lead	0.025	<0.03	<0.03	<0.03	<0.03
Manganese	0.3	1.0	0.99	0.87	0.49
May 1987***					
Phenol	0.001	<0.01	<0.01	0.023	<0.01
Iron	0.3	69.4	34.3	201.0	44.5
Lead	0.025	0.08	0.026	0.20	0.038
Manganese	0.3	2.59	0.472	4.08	1.460
Zinc	0.5	0.339	0.089	7.41	0.160
Chromium	0.05	0.044	0.013	0.059	0.027
Benzene	BDL	<0.1	<0.420	0.570	<0.500
1,4-dichlorobenzene	--	<0.01	<0.01	<0.01	0.010
trans 1,2-dichloroethene	--	0.280	<0.420	<0.500	<0.500

* = All analytical results are expressed in mg/L unless otherwise indicated.
** = Chemical Leaman Tank Lines 1985.
*** = EPA 1987.
BDL = Below detection limit.
-- = No regulatory standard.

Source: CLTL 1985; EPA 1987.

TABLE 1-5

CHEMICAL CONSTITUENT	LAGOON #1	E & E ACTION LEVEL MG/KG PPM
Chlorinated Organic Compounds		
Methylene chloride	0.069	5
1,1,1-Trichloroethane	1.7	5
Trans-1,2-dichloroethene	0.099	5
PCB Aroclor 1248	<2.6	10
1,1-Dichloroethane	<.015*	5
Trichloroethene	3.0	5
Aromatic Compounds		
Toluene	1.7	100
Ethylbenzene	1.2	100
Total Xylene	5.0	5
Naphthalene	17.0	5
2-Methylnaphthalene	36.0	5
Benzoic Acid	<5.5*	15
Phenol	2.3	4
Miscellaneous Organic Compounds		
Styrene	2.0	5
Di-n-octylphthalate	2.0	100
2-Butanone	0.56	5
4-Methyl-2-pentanone	<0.03	5
Di-n-butylphthalate	18.0	100
Bis(2-ethylhexyl)phthalate	24.0	100
Metals		
Arsenic	13.4	15
Barium	45.4	100
Cadmium	15.6	25
Hexavalent Chromium	---	25
Lead	22.0	100
Selenium	<1.30	0.05

* = Compound present below measurable detection limit.

Table 1-6

Chemical Constituent	Surface Impoundment #2 (mg/kg)	Action Level (mg/kg)
Chlorinated Organic Compounds		
Methylene chloride	1.7	5
1,1,1-Trichloroethane	4.5	5
trans-1,2-dichloroethene	2.1	5
Aroclor 1248	.4	10
1,1-Dichloroethane	< 1	5
Trichloroethene	15	5
Aromatic Compounds		
Toluene	5	100
Ethylbenzene	2	100
Total xylene	7.8	5
Napthalene	20	5
2-Methylnapthalene	38E	5
Benzoic acid	< 8	15
Phenol	5.0	4
Miscellaneous Organic Compounds		
Styrene	4.4	5
Di-n-octylphthalate	1.65	100
2-Butanone	< 2	5
4-Methyl-2-pentanone	< 2	5
Di-n-butylphthalate	3.3	100
Bis(2-ethylhexyl)phthalate	32E	100
Metals		
Arsenic	4.14	15
Barium	23.8	100
Cadmium	4.05	25
Hexavalent Chromium	27.7	25
Lead	10.3	100
Selenium	< .5	.05

E = Estimated

TABLE 1-7

CHEMICAL CONSTITUENT	SURFACE IMPOUNDMENT #3	E & E ACTION LEVEL MG/KG PPM
Chlorinated Organic Compounds		
Methylene chloride	.062	5
1,1,1-Trichloroenthane	<.012	5
Trans-1,2-dichloroethene	.063	5
PCB Aroclor 1248	<0.10	10
1,1-Dichloroethane	<.012*	5
Trichloroethene	.044	5
Aromatic Compounds		
Toluene	0.180	100
Ethylbenzene	0.092	100
Total Xylene	0.280	5
Naphthalene	<0.420*	5
2-Methylnaphthalene	<0.420*	5
Benzoic Acid	<0.420	15
Phenol	<0.420	4
Miscellaneous Organic Compounds		
Styrene	0.026	5
Di-n-octylphthalate	<0.420	100
2-Butanone	0.028	5
4-Methyl-2-pentanone	<0.024	5
Di-n-butylphthalate	<0.420	100
Bis (2-ethylhexyl)phthalate	1.100	100
Metals		
Arsenic	3.51	15
Barium	71.40	100
Cadmium	<1.30	25
Hexavalent Chromium	---	25
Lead	10.80	100
Selenium	<1.00	0.05

* = Compound present below measurable detection limit.

Table 2-8

Summary Results of Groundwater Analyses For Organics (mg/l)

Well Locations
(See Soil Sampling Plan)

Parameters	B-1	B-2	B-3	B-4	Trip Blank
Vinyl Chloride	0.32	<0.01	0.019	<0.01	<0.01
Methylene Chloride	0.13	0.023	0.025	0.028	0.024
Acetone	<0.05	<0.01	0.012	<0.01	<0.01
Trans-1,2-Dichloroethene	0.07	<0.005	<0.005	<0.005	<0.005
Benzene	<0.025	<0.005	0.41	<0.005	<0.005
Toluene	<0.025	<0.005	0.005	0.005	<0.005
Chlorobenzene	<0.025	<0.005	0.029	0.011	<0.005

NOTE:
Results of all groundwater analyses attached.

Table 2-9

(all results in mg/L)

	Sample Identity	B-1	B-2	B-3	B-4	NYSDEC STANDARD
Antimony		<0.060	<0.060	<0.060	<0.060	N/A
Arsenic		<0.005	<0.005	0.006	<0.005	0.025
Beryllium		<0.002	<0.002	<0.002	<0.002	N/A
Cadmium		<0.005	<0.005	<0.005	<0.005	0.01
Chromium		<0.010	<0.010	<0.010	<0.010	0.05
Copper		0.020	<0.010	<0.010	<0.010	1.0
Lead		0.006	<0.005	<0.005	<0.005	0.025
Mercury		<0.0002	<0.0002	<0.0002	<0.0002	0.002
Nickel		0.020	<0.015	<0.015	<0.015	N/A
Selenium		<0.005	<0.005	<0.005	<0.005	0.02
Silver		<0.010	<0.010	<0.010	<0.010	0.05
Thallium		<0.005	<0.005	<0.005	<0.005	N/A
Zinc		0.058	0.017	0.013	<0.010	5.0

cm/sec. The aquifer of concern at the Chemical Leaman site would occur in the fill and fine sand layers.

None of these wells reached bedrock; however, a well installed at the Exolon Corporation about 1/2 mile north of the site encountered bedrock at a depth of 86 feet.

A shallow perched water table exists approximately 8 to 12 feet in depth above the red clay. This aquifer may be hydraulically connected with Ellicott Creek, however, previous groundwater flow maps indicate variable flow directions (Figures 2-2 and 2-5).

