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ENGINEERING INVESTIGATIONS AT INACTIVE HAZARDOUS WASTE SITES

PRELIMINARY SITE ASSESSMENT

Stauffer Chemical -
North Love Canal
Town of Lewiston

Site No. 932034
Niagara 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:
E.C. Jordan Co.
Portland, Maine

NOVEMBER 1990

NYSDEC CONTRACT NO. D002472

NYSDEC WORK ASSIGNMENT NO. D002472-6

E.C. JORDAN CO.

FINAL REPORT

TASK 1: DATA RECORDS SEARCH AND ASSESSMENT
PRELIMINARY SITE ASSESSMENT

STAUFFER CHEMICAL-NORTH LOVE CANAL
SITE NO. 932034
NIAGARA COUNTY

NOVEMBER 1990

Submitted by:

Elizabeth Ryan
Project Manager
E.C. Jordan Co.

Approved by:

William J. Weber
NSSC Program Manager
E.C. Jordan Co.

NOTICE

This Preliminary Site Assessment report about the Stauffer Chemical-North Love Canal Site (Site No. 932034), in the Town of Lewiston, Niagara County, New York, was prepared expressly for the New York State Department of Environmental Conservation (NYSDEC) under the Superfund Standby Contract (No. D002472, Work Assignment No. D002472-6). The purpose of this report is to provide information necessary for NYSDEC to reclassify the site according to the Class 2, 3, and Delist categories described in Section 2.0 of this report. The conclusions and recommendations in the report represent E.C. Jordan's professional judgment and opinion based on present, generally accepted engineering practices for conducting preliminary site characterizations and assessments. Conclusions in this report are based on records reviews, interviews, and site walkovers performed by Jordan personnel. The health-based regulatory standards discussed in this report may change in the future. Levels of environmental contamination that are "acceptable" by current standards may not be so in the future.

Information contained in this report may not be suitable for any other use without adaptation for the specific purpose intended. Any such reuse of or reliance on the information, assessments, or conclusions in this report without adaptation will be at the sole risk and liability of the party undertaking the reuse.

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1.0 EXECUTIVE SUMMARY

The Stauffer Chemical Site, located in the Town of Lewiston, Niagara County, New York, is the northern extension of Love Canal (Figure 1). Excavation of the northern extension of Love Canal began near the turn of the century; however, it was never completed to join the southern extension (located in Niagara Falls, New York) due to poor economic conditions. The canal excavation was approximately 100 feet wide, 2,000 feet long, and 10 feet deep. Between 1930 and 1952, the canal was filled with approximately 50,000 to 75,000 cubic yards of wastes. Since 1952, the area has been covered over and developed with residential homes.

From 1930 to 1946, Niagara Smelting, a subsidiary of Stauffer Chemical Company, disposed of concrete, graphite, scrap sulfur, cinder, silicon, zirconium and titanium oxides in the canal. From 1946 to 1952, Stauffer Chemical Company disposed of scrap metal and asbestos in the canal. Union Carbide allegedly used the canal for disposal of phosphates, phenols, and flux containing fluorides; however, this has not been confirmed. Since this area was an open dump, unknown wastes from other companies may also have been disposed of in the canal.

The site is currently a rural, residential area with well-kept homes. The filled-in canal is barely discernible by a slight rise in topography. The Tuscarora Indian Reservation abuts the site to the east; ground elevation drops approximately 200 feet at the Niagara Escarpment along the northern edge of the site.

Numerous investigations have been conducted at the site. In 1979, the Town of Lewiston, New York retained Dominion Soil Investigation, Inc. (Dominion) to conduct a site inspection. During this investigation, Dominion collected subsurface soil and groundwater samples. Also in 1979 the U.S. Environmental Protection Agency (USEPA) conducted a site investigation; however, no samples were collected. In 1980, the Town of Lewiston collected crops from Escarpment and Elliott Drives and analyzed these samples for pesticides and herbicides. A preliminary site assessment was conducted by NUS Corporation (NUS) for USEPA in 1987; and a Phase I Investigation was conducted in 1989 for the New York State Department of Environmental Conservation (NYSDEC) by Ecology and Environment Engineering (E&EE). The Niagara County Health Department (NCHD) analyzed water and sediment samples from an on-site drainage ditch in 1988, and water from basement sumps overlying the canal in 1989. NUS completed a site inspection under USEPA direction in 1990, during which five shallow soil samples were collected for analysis.

Results of Dominion's subsurface soil sampling indicate that subsurface materials primarily consist of slag containing sulfur compounds, with occasional lumps of sulfur, magnesium, and phosphorus. Nitrates, cyanide, fluoride, chloride, and phenol were

detected in these soils. Groundwater was tested for pH and sulfate only; concentrations of sulfates exceeded state drinking water standards (Dominion, 1979; NYSDEC, 1986).

Results of the NCHD sampling indicated that drainage ditch water and sediments contained no detectable Hazardous Substance List (HSL) compounds, except metals within typical background levels for area soils (Dicky, 1988). Basement sump samples did not contain any HSL compounds at levels above expected background concentrations with the exception of polychlorinated biphenyls (PCBs) (NCHD, 1989; May 1990a).

During the NUS site inspection of the "Upper Mountain Road Dump," under USEPA direction in 1990, NUS personnel collected five shallow soil samples (zero to 2 feet deep) for analysis of Target Compound List (TCL) parameters (Note: the TCL replaces the HSL) (Figure 2). Several polycyclic aromatic hydrocarbons (PAHs), volatile organic compounds (VOCs), and heavy metals were detected at two of the locations sampled; however, NUS stated that "the concentrations of these substances are considered normal and do not pose a threat to human health" (NUS, 1990). PAHs and VOCs were not detected at the other three locations. In addition, NUS concluded that although the potential for groundwater contamination exists, no target populations for surface water or groundwater exposure are downgradient of the site. NUS recommended that the USEPA take no further action at the site (NUS, 1990). These recommendations were based on USEPAs criteria for hazardous waste site investigations and, therefore, may not reflect NYSDECs recommendations for further action at this site.

Wastes in the canal have not been analyzed for characteristics of Extraction Procedure (EP) toxicity, corrosivity, reactivity, and ignitability; therefore, it is not possible to determine if these wastes are hazardous as defined by 6 NYCRR Part 371 (May, 1990b). In addition, limited analyses are available to document the presence of hazardous substances in groundwater. Based on a lack of data, E.C. Jordan Co. (Jordan) cannot recommend changing the classification of the Stauffer Chemical Site on the New York State Registry of Inactive Hazardous Waste Disposal Sites.

To obtain data to confirm or deny hazardous waste disposal, Preliminary Site Assessment (PSA) Task 3 activities should be initiated. Jordan recommends sampling the subsurface waste materials and analyzing them for characteristics of EP toxicity, reactivity, corrosivity, and ignitability and the USEPA's TCL of organic and inorganic compounds. Results of these analyses will be used to determine if hazardous waste disposal occurred at this site.

Based on the results of Task 3 activities, NYSDEC will decide whether PSA Task 4 activities should be initiated to determine if any wastes present a significant threat to public health or the

environment. Should Task 4 activities be required, Jordan recommends installing monitoring wells with groundwater sampling and analysis for the TCL, or at a minimum, compounds detected in PSA Task 3 activities. Monitoring well locations should include two or more wells within the buried canal to evaluate the quality of potential leachate from the canal; an upgradient well to provide background groundwater quality data; a downgradient well to provide data to evaluate the migration of potentially contaminated groundwater; and two wells along the eastern side of Cleghorn Drive to evaluate migration of potentially contaminated groundwater toward the Indian Reservation. Monitoring wells installed by Dominion should be used if they are still adequate for sampling groundwater.

Analytical results for groundwater should be compared with state water quality standards defined in 6 NYCRR Chapter X, Part 700-705 (NYSDEC, 1986). Of particular concern at this site is the migration of contaminated groundwater toward the Tuscarora Indian Reservation and the potential impact of contaminants on the drinking water supply for this community. The comparison of groundwater analyses to state drinking water standards will determine if a significant threat exists.

