932022

PUBLIC HEALTH ASSESSMENT

HOOKER - 102nd STREET LANDFILL

Niagara County

Niagara Falls, New York

CERCLIS NO. NYD980506810

April 1994

Prepared By

New York State Department of Health

Under a Cooperative Agreement With

U.S. Department of Health & Human Services
Public Health Service
Agency for Toxic Substances and Disease Registry

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THE ATSDR PUBLIC HEALTH ASSESSMENT: A NOTE OF EXPLANATION

This Public Health Assessment was prepared by ATSDR pursuant to the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA or Superfund) section 104 (i)(6) (42 U.S.C. 9604 (i)(6), and in accordance with our implementing regulations 42 C.F.R. Part 90). In preparing this document ATSDR has collected relevant health data, environmental data, and community health concerns from the Environmental Protection Agency (EPA), state and local health and environmental agencies, the community, and potentially responsible parties, where appropriate.

In addition, this document has previously been provided to EPA and the affected states in an initial release, as required by CERCLA section 104 (i)(6)(H) for their information and review. The revised document was released for a 30 day public comment period. Subsequent to the public comment period, ATSDR addressed all public comments and revised or appended the document as appropriate. The public health assessment has now been reissued. This concludes the public health assessment process for this site, unless additional information is obtained by ATSDR which, in the Agency's opinion, indicates a need to revise or append the conclusions previously issued.

Additional copies of this report are available from:
National Technical Information Service, Springfield, Virginia

Nelson

STATE OF NEW YORK
DEPARTMENT OF HEALTH

Center for Environmental Health 2 University Place Albany, New York 12203-3399

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Center Director

June 10, 1994

Dear Concerned Citizens and Elected Officials:

Enclosed is a copy of the Hooker-102nd Street Landfill Public Health Assessment. The public health assessment has been developed by the New York State Department of Health (NYS DOH) in cooperation with the U.S. Agency for Toxic Substances and Disease Registry (ATSDR) to evaluate possible human exposure to contaminants from the Hooker-102nd Street Landfill site. A draft of this document was distributed for public comment in July 1993. The New York State Department of Health received comments from interested parties concerned with the Hooker-102nd Street Landfill site and has addressed those comments. A compilation of the comments with their responses is included as Appendix E of the public health assessment.

The public health assessment discusses the public health actions that have been taken and the actions that are planned for the future (see pages 25-26). The NYS DOH will review new data as they are generated and will make recommendations protective of public health based on that information. Additionally, as the new information becomes available the NYS DOH will review the public health assessment and revise it as needed. The public will be notified of any changes in the public health assessment.

A copy of the Public Health Assessment is also available to the public in the document repositories at:

Earl Brydges Memorial Library
1425 Main Street
Niagara Falls, NY 14305

North Tonawanda Library
505 Meadow Street
North Tonawanda, NY 14120

These repositories also contain other documents and background information related to the Hooker-102nd Street Landfill site. If you have any additional questions or concerns about the site, do not hesitate to contact me at the toll-free number 1-800-458-1158, extension 402.

Sincerely,

Meaghan Boice-Green

Meaghan Boice-Green
Health Liaison Program
New York State Department of Health

94146PRO0524

ATSDR and its Public Health Assessment

ATSDR is the Agency for Toxic Substances and Disease Registry, a federal public health agency. ATSDR is part of the Public Health Service in the U.S. Department of Health and Human Services. ATSDR is not a regulatory agency. Created by Superfund legislation in 1980, ATSDR's mission is to prevent or mitigate adverse human health effects and diminished quality of life resulting from exposure to hazardous substances in the environment.

The Superfund legislation directs ATSDR to undertake actions related to public health. One of these actions is to prepare public health assessments for all sites on or proposed for the Environmental Protection Agency's National Priorities List, including sites owned or operated by the federal government.

During ATSDR assessment process the author reviews available information on

- the levels (or concentrations) of the contaminants,
- how people are or might be exposed to the contaminants, and
- how exposure to the contaminants might affect people's health

to decide whether working or living nearby might affect peoples' health, and whether there are physical dangers to people, such as abandoned mine shafts, unsafe buildings, or other hazards.

Four types of information are used in an ATSDR assessment.

1) environmental data; information on the contaminants and how people could come in contact with them

2) demographic data; information on the ethnicity, socioeconomic status, age, and gender of people living around the site,

3) community health concerns; reports from the public about how the site affects their health or quality of life

4) health data; information on community-wide rates of illness, disease, and death compared with national and state rates

The sources of this information include the Environmental Protection Agency (EPA) and other federal agencies, state, and local environmental and health agencies, other institutions, organizations, or individuals, and people living around and working at the site and their representatives.