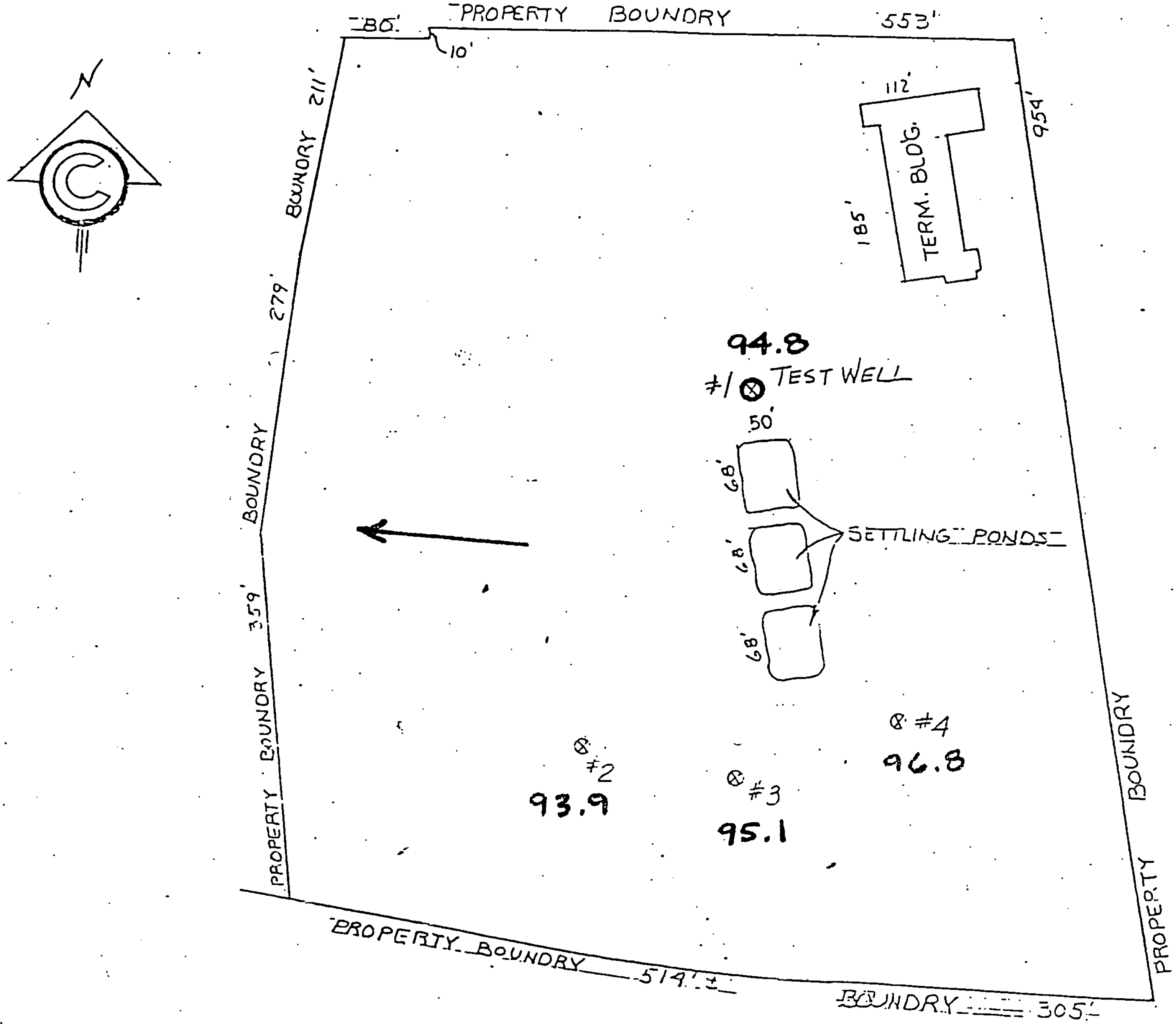
RECOMMENDATIONS

In a letter dated October 17, 1989 from Mr. James Rakitsky to Mr. Martin Doster, Chemical Leaman Tank Lines proposed the following additional actions:

1. Complete backfilling of the remaining pond.
2. Conduct water level measurements of the four on-site monitoring wells to determine groundwater flow direction.
3. Install a new upgradient well.
4. Completely clay cap the three lagoons during the spring of 1990.
5. Resample existing wells and new upgradient well for chlorinated and aromatic compounds previously detected.
6. Assess results of groundwater testing to determine course of action.

Following is my assessment of these six proposed actions.

1. Backfilling - this is part of the excavation project and should be completed as soon as possible.
2. Groundwater Flow Direction - existing groundwater flow maps (Figures 2-2 to 2-5) indicate a variable flow direction throughout the year. Between at least January and May the flow direction is westward. There is no existing well at this location. It appears likely that one additional downgradient well will be required.



TONAWANDA, N.Y.

TERM #42

TEST WELLS ELEV.

WELL	TOP ELEV.
#1	100.67
#2	100.96'
#3	103.50'
#4	100.50'

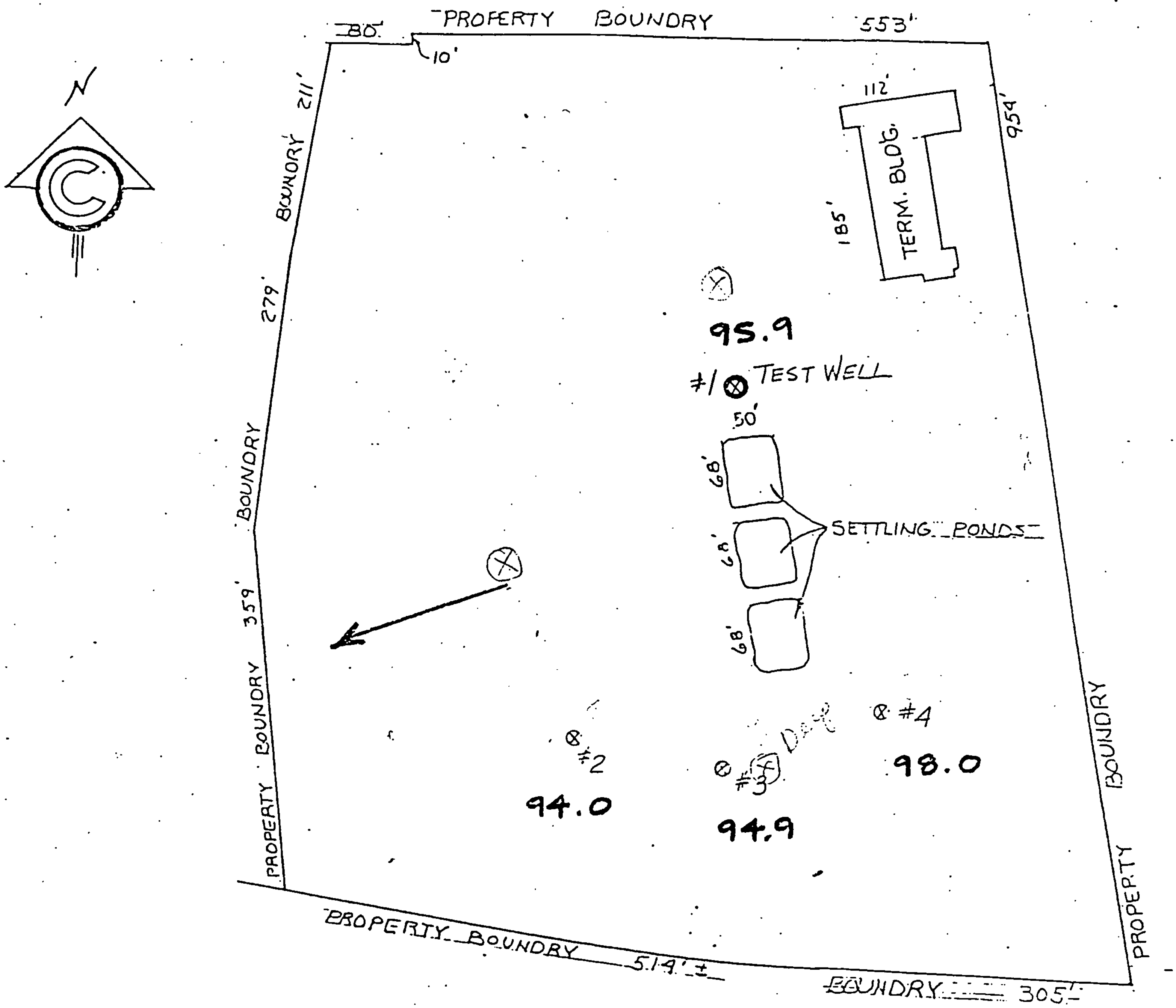
TEST WELL SYMBOLS

⊗ DOWN GRADIENT WELLS
⊙ UP GRADIENT WELL (WELL #1)

SCALE: 1 INCH = 150 FT.