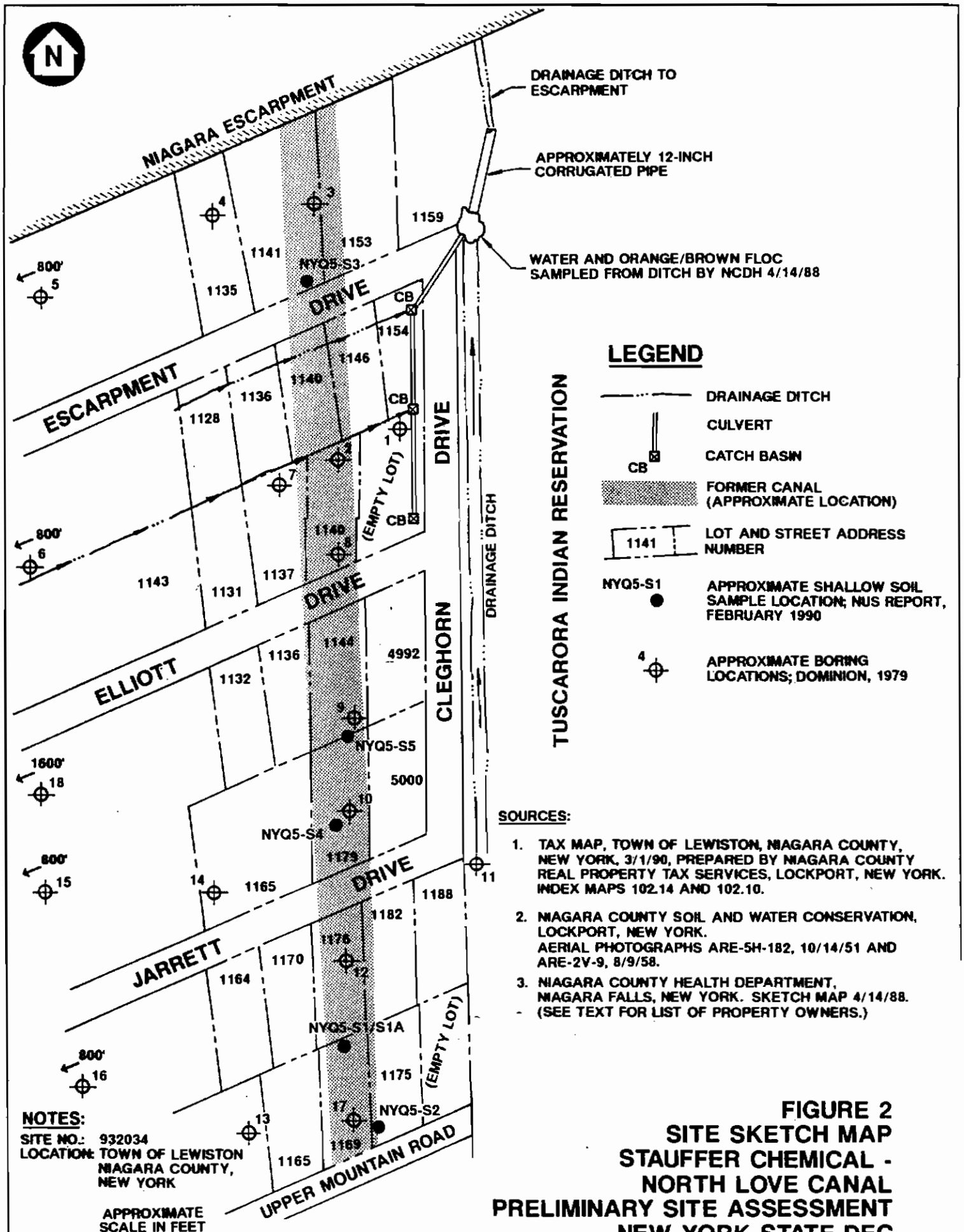
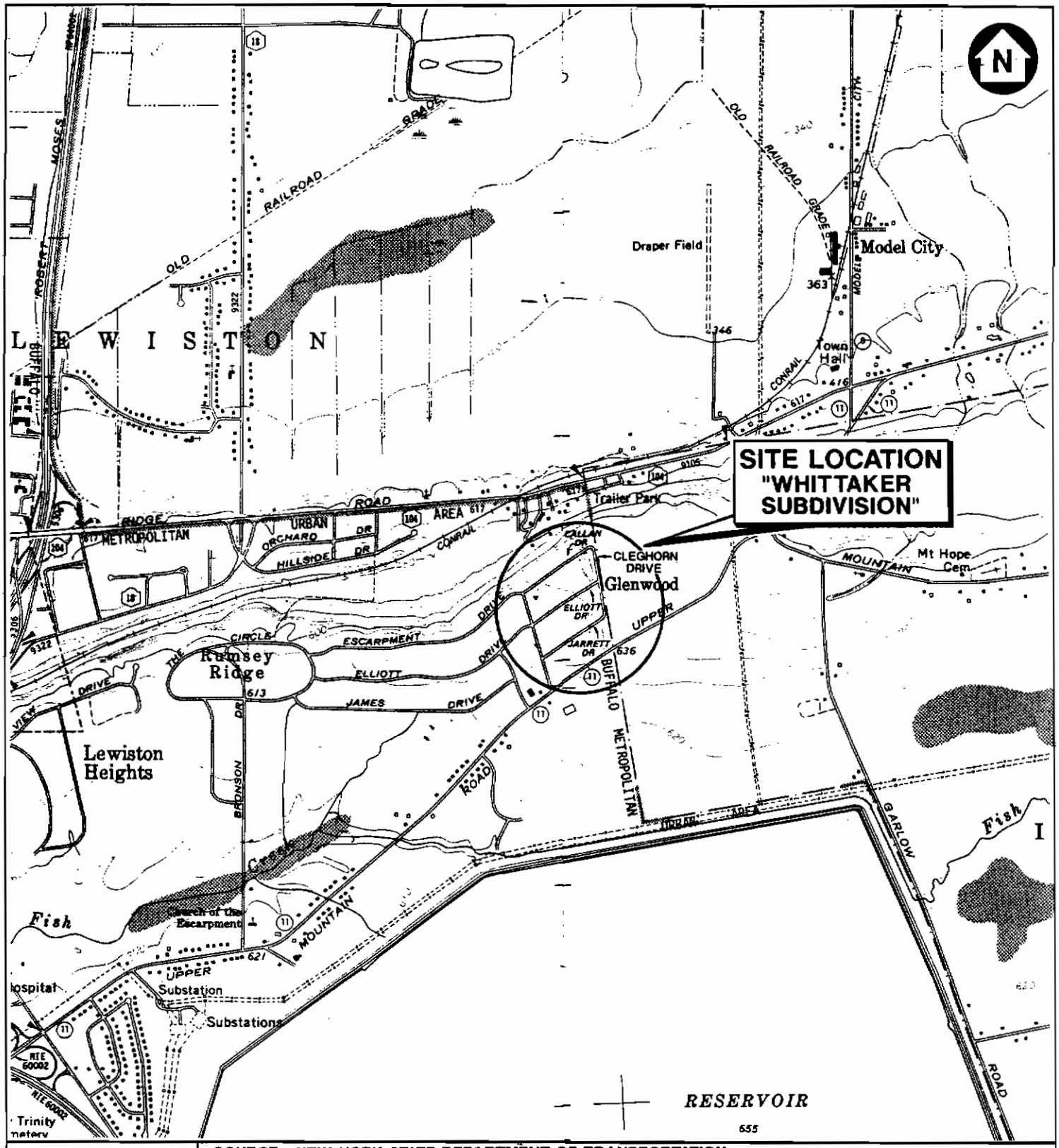


FIGURE 2
SITE SKETCH MAP
STAUFFER CHEMICAL - NORTH LOVE CANAL
PRELIMINARY SITE ASSESSMENT
NEW YORK STATE DEC



SOURCE: NEW YORK STATE DEPARTMENT OF TRANSPORTATION, RANSOMVILLE AND LEWISTON QUADRANGLES, NEW YORK 7.5-MINUTE SERIES, 1976, SECOND EDITIONS

SITE NO.: 932034

LOCATION: TOWN OF LEWISTON, NIAGARA COUNTY, NEW YORK

STATE-REGULATED WETLANDS

QUADRANGLE LOCATION

SCALE IN FEET

0 2000 4000

FIGURE 1
SITE LOCATION MAP
STAUFFER CHEMICAL - NORTH LOVE CANAL
PRELIMINARY SITE ASSESSMENT
NEW YORK STATE DEC

E.C. JORDAN CO.

6291-30

47-15-25 (9/90)—9d

NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION
DIVISION OF HAZARDOUS WASTE REMEDIATION

Original—BHSC
Copy—REGION
Copy—DEE
Copy—DOH
Copy—PREPARER

ADDITIONS/CHANGES TO REGISTRY OF INACTIVE HAZARDOUS WASTE DISPOSAL SITES

1. SITE NAME	2. SITE NO.	3. TOWN	4. COUNTY
Stauffer Chemical-North Love Canal	932034	Lewiston	Niagara

5. REGION	6. CLASSIFICATION	7. ACTIVITY
9	Current X /Proposed	☐ Add ☐ Reclassify ☐ Delist ☒ Modify Sample for hazardous waste

8a. DESCRIBE LOCATION OF SITE (Attach U.S.G.S. Topographic Map showing site location).

Residential neighborhood called Whittaker Subdivision has been developed over the former canal. The canal is not visible. Niagara Escarpment abuts the neighborhood to the north and the Tuscarora Indian Reservation abuts the site to the east.

b. Quadrangle Lewiston & Ransomville c. Site Latitude 43°10'03" Longitude 78°59'53"N d. Tax Map Number 102.10-102.14

9a BRIEFLY DESCRIBE THE SITE (Attach site plan showing disposal/sampling locations)

North end of Love Canal used for disposal of concrete cell parts, graphite, scrap sulfur cinder, silicon, zirconium, and titanium oxides, metal, asbestos, slag, phosphates, fluoride containing flux from 1930 to 1952. Residential homes developed on top of canal.

b. Area 5 acres c. EPA ID Number D000513697 d. PA/SI ☒ Yes ☐ No

e. Completed: ☒ Phase I ☐ Phase II ☐ PSA ☐ Sampling

10. BRIEFLY LIST THE TYPE AND QUANTITY OF THE HAZARDOUS WASTE AND THE DATES THAT IT WAS DISPOSED OF AT THIS SITE

Approximately 50,000 to 75,000 cubic yards of various waste materials, including asbestos, graphite, sulfur, slag, phosphates, disposed of in unlined canal. Canal eventually covered over and homes were built on top of it.

11a. SUMMARIZED SAMPLING DATA ATTACHED

☐ Air ☐ Groundwater ☐ Surface Water ☐ Soil ☐ Waste ☐ EP Tox ☐ TCLP.

b. List contravened parameters and values

No additional sampling performed during Preliminary Site Assessment activities.

12. SITE IMPACT DATA

a. Nearest surface water: Distance 2,500 ft. Direction Southwest Classification Class D (Fish Creek)

b. Nearest groundwater: Depth 5 ft. Flow Direction North ☒ Sole Source ☐ Primary ☐ Principal

c. Nearest water supply: Distance 2,000 ft. Direction East Active ☒ Yes ☐ No

d. Nearest building: Distance 0 ft. Direction Homes built on canal Use Residential

e. Crops or livestock on site? ☐ Yes ☒ No

f. Exposed hazardous waste? ☐ Yes ☒ No

g. Controlled site access? ☐ Yes ☒ No

h. Documented fish or wildlife mortality? ☐ Yes ☒ No

i. Impact on special status fish or wildlife resource? ☐ Yes ☒ No

j. Within a State Economic Development Zone? ☐ Yes ☒ No

k. For Class 2a; Code No Health Model Score No

l. For Class 2; Priority Category No

m. HRS Score No

n. Significant Threat ☐ Yes ☐ No ☒ Unknown

13. SITE OWNER'S NAME	14. ADDRESS	15. TELEPHONE NUMBER
Various Residents	Whittaker Subdivision, Lewiston New York	( ) N/A

16. PREPARER

Name	Title and Organization
Elizabeth Ryan/Catherine Lanois	E.C. Jordan Co.

Telephone Number	Date	Signature
(207) 775-5401	November 20, 1990	

2.0 PURPOSE

The purpose of a PSA is to provide the information necessary for NYSDEC to adequately categorize the site according to the following classifications:

Class 2 - Hazardous waste sites presenting a significant threat to the public health or the environment.

Class 3 - Hazardous waste sites not presenting a significant threat to the public health or the environment.

Delist - Sites where hazardous waste disposal is not documented.

Task 1, Data Records Search and Assessment, of a PSA was conducted at the Stauffer Chemical-North Love Canal Site, Site No. 932034, in Lewiston, New York, by Jordan personnel under NYSDEC Superfund Standby Contract No. D002472, Work Assignment No. D002472-6.

The Stauffer Chemical-North Love Canal Site is a suspected inactive hazardous waste site recognized by NYSDEC. This site has been classified as a Class 3 site (i.e., a hazardous waste site not presenting a significant threat to the public health or the environment), and has been in the NYSDEC Registry since 1985. The site originally was listed in 1983 in the NYSDEC Registry as a 2a site (i.e., there was insufficient information to document hazardous waste disposal and/or assess the significance of potential risks to public health or the environment). However, when or why the reclassification occurred is apparently not documented (May, 1990b).

3.0 SCOPE OF WORK

Task 1 of a PSA consists of two data-gathering functions: a file review/records search and a site walkover. Specific activities performed for the Stauffer Chemical-North Love Canal Site under these functions are described in the following subsections.

3.1 File Reviews

The Jordan project team began collecting information about the Stauffer Chemical-North Love Canal Site at the NYSDEC Central Office in Albany, New York, during the week of June 25, 1990. In addition, Jordan personnel reviewed files at the New York State Department of Health, the U.S. Geological Survey, the U.S. Fish and Wildlife Service, the New York State Department of Transportation, and the New York Geologic Survey. The USEPA Region II Office was also contacted for additional site information.

During the weeks of July 16 and 23, 1990, the Jordan team collected available background data from regional sources, including information pertaining to property ownership, land use, wetlands and critical habitats, and other pertinent information. The following regional agencies and county offices were visited:

- New York State Department of Environmental Conservation
  Division of Hazardous Waste Remediation
  Region 9
  584 Delaware Avenue
  Buffalo, NY 14202

- New York State Department of Environmental Conservation
  Division of Regulatory Affairs
  Region 9
  600 Delaware Avenue
  Buffalo, NY 14202

- New York State Department of Environmental Conservation
  Division of Fish and Wildlife
  Region 9
  600 Delaware Avenue
  Buffalo, NY 14202

- New York State Department of Health
  Western Regional Office
  584 Delaware Avenue
  Buffalo, NY 14202

- Niagara County Health Department
  Environmental Health Services
  10th and East Falls Street
  Niagara Falls, NY 14302

- USDA Soil and Water Conservation District
  Niagara County
  4487 Lake Avenue
  Lockport, NY 14094

In addition, the following local agencies and individuals were contacted to obtain additional information pertaining to water, land, and site use:

- Town of Lewiston Water Department
  Ms. Maureen Kenney
  1375 Ridge Road
  Lewiston, NY 14092
  (716) 754-8213

- Town of Lewiston Code Enforcement Officer
  Mr. Kenneth Shipman
  1375 Ridge Road
  Lewiston, NY 14092
  (716) 754-8213 ext. 258

- Town of Lewiston Tax Assessors
  Ms. Nancy Ritter
  Mr. Gene Virtuoso
  1375 Ridge Road
  Lewiston, NY 14092
  (716) 754-8213

- Resident - Whittaker Subdivision
  Mr. William Young
  1153 Escarpment Drive
  Lewiston, NY 14092
  (telephone number withheld)

- Resident - Whittaker Subdivision
  Mr. Mark Adams
  1140 Escarpment Drive
  Lewiston, NY 14092
  (telephone number withheld)

The Jordan team attempted to contact Chief Leo Henry to confirm the number of residents using private water supplies on the adjacent Tuscarora Indian Reservation, and Kent Orloff of the Agency for Toxic Substances and Disease Registry to obtain additional site information (May, 1990c). Repeated attempts to contact both individuals were unsuccessful.

3.2 Site Walkover

On July 23, 1990, a site walkover was conducted at the Stauffer Chemical-North Love Canal Site. The following individuals participated:

Name	Title	Affiliation
Catherine Lanois	Geologist	E.C. Jordan Co.
Roger Bondeson	Environ. Scientist	E.C. Jordan Co.
Sri Maddineni	Environ. Engineer II	NYSDEC-Central
Glenn May	Engineering Geologist	NYSDEC-Region 9
Kenneth Shipman	Environmental Enforcement Officer	Town of Lewiston

The site visit began at 1 p.m., was temporarily discontinued from 1:30 until 3 p.m. to allow Messrs. May and Shipman to be present, then continued from 3 to 4 p.m. The site Health and Safety Plan was reviewed before beginning the site tour. The Jordan team elected not to bring a photoionization detector or explosimeter/oxygen meter on the site tour to avoid arousing any unnecessary concern among residents regarding the monitoring devices.

A site map is provided in Figure 2. The Jordan team initially drove around the Whittaker subdivision, then revisited the site on foot. The Jordan team walked up and down Jarrett Drive, Cleghorn Drive, Elliott Drive, and Escarpment Drive. The area of the buried canal is identified only by a slight rise in topography paralleling Cleghorn Drive.

On-site residences were well-maintained, and no signs of stressed vegetation were observed in lawns, gardens, or the field east of Cleghorn Drive. During the walkover, Jordan personnel compared street addresses for residents to those provided on available site maps, and made appropriate corrections.

Storm drainage ditches parallel the east-west trending streets, as well as the north-south trending Cleghorn Drive. The storm drains converge at the far northeastern corner of the site (where NCHD sampled water and sediment in 1988). The drainage ditches were dry during Jordan's site visit; however, cattails and loosestrife bordered the ditch along Cleghorn Drive. No unusual odors or discolored soils were noted in any catch basins; however, brown to orange-colored sediment was observed in the drainage ditch at the corner of Escarpment and Cleghorn Drives.

Low polyvinyl chloride (PVC) standpipes, approximately 4 to 6 inches in diameter, were observed in residential yards. Local residents confirmed that these standpipes are connected to the town sewer system to facilitate cleaning of the sewer pipes (Adams, 1990).

The Jordan team, NYSDEC representatives, and the Lewiston Environmental Enforcement Officer obtained permission from Mr. William Young to walk through his yard at 1153 Escarpment Drive to the edge of the Niagara Escarpment. NYSDEC representatives climbed approximately 20 feet down the steep slope of the escarpment where a storm drain manhole and rock outcrop were observed. The canal excavation was not observed by NYSDEC personnel, nor was evidence of leachate observed along the escarpment. The slope of the escarpment was heavily vegetated. When interviewed, Mr. Young stated that he has noticed no unusual odors or problems with his property (Young, 1990).

Jordan personnel completed the site walkover at 4:30 p.m.

4.0 SITE ASSESSMENT

The following subsections describe the information obtained during the records search and the site walkover at the Stauffer Chemical-North Love Canal Site.

4.1 Site History

Excavation of the northern extension of Love Canal began near the turn of the century; however, it was never completed to join the southern extension (located in Niagara Falls, New York) due to declining economic conditions (E&EE, 1989). The excavation was approximately 100 feet wide, 2,000 feet long, and 10 feet deep, and trended north-south from the edge of the Niagara Escarpment (which trends east-west in this area) to Upper Mountain Road.

From 1930 to 1952, an estimated 50,000 to 75,000 cubic yards of asbestos, concrete cell parts, reactor linings, scrap sulfur, graphite, scrap metal, silicon, zirconium and titanium oxides, flux containing fluorides, cinders, and phenols, reportedly were disposed of in the canal. From 1930 to 1946, wastes generated by Niagara Smelting, a subsidiary of Stauffer Chemical Company, were disposed in the canal; from 1946 to 1952, wastes generated by Stauffer Chemical Company were disposed of in the canal (E&EE, 1989). According to local residents, Union Carbide allegedly disposed of material in the canal; however, this has never been confirmed. Local residents reported seeing Union Carbide trucks dumping brown sludge into the canal, and one resident reported that wastes splattered from a Union Carbide truck and damaged the paint on his car (USEPA, 1979).

The canal is clearly visible in aerial photographs dated 1951. At this time, the canal was surrounded by several unpaved roads, other disturbed areas, and a few residences (USDA, 1951). Waste disposal was reportedly discontinued in 1952, and the canal was subsequently filled with cinders and slag, as well as white and yellow material (USEPA, 1979). One to 2 feet of fill possibly cover the canal, and many driveways and street beds allegedly are underlain by slag (E&EE, 1989). A photocopy of a 1951 aerial photograph is provided in Appendix D.

Between 1952 and 1958, numerous residential homes and streets were developed on and near the filled-in canal. Aerial photographs dated 1958 clearly illustrate new homes constructed on top of and adjacent to the canal (USDA, 1958). A photocopy of a 1958 aerial photograph is provided in Appendix D.

In 1979, the Town of Lewiston retained Dominion to perform a site investigation. This investigation included a subsurface investigation to determine the presence of hazardous materials in the canal. Dominion drilled 18 shallow boreholes to refusal (not deeper than 17 feet). Dominion characterized subsurface materials

as primarily consisting of sulfur compounds, with occasional lumps of sulfur, magnesium, and phosphorus. Subsurface materials from the boreholes were analyzed for sulfur, phosphorous, manganese, magnesium, cyanide, fluoride, nitrates, phosphate, phenol, and chloride. Analytical results of the materials indicated the presence of cyanide, fluoride, nitrate, and phenols in the soils. These results are provided in Appendix C (Dominion, 1979). According to David Axelrod, State Health Commissioner, these results warranted further investigation (Niagara Gazette, 1979). In addition, levels of chloride and sulfate were detected at concentrations that may cause deterioration of pipes and concrete foundations (Dominion, 1979).

Dominion also installed standpipes in the boreholes and collected groundwater samples for analysis of pH and sulfates. These results are provided in Appendix C. Concentrations of sulfates exceeded the state's drinking water standards (Dominion, 1979; NYSDEC, 1986).

Also in 1979, the USEPA conducted a noninvasive investigation of the site during which no samples were collected. After reviewing available information and interviewing local residents, USEPA concluded that the canal contains materials that are not dangerous to public health and do not pose a safety hazard. Residents interviewed at this time did not appear concerned about the area or the fill material. The report also stated that "no private wells were found or hinted to in the area and the use of public water supply indicates no contaminated water is used as a drinking water supply" (USEPA, 1979).

In 1980, crop samples from Escarpment and Elliott Drives were collected and analyzed for pesticides and herbicides at the request of the Town of Lewiston Water Pollution Control Center. Analytical results of these samples reportedly did not indicate an "environmental problem" (Bidell, 1980; Aro, 1980).

In 1987, NUS performed a Potential Hazardous Waste Site Preliminary Assessment for the USEPA. Based on the information obtained, NUS recommended that additional work be performed to determine whether groundwater seepage from the escarpment is contaminated, and subsurface soils and groundwater beneath the site contain elevated concentrations of fluorides, sulfur, and phenols. The concern was over the potential health threat posed by the presence of these contaminants (NUS, 1987).

In 1988, NCHD collected one water/sediment sample from the drainage ditch along Cleghorn Drive. Brown staining of sediment in this location had been observed. The NCHD indicated that the presence of "unnatural" material in the drainage ditch was "strong evidence that contaminants are leaving the former disposal area" (Hopkins, 1988). However, analytical results of this sample contained no detectable HSL organic compounds, and inorganic (i.e., metal)

concentrations were within expected background ranges (NCHD, 1989; Dicky, 1988).

NCHD subsequently surveyed area residents, and collected water samples in 1989 from two basement sumps overlying the canal where sediment similar to that in the drainage ditch was observed. Results indicated the presence of PCBs in one basement, some elevated levels of metals, and relatively low concentrations of pesticides, VOCs and semivolatile organic compounds (SVOCs). These results are provided in Appendix C. Based on their survey and sampling results, NCHD concluded that the potential for direct contact with waste material or leachate exists, and that additional sampling should be conducted (NCHD, 1989).