1/3/82

Figure 2-2



TONAWANDA, N.Y.

TERM #42

TEST WELLS ELEV.

WELL	TOF ELEV.
#1	100.67'
#2	100.96'
#3	103.50'
#4	100.50'

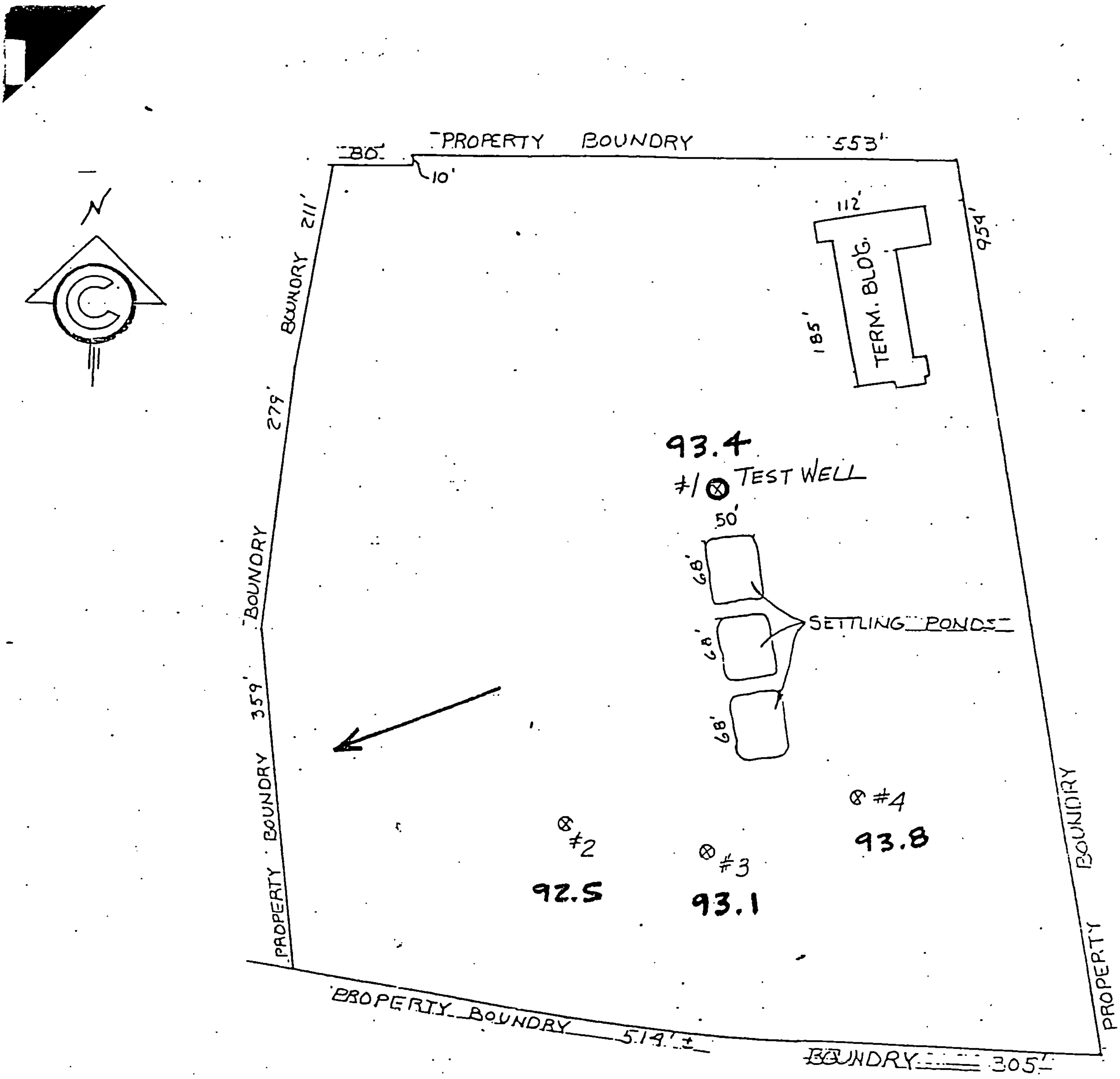
TEST WELL SYMBOLS

⊗ DOWN GRADIENT WELLS
⊙ UP GRADIENT WELL (WELL #1)

SCALE: 1 INCH = 150 FT.

4/13/82

Figure 2-3



TONAWANDA, N.Y.

TEST WELLS ELEV.

WELL	TOP ELEV.
#1	100.67'
#2	100.96'
#3	103.50'
#4	100.50'

TERM #42

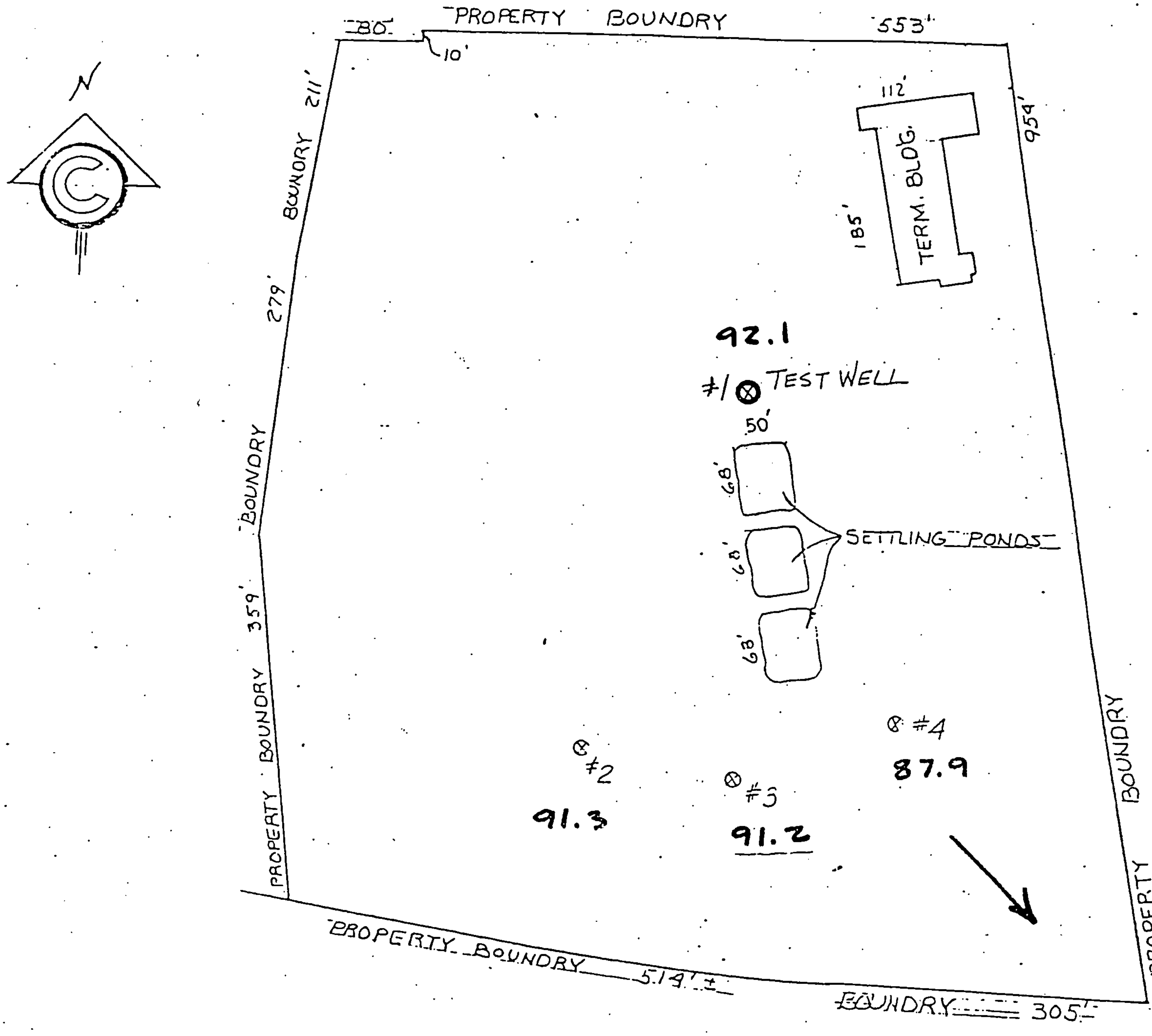
TEST WELL SYMBOLS

⊗ DOWN GRADIENT WELLS
⊙ UP GRADIENT WELL (WELL #1)

SCALE: 1 INCH = 150 FT.