In 1989, E&EE completed a Phase I Investigation of the site for NYSDEC. Based on reviewed data and a site visit, E&EE recommended that additional soil samples be collected for analysis of Resource Conservation and Recovery Act hazardous waste characteristics or priority pollutants, and that groundwater be analyzed for priority pollutants and monitored to evaluate potential waste migration (E&EE, 1989).

In February 1990, NUS completed a Site Inspection of the area, during which they collected and analyzed five shallow soil samples. Analytical results indicate the presence of PAHs, VOCs, and heavy metals at two locations at concentrations NUS considered "normal" (NUS, 1990). PAHs and VOCs were not detected at the other three sampling locations. These results are provided in Appendix C. Based on the results of their site inspection, NUS recommended that the USEPA take no further action at this site (NUS, 1990). These recommendations were based on USEPAs criteria for hazardous waste site investigations and, therefore, may not reflect NYSDECs recommendations for further action at this site.

Discolored materials have been observed during several excavations in the neighborhood. In the 1970s, discolored debris and lumps of sulfur were encountered during excavation of the sanitary sewer (Young, 1990; E&EE, 1989). In 1988, discolored soil and fill, including a blue-green paste-like material with a musty odor, were encountered during excavations for an inground pool at 1140 Escarpment Drive. The material was brought to the surface, and used to regrade parts of the property. There have been no reported problems with grass growing in the regraded area. The former owner of this home, however, reportedly had trouble growing grass in a 50-by-50-foot area beneath which the blue/green material was later encountered (Adams, 1990).

Along the escarpment at 1159 Escarpment Drive, settling problems reportedly occurred also during construction of an inground pool (Adams, 1990). However, since this property is not located over the former canal, the settling problems may not be related to the canal. In 1962, a resident on Jarrett Drive reportedly had to

replace a 6-inch cast iron water pipe beneath his property due to corrosion (USEPA, 1979). Elevated levels of chlorides in subsurface materials and sulfates in groundwater may contribute to the deterioration of pipes and concrete (Dominion, 1979).

4.2 Site Topography

Topography at the Stauffer Chemical-North Love Canal Site is fairly flat at an approximate elevation of 625 feet above mean sea level (MSL). The site is bordered on the north by the east-west trending Niagara Escarpment, with a vertical drop of approximately 200 feet (NYSDOT, 1976). Ground surface appears to slope slightly toward the north and south away from the center of the site. The area underlain by the canal is faintly discernible in some places by slight mounding of the ground surface.

On-site surface runoff is controlled by storm drainage ditches constructed parallel to the east-west and north-south trending roads. The storm drains converge at the corner of Escarpment and Cleghorn Drives at the northeastern corner of the site, flow northward, and discharge along the escarpment.

No wetlands were observed on-site; however, cattails and loosestrife were noted along the banks of the drainage ditch paralleling Cleghorn Drive. East of Cleghorn Drive are fairly flat-lying fields on the Tuscarora Indian Reservation. Several Class II state-regulated wetlands occur within a three-mile radius of the site. The closest state-regulated wetland is located more than one mile southwest of the site along the banks of Fish Creek (NYSDEC, 1980). A habitat for Gentianopsis procera (Fringed Gentian), considered an endangered species by the State of New York, is mapped along Six Mile Creek, approximately 0.7 mile north of the site (NYSDEC, 1990).

4.3 Site Hydrology

The following paragraphs describe what is known about the hydrologic setting of the Stauffer Chemical-North Love Canal Site.

Area/surficial geology is characterized by thin veneers of glacial till, glaciolacustrine clays, silts, and fine sands, and isolated glacial meltwater sand and gravel deposits (E&EE, 1989). Surface soils are mapped as poorly drained silty loam (USDA, 1972). Permeability of overburden deposits is estimated to range from 10^{-4} to 10^{-6} centimeters per second (cm/sec) (E&EE, 1989).

Regional bedrock consists of fairly flat-lying sedimentary rocks. Lockport Dolomite comprises the upper 20 to 40 feet of rock, underlain by Rochester Shale. Lockport Dolomite is characterized by an upper, fractured, fairly permeable section approximately 10 to 25 feet thick (estimated permeability of 10^{-2} to 10^{-4} cm/sec), and

a lower, less fractured, less permeable stratum. In some areas, a low-permeability clay unit separates the upper and lower strata, creating artesian conditions (E&EE, 1989).

Regional groundwater flow is primarily northward, toward the Niagara Escarpment (E&EE, 1989). Vertical gradients are not known; however, a downward component toward the fractured bedrock surface has been suggested (Dicky, 1990).

The most prominent local surface water body is the New York Power Authority Reservoir, a 2.5-square-mile reservoir located less than one-half mile south of the site. The reservoir is maintained at 655 feet above MSL. Fish Creek is the closest natural surface water body to the site, located less than one-half mile southwest of the site. Fish Creek flows westward toward the Niagara River, and is a Class D stream suitable for fishing (NYSDOT, 1976; E&EE, 1989).

Irrigation and drinking water supplying the Town of Lewiston is obtained through the Niagara County Water District, and is derived from the Niagara River (Kenney, 1990). East of the site, however, the main source of drinking water for more than 1,000 residents of the Tuscarora Indian Reservation is from wells or natural springs. The wells range in depth from 25 to 100 feet, depending on location on the Reservation. Irrigation water from the wells and springs is used to water lawns and small garden plots on the Reservation (Henry, 1987).

4.4 Contamination Assessment

Wastes allegedly disposed of in the canal include asbestos, concrete cell parts, reactor linings, scrap sulfur, graphite, scrap metal, silicon, zirconium and titanium oxides, flux containing fluorides, cinders, and phenols. During the 1979 subsurface investigation by Dominion, waste materials were characterized as consisting primarily of sulfur compounds, with occasional lumps of sulfur, magnesium, and phosphorus. Analysis of these materials indicated the presence of nitrates, cyanide, fluoride, and phenols. These results are presented in Appendix C (Dominion, 1979). Groundwater samples were analyzed only for pH and sulfates. Concentrations of sulfate exceeded state drinking water standards (Dominion, 1979; NYSDEC, 1986).

Crop samples from Escarpment and Elliott Drives were analyzed for pesticides and herbicides for the Town of Lewiston Water Pollution Control Center in 1980 by Aro Corporation. Results of the sampling and analysis reportedly did not indicate an "environmental problem" (Bidell, 1980; Aro, 1980).

A water/sediment sample collected from the drainage ditch along Cleghorn Drive by the NCHD in 1988 did not contain detectable HSL organics, and concentrations of metals were within expected

background ranges (NCHD, 1989). Analytical results of water samples containing similar brown staining in two basement sumps overlying the canal indicated the presence of metals and PCBs, and relatively low concentrations of a few pesticides, VOCs, and SVOCs. These results are presented in Appendix C (NCHD, 1989).

Analytical results of five shallow soil samples collected by NUS in 1990 indicated the presence of PAHs, VOCs, and heavy metals at two sampling locations. These concentrations were considered "normal." PAHs and VOCs were not detected at the three other sampling locations (NUS, 1990). These results are provided in Appendix C.

5.0 ASSESSMENT OF DATA ADEQUACY AND RECOMMENDATIONS

5.1 Hazardous Waste Deposition

Waste materials allegedly disposed of in the canal include asbestos, concrete cell parts, reactor linings, scrap sulfur, graphite, scrap metal, silicon, zirconium and titanium oxides, flux containing fluorides, cinders, and phenols. With the exception of phenols, these materials are not hazardous wastes as defined by 6 NYCRR Part 371. However, these wastes have not been analyzed for characteristics of EP toxicity, reactivity, ignitability, and corrosivity to determine their hazardous waste characteristics (May, 1990b). Phenols are considered a hazardous waste as defined by 6 NYCRR Part 371, if disposed of in pure form.

5.2 Significant Threat Determination

Contamination from waste materials buried in the canal may pose a potential threat to public health or the environment. Results of sampling and analysis performed by Dominion in 1979 indicate the presence of nitrates, cyanide, fluoride, and phenols in subsurface materials (Dominion, 1979; NUS, 1987). There are no standards or guideline values for soils with which to evaluate the significance of these concentrations.

The presence of brown-stained sediment in on-site drainage ditches, and similar material in basement sumps overlying the canal, suggests leachate is being generated and migrating from the canal. Analysis of the basement sumps indicated the presence of PCBs, but at levels below what is considered hazardous (Hopkins, 1988; NCHD, 1989).

PAHs, VOCs, and heavy metals were detected in shallow soil samples (zero to 2 feet below grade) collected by NUS. However, these concentrations were at levels considered "normal" (NUS, 1990).

Although site residents are supplied with municipal water from the Niagara River, residents of the neighboring Tuscarora Indian Reservation currently rely on private wells and springs as their sole source of drinking water. There is no groundwater data for this site or from wells on the reservation to evaluate the potential significance of this route of exposure.

5.3 Recommendations

Information collected by Jordan personnel did not confirm or deny the presence of hazardous wastes at the Stauffer Chemical-North Love Canal Site in Lewiston, New York. Wastes allegedly disposed of in the canal include asbestos, concrete cell parts, reactor linings, scrap sulfur, graphite, scrap metal, silicon, zirconium and titanium oxides, flux containing fluorides, cinders, and phenols. With the exception of phenols, these materials are not

hazardous wastes as defined by 6 NYCRR Part 371. However, samples have not been analyzed to determine their hazardous waste characteristics (May, 1990b). Phenols are hazardous wastes as defined by 6 NYCRR Part 371, if disposed of in pure form. There is no evidence to support the conclusion that phenols detected at the site were disposed of in a pure form. Based on available information, Jordan cannot recommend changing the classification of the Stauffer Chemical Site on the New York State Registry of Inactive Hazardous Waste Disposal Sites.

To obtain data to confirm or deny hazardous waste disposal, PSA Task 3 activities should be initiated. Jordan recommends sampling subsurface waste materials and leachate, and analyzing these samples for characteristics of EP toxicity, reactivity, corrosivity, and ignitability and the USEPA TCL of organic and inorganic compounds. Results of these analyses will be used to determine if hazardous waste disposal occurred at this site.

Based on the results of PSA Task 3 activities, NYSDEC will decide if PSA Task 4 activities should be initiated to determine whether any wastes present a significant threat to public health or the environment. Should Task 4 activities be required, Jordan recommends installing monitoring wells with groundwater sampling and analysis for the TCL, or at a minimum, compounds detected in PSA Task 3 activities. Monitoring well locations should include two or more wells within the buried canal to evaluate the quality of potential leachate from the canal; an upgradient well to provide background groundwater quality data; a downgradient well to provide data to evaluate the migration of potentially contaminated groundwater; and two wells along the eastern side of Cleghorn Drive to evaluate migration of potentially contaminated groundwater toward drinking water supplies at the Indian Reservation. Existing monitoring wells installed by Dominion should be utilized as appropriate. Analytical results for groundwater should be compared with state water quality standards defined in 6 NYCRR Chapter X, Part 700-705 (NYSDEC, 1986). These data will be used to determine if there is a contravention of standards and therefore a significant threat to public health or the environment.

GLOSSARY OF ACRONYMS AND ABBREVIATIONS

cm/sec	centimeters per second
E&EE	Ecology and Environment Engineering
EP	Extraction Procedure
HSL	Hazardous Substance List
MSL	mean sea level
NCHD	Niagara County Health Department
NUS	NUS Corporation
NYSDEC	New York State Department of Environmental Conservation
PAH	polycyclic aromatic hydrocarbon
PCB	polychlorinated biphenyl
PSA	Preliminary Site Assessment
PVC	polyvinyl chloride
SVOC	semivolatile organic compound
TCL	Target Compound List
USEPA	U.S. Environmental Protection Agency
VOC	volatile organic compound

APPENDIX A

REFERENCES

REFERENCES

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APPENDIX B

SITE INSPECTION REPORT
(USEPA FORM 2070-13)

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

EPA

I. IDENTIFICATION	
01 STATE: New York	01 SITE NUMBER: D000513697

II. SITE NAME AND LOCATION

01 SITE NAME (Legal, common, or descriptive name of site)	02 STREET, ROUTE NO., OR SPECIFIC LOCATION IDENTIFIER
Stauffer Chemical, North Love Canal	Whittaker Subdivision

03 CITY	04 STATE	05 ZIP CODE	06 COUNTY	07 COUNTY CODE	08 CONG. DIST
Lewiston	New York	14092	Niagara		

09 COORDINATES LATITUDE	LONGITUDE	10 TYPE OF OWNERSHIP (Check one)
43° 10′ 03″.N	078° 59′ 53″.W	X A. PRIVATE _ B. FEDERAL _____ _ C. STATE _ D. COUNTY _ E. MUNICIPAL _ F. OTHER _____ _ G. UNKNOWN

III. INSPECTION INFORMATION

01 DATE OF INSPECTION (MONTH / DAY / YEAR)	02 SITE STATUS	03 YEARS OF OPERATION
7 / 23 / 90	_ ACTIVE X INACTIVE	1930 (BEGINNING YEAR) — 1952 (ENDING YEAR) ___ UNKNOWN

04 AGENCY PERFORMING INSPECTION (Check all that apply)
_ A. EPA _ B. EPA CONTRACTOR _____ (Name of firm) _ C. MUNICIPAL _ D. MUNICIPAL CONTRACTOR _____ (Name of firm)
_ E. STATE X F. STATE CONTRACTOR E.C. Jordan Co. (Name of firm) _ G. OTHER _____ (Specify)

05 CHIEF INSPECTOR	06 TITLE	07 ORGANIZATION	08 TELEPHONE NO.
Catherine Lanois	Geologist	E.C. Jordan Co.	(617) 245-6606
09 OTHER INSPECTORS Roger Bondeson	10 TITLE Scientist	11 ORGANIZATION E.C. Jordan Co.	12 TELEPHONE NO. (207) 775-5401
Sri Maddineni	Environmental Engineer II	NYSDEC - Central	(518) 457-0638
Glenn May	Engineering Geologist	NYSDEC - Region 9	(716) 847-4585
Ken Shipman	Environmental Enforcement Engineer	Town of Lewiston	(716) 754-8213
			( )

13 SITE REPRESENTATIVES INTERVIEWED	14 TITLE	15 ADDRESS	16 TELEPHONE NO.
Mark Adams	Resident	1140 Escarpment Dr., Lewiston, New York	( )
William Young	Resident	1153 Escarpment Dr. Lewiston, New York	( )
			( )
			( )
			( )
			( )

17 ACCESS GAINED BY (Check one)	18 TIME OF INSPECTION	19 WEATHER CONDITIONS
X PERMISSION ☐ WARRANT	1500	Sunny, hot

IV. INFORMATION AVAILABLE FROM

01 CONTACT	02 OF (Agency/Organization)	03 TELEPHONE NO.
Sri Maddineni	New York State Department of Environmental Conservation	(518) 457-0638

04 PERSON RESPONSIBLE FOR SITE INSPECTION FORM	05 AGENCY	06 ORGANIZATION	07 TELEPHONE NO.	08 DATE (MONTH DAY YEAR)
Catherine Lanois		E.C. Jordan Co.	(207) 775-5401	7 / 27 / 90

EPA

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

I. IDENTIFICATION	
01 STATE	01 SITE NUMBER
New York	D000513697

II. WASTE STATES, QUANTITIES, AND CHARACTERISTICS

01 PHYSICAL STATES (Check all that apply)

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

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

TONS _____
CUBIC YARDS 50,000
NO. OF DRUMS _____

03 WASTE CHARACTERISTICS (Check all that apply)

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

III. WASTE TYPE

CATEGORY	SUBSTANCE NAME	01 GROSS AMOUNT	02 UNIT OF MEASURE	03 COMMENTS
SLU	SLUDGE			An estimated 50,000 to 75,000 cubic yards of
OLW	OILY WASTE			asbestos, graphite, concrete cell parts, reactor
SOL	SOLVENTS			linings, scrap sulfur, scrap metal, silicon,
PSD	PESTICIDES			zirconium-titanium oxide, phenols, slag,
OCC	OTHER ORGANIC CHEMICALS			phosphates, flux containing fluoride
IOC	INORGANIC CHEMICALS			potentially buried in former canal.
ACD	ACIDS			
BAS	BASES			
MES	HEAVY METALS			

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

01 CATEGORY	02 SUBSTANCE NAME	03 CAS NUMBER	04/STORAGE/DISPOSAL METHOD	05 CONCENTRATION	06 MEASURE OF CONCENTRATION
OCC	phenol	108-95-2	landfill	0.38	ppm sediment
IOC	asbestos	999	landfill	unknown	
IOC	fluorides	1698-34-9	landfill	152	ppm sediment
IOC	sulfur	7704-34-9	landfill	8797	ppm sediment
IOC	magnesium	7439-95-4	landfill	852	ppm sediment
IOC	phosphorus	7723-14-0	landfill	3.4	ppm sediment
IOC	manganese	7439-96-5	landfill	40	ppm sediment
IOC	cyanide	57-12-5	landfill	0.47	ppm sediment
	nitrates	999	landfill	28	ppm sediment
	chlorides	000	landfill	846	ppm sediment
	phosphates	999	landfill	8.6	ppm sediment
	sulfates	999	landfill	2006	ppm sediment

V. FEEDSTOCKS (See Appendix for CAS Numbers)

CATEGORY	01 FEEDSTOCK NAME	02 CAS NUMBER	CATEGORY	01 FEEDSTOCK NAME	02 CAS NUMBER
FDS	none		FDS		
FDS			FDS		
FDS			FDS		
FDS			FDS		

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

Preliminary Site Assessment Report, November 1990, E.C. Jordan Co., and references cited therein.

EPA

POTENTIAL HAZARDOUS WASTE SITE
SITE INSPECTION REPORT

PART 3 - DESCRIPTION OF HAZARDOUS CONDITIONS AND INCIDENTS

I. IDENTIFICATION	
01 STATE	01 SITE NUMBER
New York	D000513697

II. HAZARDOUS CONDITIONS AND INCIDENTS

01 X A. GROUNDWATER CONTAMINATION — 02 X OBSERVED (DATE: 1979) _ POTENTIAL _ ALLEGED
03 POPULATION POTENTIALLY AFFECTED: > 1,000 — 04 NARRATIVE DESCRIPTION

Results of 1979 groundwater sampling performed by Dominion Soil Investigation, Inc. indicate groundwater exceeds drinking water standards for sulfate.

01 X B. SURFACE WATER CONTAMINATION — 02 _ OBSERVED (DATE:) X POTENTIAL _ ALLEGED
03 POPULATION POTENTIALLY AFFECTED: unknown — 04 NARRATIVE DESCRIPTION

Potentially contaminated groundwater may discharge to Six Mile Creek or Fish Creek. On-site drainage ditches periodically discolored, although no hazardous substances detected during 1989 NCHD sampling of the ditch.

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

None indicated.

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

A fire in the area was reported to have a low burning flame and noxious gases and was allegedly difficult to extinguish.

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

Subsurface materials have been excavated for installation of sewers, in-ground pools, etc., posing potential for direct contact with contaminated soils by workers and residents.

01 X F. CONTAMINATION OF SOIL — 02 X OBSERVED (DATE: 1979/1988) _ POTENTIAL _ ALLEGED
03 POPULATION POTENTIALLY AFFECTED: unknown — 04 NARRATIVE DESCRIPTION

Soils encountered by Dominion Soil in 1979 contained slag containing sulfur compounds, lumps of sulfur, magnesium, and phosphorous. Blue/green paste observed by resident in 1988. Soils sampled by NUS (1990) from 0-2' deep contained polycyclic aromatic hydrocarbons, volatile organics, and heavy metals.

01 X G. DRINKING WATER CONTAMINATION — 02 _ OBSERVED (DATE:) X POTENTIAL _ ALLEGED
03 POPULATION POTENTIALLY AFFECTED: > 1,000 — 04 NARRATIVE DESCRIPTION

Groundwater sampled and analyzed by Dominion Soil, 1979, contained elevated sulfates. Residents of subdivision supplied with municipal water, however residents of neighboring Tusarora Indian Reservation use wells and springs to supply drinking water.

01 X H. WORKER EXPOSURE/INJURY — 02 _ OBSERVED (DATE:) X POTENTIAL _ ALLEGED
03 POPULATION POTENTIALLY AFFECTED: unknown — 04 NARRATIVE DESCRIPTION

Potential for workers exposure to contaminated soil and fill materials during construction of sewers, pools, etc.

01 X I. POPULATION EXPOSURE/INJURY — 02 _ OBSERVED (DATE:) X POTENTIAL _ ALLEGED
03 POPULATION POTENTIALLY AFFECTED: > 1,000 — 04 NARRATIVE DESCRIPTION

Residential homes built directly over waste, although no adverse health effects have been reported. Residents of abutting Tuscarora Reservation drink groundwater from private wells and springs.

EPA

POTENTIAL HAZARDOUS WASTE SITE
SITE INSPECTION REPORT

PART 3 - DESCRIPTION OF HAZARDOUS CONDITIONS AND INCIDENTS

I. IDENTIFICATION	
01 STATE	01 SITE NUMBER
New York	D000513697

II. HAZARDOUS CONDITIONS AND INCIDENTS (Continued)

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

None indicated.