5/27/82

Figure 2-4



TONAWANDA, N.Y.

TEST WELLS ELEV.

WELL	TOP ELEV.
#1	100.67'
#2	100.96'
#3	103.50'
#4	1[illegible].30'

TERM #42

TEST WELL SYMBOLS

⊗ DOWN GRADIENT WELLS
⊙ UP GRADIENT WELL (WELL #1)

SCALE: 1 INCH = 150 FT.

9/27/82

Figure 2-5

3. New Upgradient Well - the existing upgradient well is contaminated. Concentrations of phenol, iron, lead and manganese have exceeded NYSDEC drinking water standards. A new well that is clearly upgradient of the lagoons is required.

4. Clay Cap - this is part of the excavation project and should be completed as soon as possible.

5. Sampling and Analysis - compounds detected in soils during lagoon excavation (Tables 2-5 to 2-7) as well as compounds previously detected in groundwater samples should be analyzed for. This includes metals in addition to chlorinated and aromatic compounds.

6. Assess Results - this assessment should be in the form of a report which details the excavation procedures and the new work to be conducted.

In addition, some type of long term monitoring program should be implemented to better assess the effectiveness of lagoon excavation.

A. Listing of 65 Toxic Pollutants as outlined in "Appendix B"

29. Dichloropropane and Dichloropropene
30. 2,4 Dimethylphenol
31. Dinitrotoluene
32. Diphenylhydrazine
33. Endosulfan and Metabolites
34. Endrin and Metabolites
35. Ethylbenzene
36. Fluoroanthene
37. Haloethers (other than those listed elsewhere; includes chlorophenylphenyl ethers, bromophenylphenyl ether, bis-(dischloroisopropyl) ether, bis-(chloroethoxy) methane and polychlorinated diphenyl ethers)
38. Halomethanes (other than those listed elsewhere; includes methylene chloromethylchoride, methylbromide, bromoform, dichlorobromomethane, trichlorofluoromethane, dichlorodifluromethane)
39. Heptachlor and Metabolites
40. Hexachlorobutadiene
41. Hexachlorocyclohexane (all isomers)
42. Hexachlorocyclopentadiene
43. Isophorone
*44. Lead and Compounds
*45. Mercury and Compounds
46. Naphthalene
*47. Nickel and Compounds
48. Nitrobenzene
49. Nitrophenols (including 2,4 dinitrophenol; dinitrocresol)
50. Nitrosamines
51. Pentachlorophenol
52. Phenol
53. Phthalate Esters
54. Polychlorinated Biphenyls (PCSs)
55. Polynuclear Aromatic Hydrocarbons (including benzanthracenes, benzopyrenes, benzofluoroanthene, chrysenes, dibenzanthracenes, and indenopyrenes)
*56. Selenium and Compounds
*57. Silver and Compounds
58. 2,3.7,8 Tetrachlorodibenzo-p-Dioxin (TCDD)
59. Tetrachloroethylene
*60. Thallium and Compounds
61. Toluene
62. Toxaphene
63. Trichloroethylene
64. Vinyl Chloride
*65. Zinc and Compounds

*The term "compounds" includes organic and inorganic compounds.

August 18, 1978

IMMEDIATE PRELIMINARY CLEANING PROCEDURES
FOR CHEMICAL COMMODITIES INCLUDED IN SIXTY-FIVE (65)
TOXIC POLLUTANTS IN FEDERAL REGISTER,
VOLUME 43, DATED JUNE 26, 1978,
"APPENDIX B"

* * *

A. Listing of 65 Toxic Pollutants as outlined in "Appendix B"

1. Acenaphthene
2. Acrolein
3. Acrylonitrile
4. Aldrin/Dieldrin
*5. Antimony and Compounds
*6. Arsenic and Compounds
7. Asbestos
8. Benzene
9. Benzidine
*10. Beryllium and Compounds
*11. Cadmium and Compounds
12. Carbon Tetrachloride
13. Chlordane (technical mixture and methabolites)
14. Chlorinated Benzenes (other than dichlorobenzenes)
15. Chlorinated Ethanes (including 1,2 dichloroethane, 1,1,1-trichloroethane and hexachloroethane)
16. Chloroalkyl Ethers (chloromethyl, chloroethyl and mixed ethers)
17. Chlorinated Naphthalene
18. Chlorinated Phenols (other than those listed elsewhere; includes trichlorophenols and chlorinated cresols)
19. Chloroform
20. 2-Chlorophenol
*21 Chromium and Compounds
*22. Copper and Compounds
23. Cyanides
24. DDT and Metabolites
25. Dichlorobenzenes (1,2-1,3 and 1,4 dichlorobenzenes)
26. Dichlorobenzidine
27. Dichloroethylenes (1,1 and 1,2 dichloroethylene)
28. 2,4 Dichlorophenol

*The term "compounds" includes organic and inorganic compounds.

B-11

Area Population Figures
The Buffalo News, January 25, 1991

C
Friday, January 25, 1991
THE BUFFALO NEWS
Local News

Area lost 4.3% of residents since '80, census shows

Erie County's decline of 4.62% ranks as the largest in the state

By DOUGLAS TURNER
News Washington Bureau Chief

WASHINGTON — Driven by the continuing flight of residents from Buffalo and Niagara Falls, the Buffalo metropolitan area lost 53,358, or 4.3 percent, of its residents in the last 10 years, according to the final 1990 census figures released Thursday.

The metropolitan area is made up of Erie County, which suffered the largest percentage decrease of any county in the state (4.62 percent), and Niagara County, which lost 2.9 percent of its population.

Combined, those two counties have dropped from 1,232,826 residents in 1980 to 1,189,288 in 1990.

Separately, Niagara County's population has gone from 227,354 to 220,756.

And Erie County's population has fallen from 1,015,472 to 968,532, the first time it has gone below the 1 million mark since 1950. It hit a high in 1970, with a count of 1,113,491.

County Executive Gorski could not be reached to comment. He is on his way to Tampa. Deputy County Executive David R. Smith said the population loss is not unexpected.

"I think the numbers verify something we've known for quite a while," he said. "Obviously, we lost people in the early part of the decade when plants were closing and jobs were evaporating."

While the county stands to lose some amount of federal and state aid, which is based on the local head count, the reduction should be modest, Smith said. State and local revenue sharing, which is tied directly to population tallies, already has been scaled back.

"We've already lost the big categories of aid that are populaton-driven, so I don't expect any major negative impact from the census numbers," he said.

The Census Bureau said 328,123 people now live in Buffalo, down 8.3 percent from the 357,870 recorded in 1980 — the largest decrease among the state's five major upstate cities, which include Albany, Rochester, Syracuse and Yonkers.

POPULATION DROPPING

Census figures down

	1980	1990
Erie, Niagara	1,232,826	1,189,288
Erie County	1,015,472	968,532
Niagara County	227,354	220,756
Niagara Falls	71,384	61,840
Buffalo	357,870	328,123

Niagara Falls declined 13.4 percent to 61,840.

The only significant gains in the Buffalo metropolitan area were in towns close to the University at Buffalo North Campus — Amherst, up 2.8 percent to 111,711; Clarence, up 10.4 percent to 20,041, and the Niagara County Town of Lockport, up 28.2 percent to 16.5[illegible].