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

None indicated.

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

None indicated.

01 X M. UNSTABLE CONTAINMENT OF WASTES (Spills/Runoff/Standing liquids, Leaking drums) — 02 _ OBSERVED (DATE: _____) X POTENTIAL _ ALLEGED
03 POPULATION POTENTIALLY AFFECTED: > 1,000 — 04 NARRATIVE DESCRIPTION

Canal was unlined when materials were disposed in it. No leachate has potentially been observed in basement sumps.

01 X M. DAMAGE TO OFFSITE PROPERTY — 02 _ OBSERVED (DATE: _____) X POTENTIAL _ ALLEGED
03 POPULATION POTENTIALLY AFFECTED: unknown — 04 NARRATIVE DESCRIPTION

Wastes may cause spoiling of basement walls. Corrosion of pipes potentially due to elevated chlorides and sulfates has been reported.

01 X O. CONTAMINATION OF SEWERS, STORM DRAINS, WWTPs — 02 _ OBSERVED (DATE: _____) X POTENTIAL _ ALLEGED
03 POPULATION POTENTIALLY AFFECTED: _____ — 04 NARRATIVE DESCRIPTION

Tan/brown staining of drainage ditches on-site reported. Previous sampling did not indicate contaminants were present.

01 X P. ILLEGAL/UNAUTHORIZED DUMPING — 02 _ OBSERVED (DATE: _____) _ POTENTIAL X ALLEGED
03 POPULATION POTENTIALLY AFFECTED: _____ — 04 NARRATIVE DESCRIPTION

Dumping between 1930-1952 was not regulated.

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

None known.

III. TOTAL POPULATION POTENTIALLY AFFECTED: > 1,000

IV. COMMENTS

Population potentially affected by potential drinking water contamination primarily includes residents of Tuscarora Indian Reservation. Whittaker subdivisions residents are supplied with municipal water.

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

Preliminary Site Assessment Report, November 1990, E.C. Jordan Co., and references cited therein.

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

EPA

I. IDENTIFICATION	
01 STATE: New York	01 SITE NUMBER: D000513697

II. PERMIT INFORMATION

01 TYPE OF PERMIT ISSUED (Check all that apply)	02 PERMIT NUMBER	03 DATE ISSUED	04 EXPIRATION DATE	05 COMMENTS
_ A. NPDES				
_ B. UIC				
_ C. AIR				
_ D. RCRA				
_ E. RCRA INTERIM STATUS				
_ F. SPCC PLAN				
_ G. STATE (specify)				
_ H. LOCAL (specify)				
_ I. OTHER (specify)				
X J. NONE				

III. SITE DESCRIPTION

01 STORAGE/DISPOSAL (check all that apply)	02 AMOUNT	03 UNIT OF MEASURE
_ A. SURFACE IMPOUNDMENT		
_ B. PILES		
_ C. DRUMS, ABOVE GROUND		
_ D. TANK, ABOVE GROUND		
_ E. TANK, BELOW GROUND		
X F. LANDFILL	50,000-75,000	cubic yards
_ G. LANDFARM		
_ H. OPEN DUMP		
_ I. OTHER _____ (specify)		

04 TREATMENT (check all that apply)
- _ A. INCINERATION
- _ B. UNDERGROUND INJECTION
- _ C. CHEMICAL/PHYSICAL
- _ D. BIOLOGICAL
- _ E. WASTE OIL PROCESSING
- _ F. SOLVENT RECOVERY
- _ G. OTHER RECYCLING/RECOVERY
- _ H. OTHER _____ (specify)

05 OTHER
- X A. BUILDINGS ONSITE

06 AREA OF SITE
5 (acres)

07 COMMENTS

Site consists of unlined canal into which various materials were dumped between 1930-1952. Site is currently a residential neighborhood built on top of canal.

IV. CONTAINMENT

01 CONTAINMENT OF WASTES (check one)

_ A. ADEQUATE, SECURE _ B. MODERATE X C. INADEQUATE, POOR _ D. INSECURE, UNSOUND, DANGEROUS

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

Various materials placed in unlined canal and buried with approximately two feet of soil.

V. ACCESSIBILITY

01 WASTE EASILY ACCESSIBLE: _ YES X NO

02 COMMENTS

Wastes covered with homes, roads, yards, driveways. Wastes are accessible during subsurface excavation work.

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

Preliminary Site Assessment Report, November 1990, E.C. Jordan Co., and references cited therein.

EPA

POTENTIAL HAZARDOUS WASTE SITE
SITE INSPECTION REPORT

PART 6 - WATER, DEMOGRAPHIC, AND ENVIRONMENTAL DATA

I. IDENTIFICATION

01 STATE	01 SITE NUMBER
New York	D000513697

II. DRINKING WATER SUPPLY

01 TYPE OF DRINKING SUPPLY (check as applicable)

	SURFACE	WELL
COMMUNITY	A. X	A.
NON-COMMUNITY	B. _	B. X

02 STATUS

ENDANGERED	AFFECTED	MONITORED
A. _	B. _	C. _
D. _	E. _	F. _

03 DISTANCE TO SITE

A. > 3 (mi)
B. 0.4 (mi)

III. GROUNDWATER

01 GROUNDWATER USE IN VICINITY (check one)

_ A. ONLY SOURCE FOR DRINKING
X B. DRINKING (other sources available) COMMERCIAL, INDUSTRIAL, IRRIGATION (No other water sources available)
_ C. COMMERCIAL INDUSTRIAL IRRIGATION (Limited other sources available)
_ D. NOT USED, UNUSABLE

02 POPULATION SERVED BY GROUNDWATER > 1,000

03 DISTANCE TO NEAREST DRINKING WATER WELL 0.4 (mi)

04 DEPTH TO GROUNDWATER	05 DIRECTION OF GROUNDWATER FLOW	06 DEPTH TO AQUIFER OF CONCERN	07 POTENTIAL YIELD OF AQUIFER	08 SOLE SOURCE AQUIFER
5-10 (ft)	North (estimated)	10-25 (ft)	15 (gpd)	X YES _ NO

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

Tuscarora Indian Reservation supplied with drinking water from private wells and springs. Wells range from 25 to 100 feet deep.

10 RECHARGE AREA		11 DISCHARGE AREA	
X YES _ NO	COMMENTS - Precipitation	X YES _ NO	COMMENTS - Groundwater discharges off-site along escarpment.

IV. SURFACE WATER

01 SURFACE WATER USE (Check one)

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

02 AFFECTED/POTENTIALLY AFFECTED BODIES OF WATER

NAME:	AFFECTED	DISTANCE TO SITE
Fish Creek	_	0.5 (mi)
Six Mile Creek	_	0.7 (mi)
	_	(mi)

V. DEMOGRAPHIC AND PROPERTY INFORMATION

01 TOTAL POPULATION WITHIN

ONE (1) MILE OF SITE	TWO (2) MILES OF SITE	THREE (3) MILES OF SITE
A. > 1,000 NO. OF PERSONS	B. > 6,000 NO. OF PERSONS	C. > 14,500 NO. OF PERSONS

02 DISTANCE TO NEAREST POPULATION

0 (mi)

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

> 2,000

04 DISTANCE TO NEAREST OFF-SITE BUILDING

0.01 (mi)

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

The site is currently overlain by a residential housing development, approximately 1.5 mile east of the Town of Lewiston. The Tuscarora Indian Reservation abuts the property to the east. Area is generally residential to rural.

EPA

POTENTIAL HAZARDOUS WASTE SITE
SITE INSPECTION REPORT

PART 6 - WATER, DEMOGRAPHIC, AND ENVIRONMENTAL DATA

I. IDENTIFICATION	
01 STATE	01 SITE NUMBER
New York	D000513697

VI. ENVIRONMENTAL INFORMATION

01 PERMEABILITY OF UNSATURATED ZONE (Check one)

_ A. 10^{-6} - 10^{-8} cm/sec X B. 10^{-4} - 10^{-6} cm/sec _ C. 10^{-4} - 10^{-3} cm/sec _ D. GREATER THAN 10^{-3} cm/sec

02 PERMEABILITY OF BEDROCK (Check one)

_ A. IMPERMEABLE (less than 10^{-6} cm/sec) _ B. RELATIVELY IMPERMEABLE (10^{-4} - 10^{-6} cm/sec) X C. RELATIVELY PERMEABLE (10^{-2} - 10^{-4} cm/sec) _ D. VERY PERMEABLE (Greater than 10^{-2} cm/sec)

03 DEPTH TO BEDROCK	04 DEPTH OF CONTAMINATED SOIL ZONE	05 SOIL Ph	
10 (ft)	5 - 10 (ft)	6.1 - 7.6	

06 NET PRECIPITATION	07 ONE YEAR 24 HOUR RAINFALL	08 SLOPE		
		SITE SLOPE	DIRECTION OF SITE SLOPE	TERRAIN AVERAGE SLOPE
4 (in)	2.1 (in)	< 1 %	north	< 1 %

09 FLOOD POTENTIAL

SITE IS IN None YEAR FLOODPLAIN

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

11 DISTANCE TO WETLANDS (5 acre minimum)

ESTAURINE	OTHER
A. _____ (mi)	B. 1 (mi)

12 DISTANCE TO CRITICAL HABITAT (of endangered species)

> 1 (mi)

(NY regulated)
ENDANGERED SPECIES: Fringed Gentian

13 LAND USE IN VICINITY

DISTANCE TO:

COMMERCIAL/INDUSTRIAL	RESIDENTIAL AREAS; NATIONAL/STATE PARKS, FORESTS, OR WILDLIFE RESERVES	AGRICULTURAL LANDS PRIME AG LAND	AGRICULTURAL LANDS AG LAND
A. 0.5 (mi)	B. 0 (mi)	C. 0.01 (mi)	D. 0.01 (mi)

14 DESCRIPTION OF SITE IN RELATION TO SURROUNDING TOPOGRAPHY

North Love Canal was an excavation approximately 100 feet wide, 2,000 feet long, and 5 to 10 feet deep, oriented north-south. The canal was excavated perpendicular to the edge of the Niagara Escarpment, which trends east-west in this area. Some houses in the Whittaker subdivision were built directly on top of the filled-in canal. Site topography is fairly flat, while the Niagara Escarpment at the north end of the site drops 235 feet to the lake plain below. The site is bordered by the Tuscarora Reservation to the east, where land is used for agriculture and groundwater is used for drinking water supplies.

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

Preliminary Site Assessment Report, November 1990, E.C. Jordan Co., and references cited therein.