However, nearly every large community in the eight Western New York counties that once had a major industry — or was home for employees of those industries — experienced radical losses.

The four counties in the industrial grid stretching from the Niagara Frontier to the Pennsylvania line — Erie, Niagara, Chautauqua and Cattaraugus — had 60,031 fewer residents than in 1980. All the cities in Western New York experienced declines, ranging from 2 percent in Batavia to 9.2 percent in Dunkirk.

Al Price, acting dean of planning and design at UB, said the losses paralleled the decline of heavy industry in the region, which he said was mainly caused by dramatic changes in the global economy and poor investment decisions by those who controlled these American-owned exporting companies.

This shrinkage has clearly had an impact on the region's retail industry, Price said.

Niagara Falls Mayor Michael Michael C. O'Laughlin said he was surprised to see his city's population had dropped from 71,384 to 61,840.

The only large city in the state

See **Census** *Page* **C4**

Census: State population is 17.9 million

Continued from Page C1

that gained was New York City, with 250,925 more residents than it had in 1980. The census reported 7,322,564 people lived in New York City in 1990.

Statewide, New York's population increased from 17,558,165 in 1980 to 17,990,455 in 1990, according to the bureau. But as a result of population shifts to the South and West, New York is expected to lose three House seats after redistricting.

The figures released Thursday are, for the most part, final. The Census Bureau has until July 15 to announce whether it will make any adjustment.

New York State is involved in a federal lawsuit to force the Commerce Department to make a statistical adjustment.

The 1990 census totals for Western New York cities and the percentage of change follow:

Batavia — 16,310, down 2 percent.

Dunkirk — 13,898, down 9.2 percent.

Jamestown — 34,681, down 3 percent.

Lackawanna — 20,585, down 9.3 percent.

Lockport — 24,426, down 1.8 percent.

✱ North Tonawanda — 34,989, down 2 percent.

✱ City of Tonawanda — 17,284, down 7.5 percent.

Olean — 16,946, down 6.9 percent.

Salamanca — 6,556, down 4.8 percent.

The totals for Erie County towns and their percentage of change follow:

Alden — 10,372, up 2.8 percent.

Aurora — 13,433, down 3.2 percent.

Boston — 7,445, down 3.1 percent.

Brant — 2,119, down 13 percent.

Cheektowaga — 99,314, down 9.3 percent.

Colden — 2,899, down 7.3 percent.

Collins — 6,020, up 19.5 percent.

Concord — 8,387, up 2.6 percent.

Eden — 7,416, up 1.2 percent.

Elma — 10,355, down 2.1 percent.

Evans — 17,478, down 2.7 percent.

Hamburg — 53,735, up 0.9 percent.

Holland — 3,572, up 3.7 percent.

Lancaster — 32,181, up 6.8 percent.

Marilla — 5,250, up 8 percent.

Newstead — 7,440, up 2.9 percent.

North Collins — 3,502, down 7.6 percent.

Orchard Park — 24,632, up 1.1 percent.

Sardinia — 2,667, down 4.5 percent.

✱ Town of Tonawanda — 82,464, down 9.6 percent.

Wales — 2,917, up 2.6 percent.

West Seneca — 47,830, down 6.6 percent.

POPULATION WITHIN 3 MILES OF CHEMICAL LEAMAN.

APPROX PER CENT		
100 %	CITY OF TONAWANDA	17284
85 %	CITY OF NORTH TONAWANDA	29740
70 %	TOWN OF TONAWANDA	57724
5 %	TOWN OF AMHERST	5585
	APPROX TOTAL	110,333

Population Within 3 Miles of Chemical Leaman Tank Lines

B-12

Boring Logs CLTL Wells, August 1981

ANDERSON DRILLING COMPANY INC.
4318 S. BUFFALO STREET, ORCHARD PARK, NEW YORK 14127 (716) 662-5525

PROJECT: Chemical Leman Tank Lines
LOCATION: Tonawanda, New York
DATE STARTED: 8/14/81
DATE FINISHED: 8/14/81
HOLE NO.: B-1
SURF. ELEV.:
METHOD OF INVESTIGATION: ASTM D-1586, Using Drilled-In Casing.

DEPTH (FT)	SAMPLE NO.	BLOWS ON SAMPLER 0/6	6/12	12/18	N	BLOWS ON CASING	DESCRIPTION OF RECOVERED SAMPLES	REMARKS & WATER READINGS
0							CINDERS, SAND, FILL (Hand Excavated)	0-2' dug by hand to expose electric cable.
	1	4	3				Wet br. loose fine SAND & Silt, little medium-coarse Sand, trace fine gravel (Fill)	
		4	5		7			
5	2	1	2				Wet gray loose organic fine SAND, some Silt, trace roots	
		2	5		4			
	3	7	8				Wet brown firm fine SAND, trace silt	
		10	15		18			
	4	4	5					
10		4	6		9		Becomes gray-loose-firm	
	5	6	7					
		6	8		13			
15	6	4	6	7	13			
20	7	2	2	4	6			
							Boring Complete at 21.0 feet.	1. First free standing water at 1.4 feet. 2. Installed 2" dia. PVC well at 20.0 feet. 10' screen 12.2' riser 1 protective casing. 3. Free standing water after 48 hours, 4.8 feet.

N = No. blows to drive 2 " spoon 12 " with 140 lb. pin wt. falling 30 " per blow. Sheet 1 of 1

NDERSON DRILLING COMPANY INC.

4318 S. BUFFALO STREET, ORCHARD PARK, NEW YORK 14127 (716) 662-5525

PROJECT Chemical Leman Tank Lines | DATE STARTED 8/14/81 | HOLE NO B-2

DATE FINISHED 8/14/81 | SURF. ELEV.

LOCATION Tonawanda, New York | METHOD OF INVESTIGATION ASTM D-1586, Using Drilled-In Casing.

DEPTH	SAMPLES	SAMPLE NO.	BLOWS ON SAMPLER 0/6	6/12	12/18	N	BLOW ON CASING C	DESCRIPTION OF RECOVERED SAMPLES	REMARKS & WATER READINGS
0		1	1	2				Moist brown medium soft CLAY & Silt, trace fine-coarse sand (Fill)	
			2	3		4			
		2	3	4				Contains pieces of wood	
			4	7		8			
		3	2	2				Contains some fine-coarse Sand	
5			3	4		5			
		4	4	6				Contains brick fragments	1. Layer of wet black residue at 7.0 feet.
			4	7		10			
		5	3	3				Wet gray loose Clayey SILT and fine Sand	
10			4	3		7			
		6	3	4					
			4	3		8			
		7	1	1	1	2		Wet gray soft layered Clay and fine Sand	
15									
		8	2	2	2	4		Moist red soft CLAY	
20								Boring Complete at 20.5 feet.	2. Installed 2" dia. PVC well at 19.0 feet. 10' screen 11' riser 1 protective casing. 3. Free standing water at 5.5 feet.

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

NDERSON DRILLING COMPANY INC.
4318 S. BUFFALO STREET, ORCHARD PARK, NEW YORK 14127 (716) 662-5525

PROJECT Chemical Leman Tank Lines
DATE STARTED 8/14/81 HOLE NO B-3
DATE FINISHED 8/14/81 SURF. ELEV
LOCATION Tonawanda, New York
METHOD OF INVESTIGATION ASTM D-1586, Using Drilled-In Casing.

DEPTH	SAMPLES	SAMPLE NO	BLOWS ON SAMPLER 0/6	6/12	12/18	N	BLOW ON CASING C	DESCRIPTION OF RECOVERED SAMPLES	REMARKS & WATER READINGS
0		1	2	3				4" TOPSOIL	
			3	3		6		Moist brown loose Clayey SILT, little fine Sand, few roots - organic	
		2	3	3					
			4	4		7			
5		3	3	3				Moist gray medium Silty CLAY, little-trace fine sand, organic	
			4	4		7			
		4	4	5					
			5	7		10			
		5	3	4				Moist gray loose fine SAND, little Silt	
			4	4		8			
10		6	4	5					
			5	4		10			
15		7	4	2	5	7			
20		8	2	5	5	10		Wet gray loose fine SAND	
		9	2	2	4	6		Moist red medium Silty CLAY	
								Boring Complete at 23.5 feet.	1. Installed 2" dia. PVC well at 22.6 ft. 10' screen 15' riser 1 protective casing. 2. Free standing water at 7.5 feet at completion.

N = No. blows to drive 2" spoon 12" with 140 lb. pin wt. falling 30" per blow. Sheet 1 of 1

ANDERSON DRILLING COMPANY INC.
4318 S. BUFFALO STREET, ORCHARD PARK, NEW YORK 14127 (716) 662-5525

PROJECT: Chemical Leman Tank Lines
LOCATION: Tonawanda, New York
DATE STARTED: 8/17/81
DATE FINISHED: 8/17/81
HOLE NO: B-4
SURF ELEV:
METHOD OF INVESTIGATION: ASTM D-1586, Using Drilled-In Casing.

DEPTH FEET	SAMPLES	SAMPLE NO	BLOWS ON SAMPLER 0/6	6/12	12/18	N	BLOWS ON CASING C	DESCRIPTION OF RECOVERED SAMPLES	REMARKS & WATER READINGS
0		1	1	1				TOPSOIL & ORGANIC SILT	
			2	3		3			
		2	2	2				Moist brown loose Silt & Clay, little fine Sand	
			4	3		6			
		3	2	3				Moist brown medium Silty CLAY, trace fine sand	
5			3	4		6			
		4	2	3					1. Sample #4, no recovery.
			3	4		0			
		5	3	2				Wet brown loose fine SAND, some Silt, w/layers of clay	
			3	3		5			
10		6	2	2					
			1	2		3			
15		7	1	3	6	9		Moist red medium CLAY	
								Boring Complete at 16.5 feet.	2. 2" dia. PVC well installed at 15.0 feet. 10' screen 7.4' riser 1 protective casing. 3. Free standing water at 5.8 feet at completion.

N = No. blows to drive 2" spoon 12" with 140 lb pin wt falling 30" per blow   Sheet 1 of 1.

B-13

Bedrock Depths at Two Sites Near CLTL

MALCOLM PIRNIE

TABLE 4-6

COLUMBUS McKINNON CORP.
STRATIGRAPHIC SUMMARY TABLE FOR
DEEP BORINGS

Well No.	Elevation (G.L. amsl)	Depth to Glaciolacustrine Deposit/Fill Thickness	Elevation Glacio-Lacustrine Deposit	Depth to Till	Elevation of Till	Depth to Bedrock	Elevation of Bedrock
MW-1S-90	571.71	>5.1 <7.0	566.6	NA	NA	-	-
MW-1D-90	572.13	6.2	565.9	27.6	544.53	-	-
MW-2S-90	574.35	>6.4 <7.0	567.9	NA	NA	-	-
MW-2D-90	574.57	6.7	567.9	29.4	545.17	-	-
MW-3-90	576.72	2.5	574.2	NA	NA	-	-
CM-1-89	572.4	8.2	564.2	28.6	543.8	51.2	520.8
CM-2-89	573.5	8.3	565.2	27.6	545.9	54.8	518.2
CM-3-89	571.0	8.1	562.9	27.4	543.6	52.3	518.7
CM-4-89	575.2	2.6	572.6	31.4	543.8	54.9	520.1
CM-5-89	573.6	0.0	573.6	29.1	544.5	53.0	520.0