EPA

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

I. IDENTIFICATION	
01 STATE	01 SITE NUMBER
New York	000513697

II. SAMPLES TAKEN

SAMPLE TYPE	01 NUMBER OF SAMPLES TAKEN	02 SAMPLES SENT TO	03 ESTIMATED DATE RESULTS AVAILABLE
GROUNDWATER		No samples collected	
SURFACE WATER			
WASTE			
AIR			
RUNOFF			
SPILL			
SOIL			
VEGETATION			
OTHER			

III. FIELD MEASUREMENTS TAKEN

01 TYPE	02 COMMENTS

IV. PHOTOGRAPHS AND MAPS

01 TYPE X GROUND X AERIAL

02 IN CUSTODY OF E.C. Jordan Co., Niagara County USDA Soil and Water Conservation Service
(Name of organization or individual)

03 MAPS
X YES
_ NO

04 LOCATION OF MAPS
NYSDEC Region 9, Buffalo, Lewiston Tax Assessors

V. OTHER FIELD DATA COLLECTED (Provide narrative description)

None collected.

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

Preliminary Site Assessment Report, November 1990, E.C. Jordan Co., and references cited therein.

EPA

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

I. IDENTIFICATION	
01 STATE: New York	01 SITE NUMBER: 000513697

II. CURRENT OWNER(S)

01 NAME	02 D+B NUMBER	03 STREET ADDRESS (P.O. Box, RFD #, etc.)	04 SIC CODE	05 CITY	06 STATE	07 ZIP CODE
Various owners/Residents		Whittaker Subdivision		Lewiston	New York	14092
Lewiston, New York						

PARENT COMPANY (If applicable)

08 NAME	09 D+B NUMBER	10 STREET ADDRESS (P.O. Box, RFD #, etc.)	11 SIC CODE	12 CITY	13 STATE	14 ZIP CODE

III. PREVIOUS OWNER(S) (List most recent first)

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

IV. REALTY OWNER(S) (If applicable; list most recent first)

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

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

Preliminary Site Assessment Report, November 1990, E.C. Jordan Co., and references cited therein.

EPA

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

I. IDENTIFICATION	
01 STATE	01 SITE NUMBER
New York	D000513697

II. CURRENT OPERATOR (Provide if different from owner)			OPERATOR'S PARENT COMPANY (If applicable)		
01 NAME	02 D+B NUMBER		10 NAME	11 D+B NUMBER	
03 STREET ADDRESS (P.O. Box, RFD #, etc.)	04 SIC CODE		12 STREET ADDRESS (P.O. Box, RFD #, etc.)	13 SIC CODE	
05 CITY	06 STATE	07 ZIP CODE	14 CITY	15 STATE	16 ZIP CODE
08 YEARS OF OPERATION	09 NAME OF OWNER				

III. PREVIOUS OPERATOR(S) (List most recent first; provide only if different from owner)			PREVIOUS OPERATOR'S PARENT COMPANIES (If applicable)		
01 NAME Stauffer Chemical	02 D+B NUMBER		10 NAME	11 D+B NUMBER	
03 STREET ADDRESS (P.O. Box, RFD #, etc.) P.O. Box 0820852	04 SIC CODE		12 STREET ADDRESS (P.O. Box, RFD #, etc.)	13 SIC CODE	
05 CITY Westport	06 STATE CT	07 ZIP CODE 06881	14 CITY	15 STATE	16 ZIP CODE
08 YEARS OF OPERATION 1930-1952	09 NAME OF OWNER				
01 NAME Niagara Smelting	02 D+B NUMBER		10 NAME Stauffer Chemical	11 D+B NUMBER	
03 STREET ADDRESS (P.O. Box, RFD #, etc.) Subsidiary of Stauffer Chemical	04 SIC CODE		12 STREET ADDRESS (P.O. Box, RFD #, etc.) P.O. Box 0820852	13 SIC CODE	
05 CITY	06 STATE	07 ZIP CODE	14 CITY Westport	15 STATE CT	16 ZIP CODE 06881
08 YEARS OF OPERATION	09 NAME OF OWNER				
01 NAME	02 D+B NUMBER		10 NAME	11 D+B NUMBER	
03 STREET ADDRESS (P.O. Box, RFD #, etc.)	04 SIC CODE		12 STREET ADDRESS (P.O. Box, RFD #, etc.)	13 SIC CODE	
05 CITY	06 STATE	07 ZIP CODE	14 CITY	15 STATE	16 ZIP CODE
08 YEARS OF OPERATION	09 NAME OF OWNER				

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

Preliminary Site Assessment Report, November 1990, E.C. Jordan Co., and references cited therein.

EPA	POTENTIAL HAZARDOUS WASTE SITE SITE INSPECTION REPORT PART 10 - PAST RESPONSE ACTIVITIES	I.IDENTIFICATION 01 STATE: New York 01 SITE NUMBER: D000513697

II. PAST RESPONSE ACTIVITIES

01 _ A. WATER SUPPLY CLOSED — 02 DATE _____ — 03 AGENCY _____
04 DESCRIPTION

None indicated.

01 _ B. TEMPORARY WATER SUPPLY PROVIDED — 02 DATE _____ — 03 AGENCY _____
04 DESCRIPTION

None indicated.

01 _ C. PERMANENT WATER SUPPLY PROVIDED — 02 DATE _____ — 03 AGENCY _____
04 DESCRIPTION

None indicated.

01 _ D. SPILLED MATERIAL REMOVED — 02 DATE _____ — 03 AGENCY _____
04 DESCRIPTION

None indicated.

01 _ E. CONTAMINATED SOIL REMOVED — 02 DATE _____ — 03 AGENCY _____
04 DESCRIPTION

None indicated.

01 _ F. WASTE REPACKAGED — 02 DATE _____ — 03 AGENCY _____
04 DESCRIPTION

None indicated.

01 _ G. WASTE DISPOSED ELSEWHERE — 02 DATE _____ — 03 AGENCY _____
04 DESCRIPTION

None indicated.

01 _ H. ON SITE BURIAL — 02 DATE _____ — 03 AGENCY _____
04 DESCRIPTION

None indicated.

01 _ I. IN SITU CHEMICAL TREATMENT — 02 DATE _____ — 03 AGENCY _____
04 DESCRIPTION

None indicated.

01 _ J. IN SITU BIOLOGICAL TREATMENT — 02 DATE _____ — 03 AGENCY _____
04 DESCRIPTION

None indicated.

01 _ K. IN SITU PHYSICAL TREATMENT — 02 DATE _____ — 03 AGENCY _____
04 DESCRIPTION

None indicated.

01 _ L. ENCAPSULATION — 02 DATE _____ — 03 AGENCY _____
04 DESCRIPTION

None indicated.

01 _ M. EMERGENCY WASTE TREATMENT — 02 DATE _____ — 03 AGENCY _____
04 DESCRIPTION

None indicated.

01 _ N. CUTOFF WALLS — 02 DATE _____ — 03 AGENCY _____
04 DESCRIPTION

None indicated.

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

None indicated.

01 _ P. CUTOFF TRENCHES/SUMP — 02 DATE _____ — 03 AGENCY _____
04 DESCRIPTION

None indicated.

01 _ Q. SUBSURFACE CUTOFF WALL — 02 DATE _____ — 03 AGENCY _____
04 DESCRIPTION

None indicated.

II. PAST RESPONSE ACTIVITIES (Continued)

01 _ R. BARRIER WALLS CONSTRUCTED — 02 DATE _____ — 03 AGENCY _____
04 DESCRIPTION

None indicated.

01 _ S. CAPPING/COVERING — 02 DATE _____ — 03 AGENCY _____
04 DESCRIPTION

None indicated.

01 _ T. BULK TANKAGE REPAIRED — 02 DATE _____ — 03 AGENCY _____
04 DESCRIPTION

None indicated.

01 _ U. GROUT CURTAIN CONSTRUCTED — 02 DATE _____ — 03 AGENCY _____
04 DESCRIPTION

None indicated.

01 _ V. BOTTOM SEALED — 02 DATE _____ — 03 AGENCY _____
04 DESCRIPTION

None indicated.

01 _ W. GAS CONTROL — 02 DATE _____ — 03 AGENCY _____
04 DESCRIPTION

None indicated.

01 _ X. FIRE CONTROL — 02 DATE _____ — 03 AGENCY _____
04 DESCRIPTION

None indicated.

01 _ Y. LEACHATE TREATMENT — 02 DATE _____ — 03 AGENCY _____
04 DESCRIPTION

None indicated.

01 _ Z. AREA EVACUATED — 02 DATE _____ — 03 AGENCY _____
04 DESCRIPTION

None indicated.

01 _ 1. ACCESS TO SITE RESTRICTED — 02 DATE _____ — 03 AGENCY _____
04 DESCRIPTION

None indicated.

01 _ 2. POPULATION RELOCATED — 02 DATE _____ — 03 AGENCY _____
04 DESCRIPTION

None indicated.

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

None indicated.

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

Preliminary Site Assessment Report, November 1990, E.C. Jordan Co., and references cited therein.

EPA	POTENTIAL HAZARDOUS WASTE SITE SITE INSPECTION REPORT PART 11 - ENFORCEMENT INFORMATION	I.IDENTIFICATION	
		01 STATE New York	01 SITE NUMBER D000513697

II. ENFORCEMENT INFORMATION

01 PAST REGULATORY/ENFORCEMENT ACTION X YES _ NO

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

Site Inspection Report completed for USEPA, February 1990, by NUS.

Phase I Investigation performed for NYSDEC, September 1989, by Ecology and Environment, Inc.

Samples collected in drainage ditch and basement sumps by Niagara County Health Department 1988-1989.

Preliminary Assessment performed for USEPA in June 1987 by NUS.

Subsurface soil investigation performed for Town of Lewiston in March 1979 by Dominion Soil Investigations, Inc.

Investigation performed by USEPA in September 1979.

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

Preliminary Site Assessment Report, November 1990, E.C. Jordan Co., and references cited therein.

APPENDIX C

SUMMARY OF ANALYTICAL DATA

APPENDIX C

TABLE 1

SUMMARY OF ANALYTICAL RESULTS OF SOIL
(Dominion Soil Investigations, Inc., 1979)

PARAMETER (ppm)	MINIMUM DETECTED	MAXIMUM DETECTED	AVERAGE
Sulfur	< 1	8797	742
Phosphorus	< 1	3.4	1.5
Manganese	< 1	40	4.8
Magnesium	< 1	852	62
Cyanide	0.01	0.47	0.07
Fluoride	< 1	152	70
Nitrate	1	28	9.0
Phosphate	8.6	8.6	8.6
Phenol	0.001	0.38	0.08
Chloride	0.03	846	423

SUMMARY OF ANALYTICAL RESULTS OF GROUNDWATER
(Dominion Soil Investigation, Inc., 1979)

PARAMETER	MINIMUM DETECTED	MAXIMUM DETECTED	AVERAGE
pH	6.8	9.7	7.6
Sulfate (ppm)	31	2006	342

NOTES:

< = less than
ppm = parts per million

APPENDIX C

TABLE 2

SUMMARY OF ANALYTICAL RESULTS OF TWO BASEMENT SUMP PUMPS
(Niagara County Health Department, 1989)

PARAMETER (ppb)	MINIMUM DETECTED	MAXIMUM DETECTED
INORGANICS		
Mercury	ND	0.98
Barium	13	18
Copper	ND	81
Iron	925	1,450
Manganese	388	3,860
Nickel	8	21
Strontium	230	2,300
Zinc	19	619
Fluoride	600	1,300
Nitrogen, Nitrate	670	1,550
PESTICIDES		
4,4-DDE	ND	0.05
4,4-DDD	ND	0.05
Heptaclor	ND	0.05
PCBs		
Aroclor	ND	0.56
VOLATILE ORGANICS		
Chloroform	ND	2
Acetone	ND	63
Ethyl tert butyl ether	ND	8
SEMIVOLATILE ORGANICS		
Bis(2-ethylhexyl)phthalate	ND	32
Dimethylphthalate	ND	10
Diethylphthalate	ND	61

NOTES:

ND = Not Detected
ppb = parts per billion
PCB = polychlorinated biphenyl

APPENDIX C

TABLE 3

SUMMARY OF ANALYTICAL RESULTS OF
SHALLOW SOIL SAMPLES
(NUS, 1990)

PARAMETER	SAMPLE LOCATION NYQ5-S1/S1A	NYQ5-S5
INORGANICS (mg/kg)		
Mercury	ND	0.87
Copper	277	63.8
Lead	257	280
VOLATILE ORGANIC COMPOUNDS (µg/kg)		
Chloroform	ND	22
Carbon Tetrachloride	ND	34
Tetrachloroethene	18	35
SEMIVOLATILE ORGANIC COMPOUNDS (µg/kg) (Polycyclic Aromatic Hydrocarbons)		
Phenanthrene	1,800	J
Fluoranthene	2,300	970
Pyrene	2,400	930
Benzo(a)anthracene	1,400	J
Chyrsene	1,500	J
Benzo(b)fluoranthene	1,300	J
Benzo(k)fluoranthene	1,000	J
Benzo(a)pyrene	1,200	J
Indino (1,2,3-cd)pyrene	870	J

NOTES: VOCs and PAHs were not detected at other sample locations. Inorganic compounds were detected at other locations, however these concentrations were within acceptable background ranges.

ND = Not detected above laboratory detection limit

J = Estimated value; compound present but below detection limit. Included for compounds quantified in other samples only.

NYQ5 = S1A is a duplicate sample NYQ5-S1. Where compounds were detected in both samples. The higher concentration is reported.

mg/kg = milligrams per kilogram

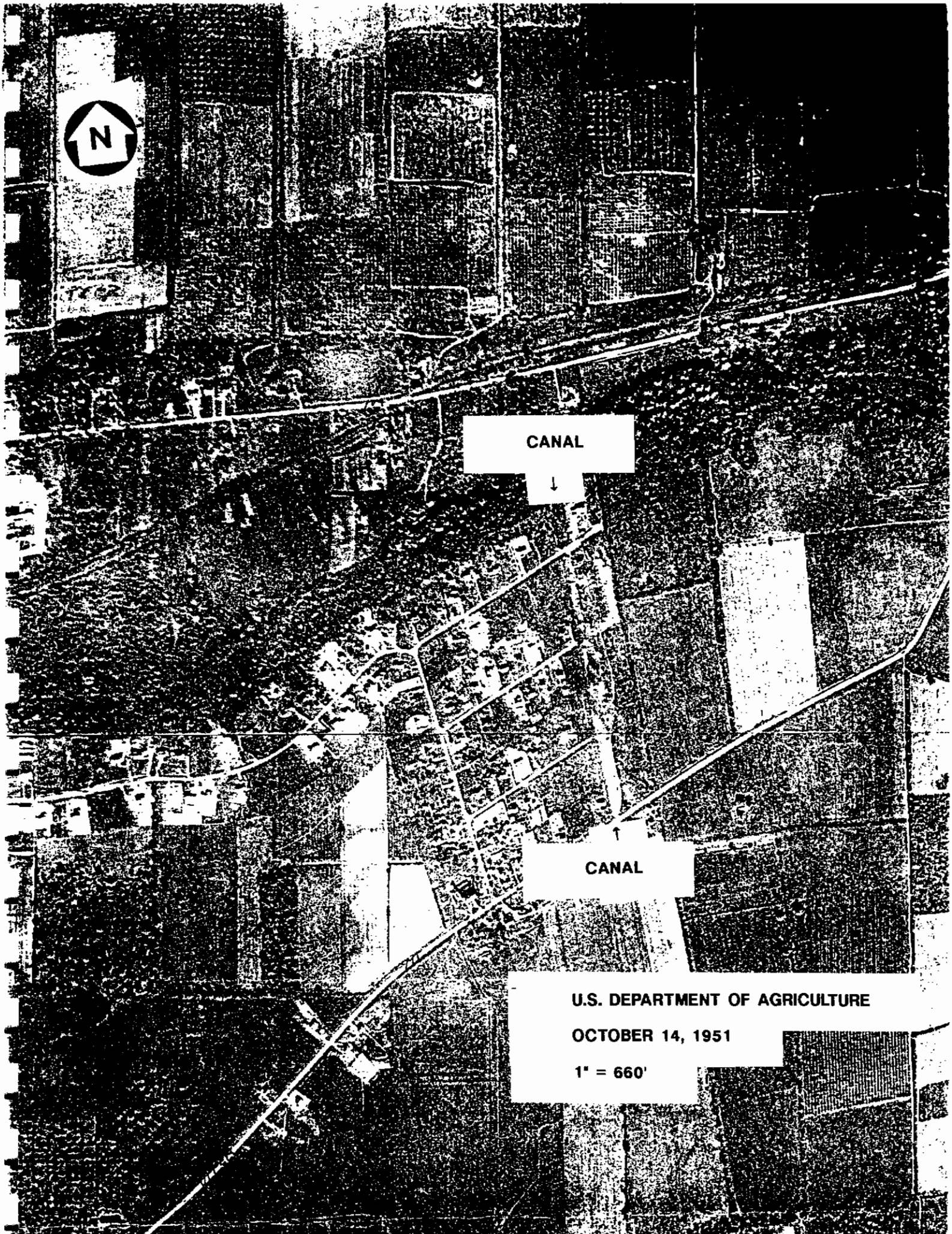
µg/kg = micrograms per kilogram

VOC = volatile organic compound

PAH = polycyclic aromatic hydrocarbon

APPENDIX D

PHOTOCOPIES OF AERIAL PHOTOGRAPHS REVIEWED AT USDA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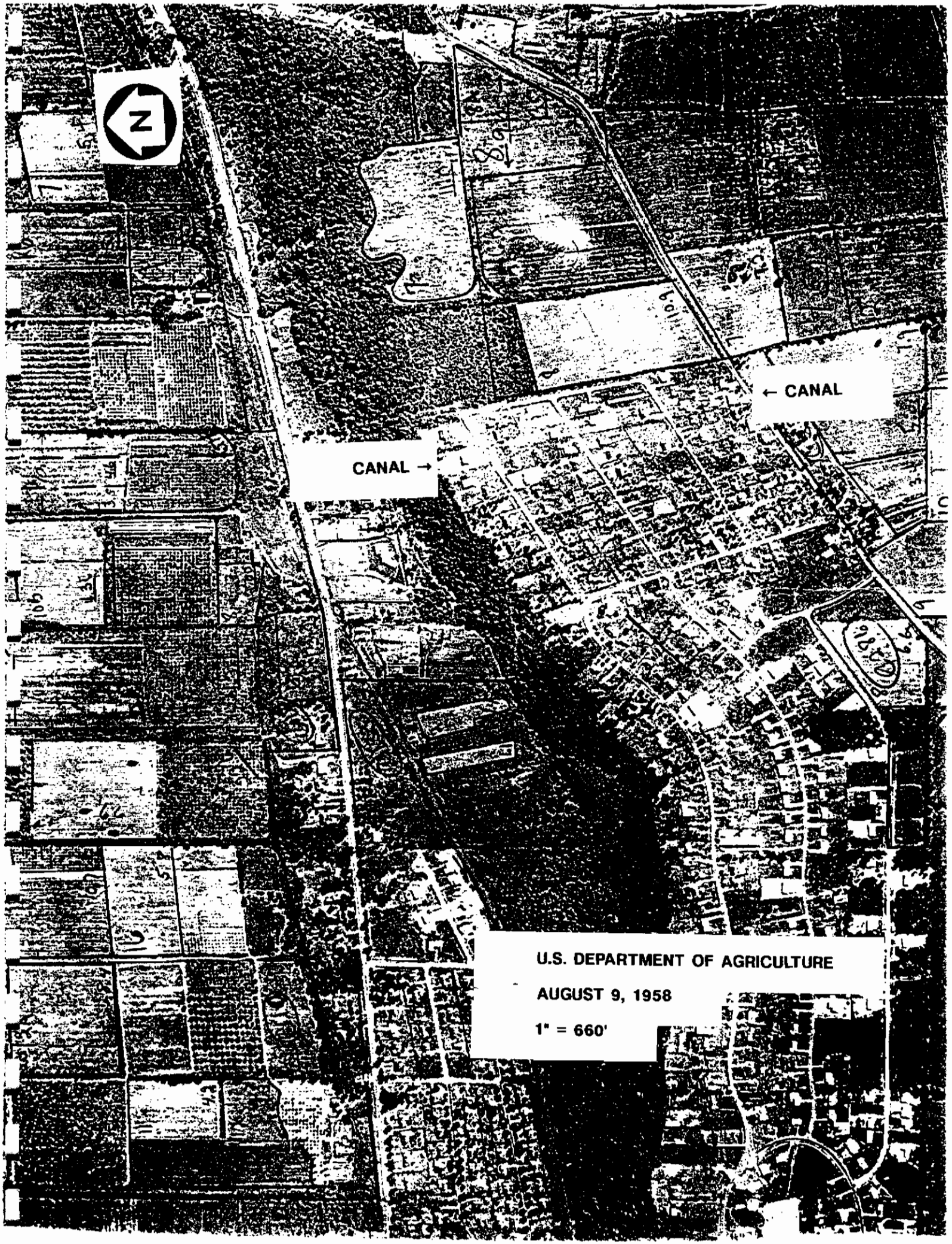
CANAL
CANAL
U.S. DEPARTMENT OF AGRICULTURE
OCTOBER 14, 1951
1" = 660'


N
← CANAL
CANAL →
U.S. DEPARTMENT OF AGRICULTURE
AUGUST 9, 1958
1" = 660'