EXOLON COMPANY
1000 East Niagara Street
Tonawanda, N. Y. 14150

WATER SUPPLY # 1

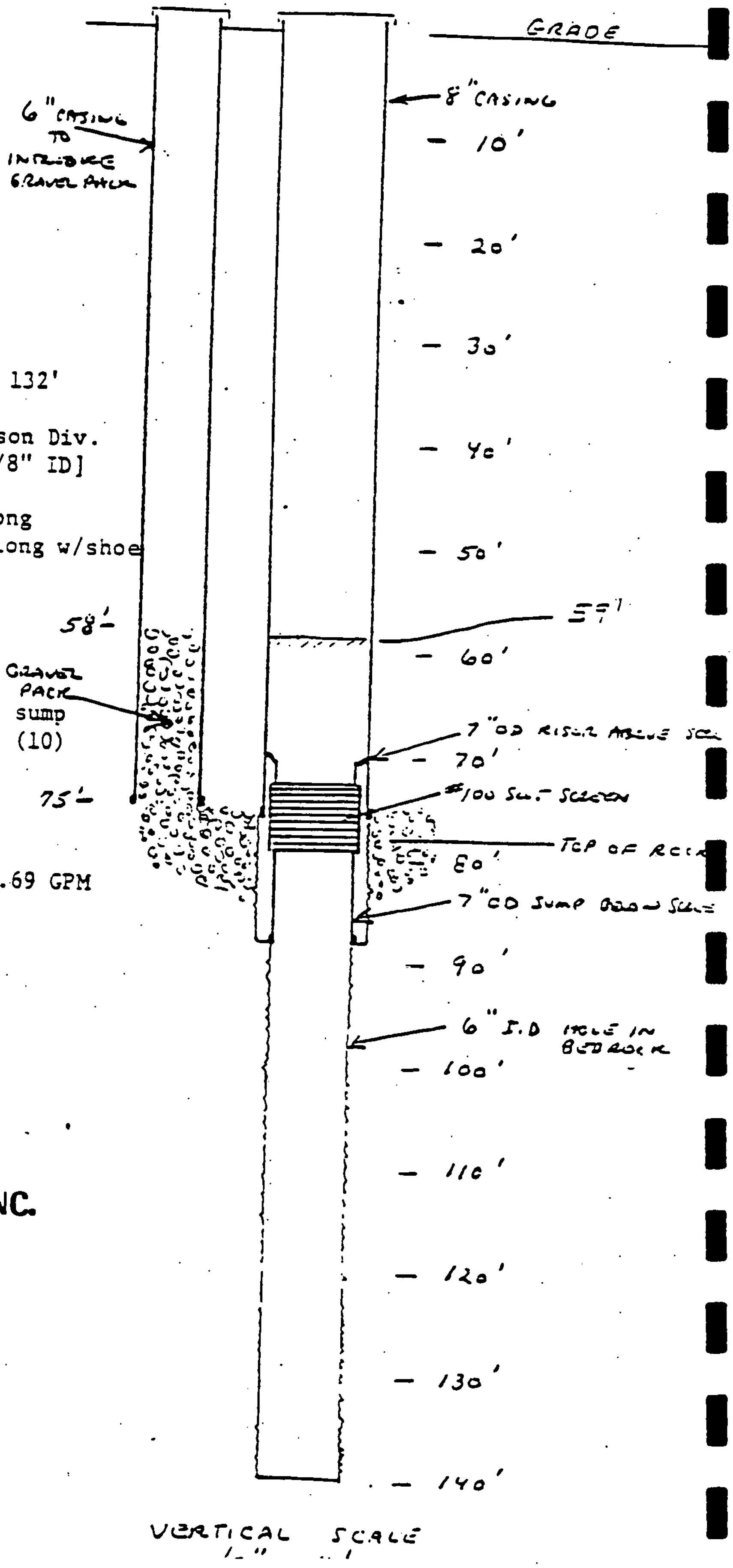
Completed: 3-28-78

Driller: Ronald Metzger
Tool Dresser: Jack Will

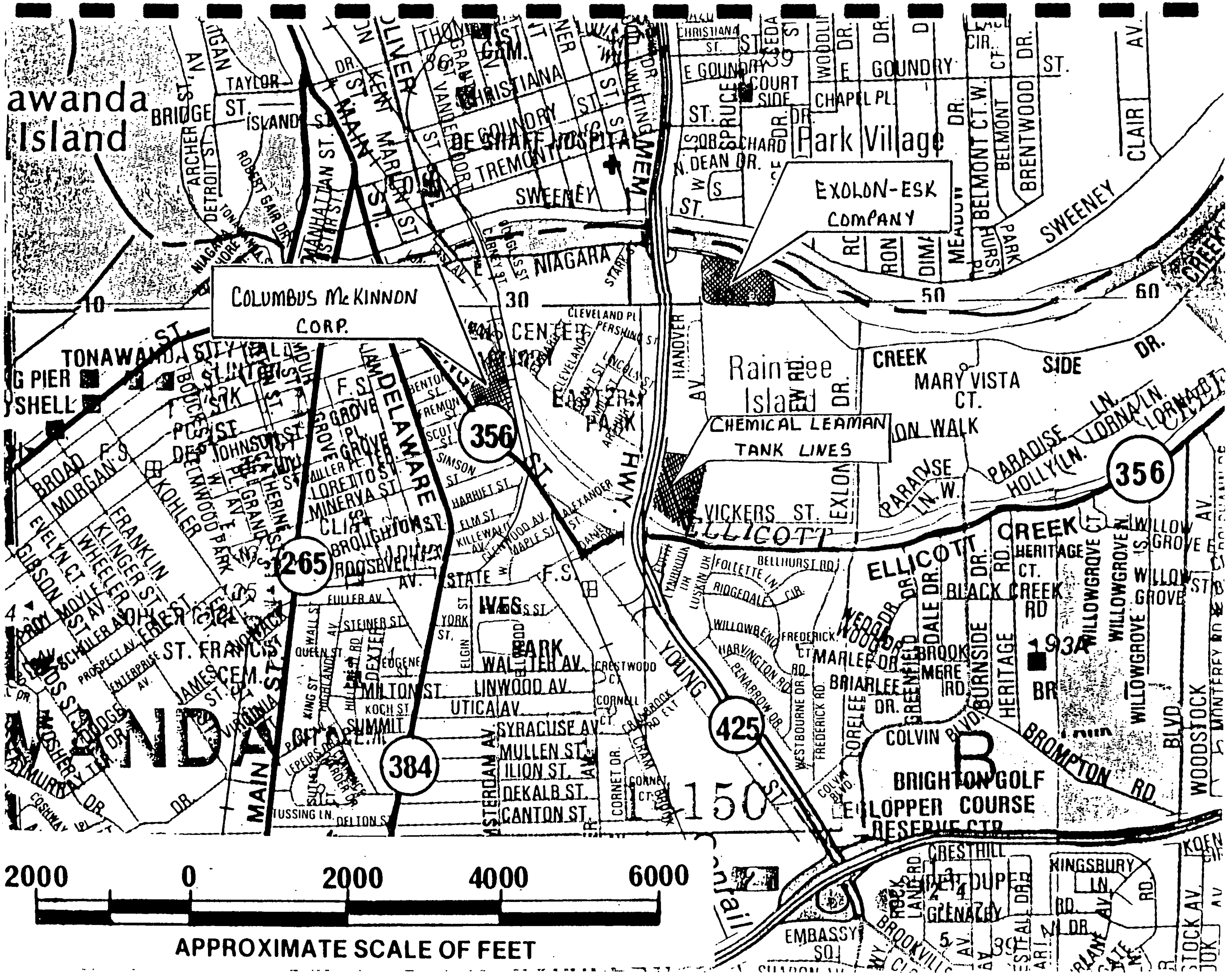
Total depth: 140'
~~Bottom of 8" hole: 88'~~
Top of Bedrock: 78'
Sand & gravel vein: 72' thru 78'
Bedrock Vein: 106' (gypsum break)
132' (limestone)
Note: Extreme hard rock: 130' thru 132'

Screen: 8" telescope size UOP Johnson Div.
100 slot throughout [6-5/8" ID]
stainless steel material
risor pipe of 7" OD 2'7" long
sump casing of 7" OD 9'0" long w/shoe
screen length: 6'0"
overall length: 17'7"
length exposed: 3'0"
Note: gravel stop ring at
bottom of screen area
and slots in the 7" OD sump
cut by acetylene torch (10)

Final pumping test: 3-27 & 28-78
Gauged 110 GPM at 59' pumping level. 24 hour test. The average rate of flow was 111.69 GPM



EHMKE WELL DRILLERS INC.
Box 4, 104 Main Street
Silver Creek, N. Y. 14136
934-2658


COLUMBUS McKINNON CORP.
EXOLON-ESK COMPANY
CHEMICAL LEAMAN TANK LINES
Park Village
BRIGHTON GOLF COURSE
2000 0 2000 4000 6000
APPROXIMATE SCALE OF FEET

B-14

Interview with Art Haller, CLTL

SITE INTERVIEW FORM

SITE: Chemical Leaman Tank Lines **PROJECT NUMBER:** 00296-01694

DATE: July 19, 1990 **TIME:** 1500

INTERVIEWER (Dunn/TAMS): George C. Moretti

INTERVIEWEE (OF SITE): Art Hallar

NO. OF YEARS WORKING AT THE SITE: 20

DATES FROM: 1970 **TO:** Present

JOB RESPONSIBILITIES AT SITE:

Previously: Dispatcher. Presently: Shop and Tank Cleaning Foreman.

INTERVIEW:

The following items were disclosed in discussions with Mr. Hallar:

- Lagoons were dewatered, excavated and backfilled during Summer 1989.
- Backfill material from lagoons came from old trolley grading located on south side of the property.
- Fill area on west side of property is approximately 10 feet deep. No records of what was placed in this area but believed to be mostly demolition debris primarily from former ~~Hen's & Kelley~~ JENNS GCM building located in City of Tonawanda. – APPROX. 1975 AFH
- Stained area at south end of property on bank of Ellicott Creek was sampled previously and revealed iron as primary constituent.

SIGNATURES:

INTERVIEWEE: Arthur F. Haller / CLTL **DATE:** 10/11/90

INTERVIEWER: George C. Moretti **DATE:** 10/11/90

B-15

Interview with Glenn May, NYSDEC, Region 9

SITE INTERVIEW FORM

SITE: Chemical Leaman Tank Lines PROJECT NUMBER: 00296-01694

DATE: October 10, 1990 TIME: 1330

INTERVIEWER (Dunn/TAMS): George C. Moretti

INTERVIEWEE: Glenn May - NYSDEC Region 9

NO. OF YEARS WORKING AT THE SITE: N/A

DATES FROM: N/A TO: N/A

JOB RESPONSIBILITIES AT SITE:

NYSDEC Region 9 Site Manager

INTERVIEW:

The following items were disclosed in discussions with Glenn May:

- An Order of Consent was issued to CLTL on January 30, 1987 for a closure of the lagoons under RCRA. BY NYSDEC DIVISION OF SOLID WASTE. GCM

- Site was also classified as a "2a" Inactive Hazardous Waste Site. The Division of Hazardous Waste maintained that the Consent Order required review and comment by the Division of Hazardous Waste before implementation. Review and comment was delayed for well over a year after the issuance of the CO. CLTL thought they may be out of compliance for not responding to the CO. and decided to go ahead and implement the remediation under the CO. CLTL completed the closure without DEC oversight.

- Region 9 is presently in negotiation with CLTL to implement a post closure monitoring program to verify the lagoon cleanup. Region 9 wants two new monitoring wells installed. One will be a new upgradient well installed east of the terminal building and one will be a new downgradient well located west of the former lagoons in the adjacent field.

SIGNATURES:

INTERVIEWEE: Glenn M May DATE: 10/15/90

INTERVIEWER: George C Moretti DATE: 10/15/90

B-16

Letter from Greg G. Ecker
NYSDEC Region 9, Bureau of Wildlife

New York State Department of Environmental Conservation
Bureau of Wildlife - Region 9
600 Delaware Avenue, Buffalo, New York 14202-1073
716/847-4550

Thomas C. Jorling
Commissioner

March 29, 1991

Ms. Leslie Gracz
Dunn Geoscience Corporation
495 Commerce Drive
Amherst, New York 14228

Dear Ms. Gracz:

I have reviewed and signed the site information forms you sent me, as per our meeting of Wednesday, March 6, 1991.

Please note the following comments concerning the site interview forms:

1. The Natural Heritage files indicate a date when a particular plant or animal species was observed. This date does not imply that the species has not existed on that site since the date, but rather the site has not been revisited. Therefore, that species may still exist today.

2. The Common Tern is currently on the New York State Threatened list. The Tonawanda water intake in the Niagara River is an important nesting area for the Terns.

3. "Designated Wetland" may not be the proper terminology for these wetland areas. New York State regulated wetland is a more appropriate title.

4. The species Redhorse that was listed in the Natural Heritage files is a fish. My recommendation is to contact our Bureau of Fisheries to obtain additional information on this species.

5. An additional issue that should be addressed is streams. Some waterways fall under the category of New York State Protected Streams. This information is available at our Delaware Avenue office.

6. Please be aware that other unique or important areas may exist within the areas you inquired about. The Bureau of Wildlife considers all wetlands associated with the Niagara River as locally important, regardless of size. Other locally significant areas, such as riparian habitats, mature woodlots, and corridors between mature woodlots are important for populations of Wildlife, fish, reptiles and amphibians.

If I can be of further assistance, please feel free to contact me at (716) 847-4550.

Sincerely,

Greg G. Ecker

Greg G. Ecker
Fish and Wildlife Technician

cc: Significant Habitat File

GGE:kah

SITE INTERVIEW FORM

SITE NO. 915014

SITE: CHEMICAL LEAMEN PROJECT NUMBER: 00296 - 01694

DATE: 3.7.91 TIME: PM 1:00 - 3:00

INTERVIEWER (DUNN/TAMS): LESLIE GRACZ

INTERVIEWEE (OF SITE): GREG G. ECKER (NYS DEC FISH & WILDLIFE)

NO. OF YEARS WORKING AT THE SITE: N/A

DATES FROM: N/A TO: N/A

JOB RESPONSIBILITIES AT SITE: N/A

INTERVIEW:

MR. ECKER IS A WILDLIFE REPRESENTATIVE FOR THE NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION. MR. ECKER ASSISTED MS. GRACZ IN THE USE OF LOCAL MAPS TO IDENTIFY STATE REGULATED WETLAND AREAS AND AREAS SIGNIFICANT TO WILDLIFE. WITHIN A THREE MILE RADIUS OF CHEMICAL LEAMEN THERE IS A DEER CONCENTRATION NEAR THE ELLICOTT CREEK PARK. 32-101 IS THE IDENTIFICATION NUMBER FOR THE AREA. THREE SIGNIFICANT WETLAND AREAS ARE ALSO IDENTIFIED WITHIN A THREE MILE RADIUS OF CHEMICAL LEAMEN. TWO AND A HALF MILES NORTH WEST OF THE FACILITY THERE ARE TWO WETLAND AREAS, THERE IDENTIFICATION NUMBERS ARE TW-10 AND TW-12. ONE OTHER WETLAND AREA IS LOCATED LESS THAN ONE HALF MILE NORTH EAST OF THE FACILITY, ITS IDENTIFICATION NUMBER IS TE-23.

SIGNATURES:

INTERVIEWEE: Greg G. Ecker DATE: 3/27/91

INTERVIEWER: [signature] DATE: 3.25.91

B-17

Letter from James A. Rakitsky, CLTL to Mark Mateunas, NYSDEC, Central

Chemical Leaman Tank Lines, Inc.

102 Pickering Way, Exton, PA 19341-0200 • 215-363-4200

December 28, 1993

New York State Department of Environmental Conservation
50 Wolfe Road
Room 220
Albany, New York 12233-7010

Attention: Mark Meteunas
Hazardous Site Central

Reference: NYSDEC Site No. 915014

Per your telephone request enclosed are the analytical results for the groundwater sampling that was conducted on April 2 and 3, 1991 at Chemical Leaman's Tonawanda, New York facility.

If you have any questions please feel free to contact me at (215) 363-4232.

Sincerely,

James A. Rakitsky
Authorized Agent

JAR/kac

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CHEMICAL LEAMAN - TONAWANDA, NEW YORK
ORGANIC ANALYSIS SUMMARY
SAMPLE DATE: APRIL 2, 1991

(all values in μg/L)

Compound	B-1	B-2	B-3	B-4	B-5	B-6	NYSDEC Class GA Standard
Base/Neutral Extractables							
1,3-Dichlorobenzene	--	--	<10	--	<10	--	5
1,4-Dichlorobenzene	--	--	--	<10	20	--	4.7
1,2-Dichlorobenzene	--	--	--	<10	34	--	4.7
Naphthalene	--	--	--	--	<10	--	10 G
Acid Extractables							
Phenol	--	--	<10	--	<10	--	b
2,4-Dimethylphenol	--	--	--	--	<10	--	b
2-Methylphenol	--	--	--	--	<10	--	b
4-Methylphenol	--	--	--	--	<10	--	b
Volatiles							
Benzene	--	--	130	--	530	--	ND
Ethylbenzene	--	--	--	--	10	--	5
Toluene	--	--	--	--	350	--	5
Total xylenes	--	--	--	--	54	--	5[c]
Chlorobenzene	14	--	13	16	63	--	5
Vinyl chloride	13	<10[a]	--	--	410	--	2
1,1-Dichloroethene	--	--	--	--	21	--	5
Total-1,2-Dichloroethene	54	--	--	--	670	--	5[a]
Trichloroethene	--	--	--	--	710	--	5
Tetrachloroethene	--	--	--	<5	1,500	--	5

02[AD]CE7010:D3661/5005/19

Note: Where "<" precedes a number, that compound was detected below the sample quantitation.

Key:

[a]Not detected in duplicate sample B-2D.
[b]NYSDEC Class GA standard for phenolic compounds (total phenols) is 1 ppb.
[c]Applies to individual isomers.

G = Guidance value.

Source: Ecology and Environment, Inc. 1991.

CHEMICAL LEAMAN - TONAWANDA, NEW YORK
INORGANIC ANALYSIS SUMMARY
SAMPLE DATE: APRIL 3, 1991

(all values in $\mu g/L$)

Analyte	B-1	B-2	B-2D	B-3	B-4	B-5	B-6	NYSDEC Class GA Standard
Antimony	--	--	--	--	--	--	--	3 G
Arsenic	35	--	5.4	24	7.6	9.7	--	25
Barium	680	480	510	85	100	330	32	1,000
Beryllium	8.3	--	--	--	--	--	--	3 G
Cadmium	56	--	5.1	--	7.8	--	--	10
Chromium	250	12	--	--	34	14	--	50
Copper	350	--	--	--	36	--	--	200
Lead	270	7.4	9.6	6.1	18	6.9	--	25
Mercury	0.50	--	--	--	--	--	--	2
Nickel	330	--	--	--	44	180	--	NA
Selenium	--	--	--	--	--	--	--	10
Silver	--	--	--	--	--	--	--	50
Thallium	--	--	--	--	--	--	--	4 G
Zinc	1,700	66	89	63	140	68	77	300
Cyanide	--	--	--	--	--	--	10	100

02[AD]CE7010:D3661/5006/23

Key:

G = Guidance value.

Source: Ecology and Environment, Inc. 1991.

GROUNDWATER CHARACTERIZATION
APRIL 2, 1991

Well	pH	Temperature (°C)	Conductivity (μmhos)	Total Dissolved Solids (mg/L)	Turbidity (NTU)
B-1	7.19	8.5	1,119	755	>200
B-2	6.87	7.6	1,294	862	>200
B-3	6.87	6.3	994	662	>200
B-4	6.69	5.5	533	355	>200
B-5	6.67	5.8	1,732	1,150	>200
B-6	6.71	6.3	1,027	685	>200

02[AD]CE7010:D3661/4990/17

Source: Ecology and Environment, Inc. 1991.