ATSDR health assessors visit the site to see what it is like, how it is used, whether people can walk onto the site, and who lives around the site. Throughout the assessment process, ATSDR health assessors meet with people working at and living around the site to discuss with them their health concerns or symptoms.

A team of ATSDR staff recommend actions based on the information available that will protect the health of the people living around the site. When actions are recommended, ATSDR works with other federal and state agencies to carry out those actions.

A public health action plan is part of the assessment. This plan describes the actions ATSDR and others will take at and around the site to prevent or stop exposure to site contaminants that could harm peoples' health. ATSDR may recommend public health actions that include these:

- restricting access to the site,
- monitoring,
- surveillance, registries, or health studies,
- environmental health education, and
- applied substance-specific research.

ATSDR shares its initial release of the assessment with EPA, other federal departments and agencies, and the state health department to ensure that it is clear, complete, and accurate. After addressing the comments on that release, ATSDR releases the assessment to the general public. ATSDR notifies the public through the media that the assessment is available at nearby libraries, the city hall, or another convenient place. Based on comments from the public, ATSDR may revise the assessment. ATSDR then releases the final assessment. That release includes in an appendix ATSDR's written response to the public's comments.

If conditions change at the site, or if new information or data become available after the assessment is completed, ATSDR will review the new information and determine what, if any, other public health action is needed.

For more information about ATSDR's assessment process and related programs please write to:

Director
Division of Health Assessment and Consultation
Agency for Toxic Substances and Disease Registry
1600 Clifton Road (E-32)
Atlanta, Georgia 30333

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SUMMARY

The 102nd Street Landfill is an inactive landfill along the Niagara River in the City of Niagara Falls, New York. The majority of the 102nd Street Landfill is owned by Occidental Chemical Corporation (OCC) and the remainder is owned by Olin Chemical Corporation (Olin). The owners and their respective predecessors disposed of industrial and hazardous waste at this site.

The surrounding area is zoned for both residential and commercial use. To the west is Griffon Park, a former municipal dump, and to the east is another landfill, known as the Belden site. The area around the site is not heavily populated due, in part, to the proximity of the Love Canal site to the north and its associated Emergency Declaration Area (EDA).

Many chemicals have been found during investigations at the 102nd Street Landfill, including underground layers of non-aqueous phase liquid (NAPL), a mixture of chemicals which frequently resembles a liquid tar. Tetrachlorodibenzo-p-dioxins (TCDDs) including 2,3,7,8-TCDD, have been found in soils off-site. This area of soil contamination has been covered with gravel to limit the possibility of contaminant migration and human exposure through direct contact.

Contamination on-site has been partially contained by the placement of a soil cover and construction of a shoreline bulkhead. Access roads were constructed to eliminate tracking of contaminated soils off-site by vehicles and rutting of the surface material which could have exposed buried wastes. Fencing limits access to the site along the three sides accessible by land.

Residents have expressed concern over their combined exposures to 102nd Street and Love Canal contaminants as well as the effectiveness of the chosen remedy.

In the past, this site posed a public health hazard because of exposures to site contaminants in on-site and off-site surface soils, on-site wastes, and airborne soil particulates. However, these past exposures cannot be characterized because of insufficient data. This site currently poses an indeterminate public health hazard because it is unknown to what extent persons may be exposed to surface soils off-site. Additionally, there has been a potential for exposures to contamination in surface water, sediments, and airborne soil particulates. The current major public health concern is ingestion of fish caught in the Niagara River or Lake Ontario that have bioaccumulated contaminants from the 102nd Street Landfill and other sources. However, there are inadequate data to assess the public health significance of past, present and potential exposures to site-related contaminants in fish. The NYS DOH has recommended that

the NYS Department of Environmental Conservation analyze fish caught in the upper Niagara River for organochlorines.

Exposures to site-related chemicals could cause an increased risk of cancer. Other health related problems associated with site contaminants are neurological, liver, and kidney effects.

The ATSDR's Health Activities Recommendation Panel (HARP) determined that no other follow-up health actions are needed with respect to the 102nd Street site due to the follow-up activities being performed for the Love Canal site.

Remediation measures at the site will include recovery and incineration of NAPL, excavation of contaminated off-site soils and river sediments. The off-site soils and excavated sediments will be placed on-site and the wastes will be encapsulated within a slurry wall and a multi-media cap.

BACKGROUND

In cooperation with the New York State Department of Health (NYS DOH), the Agency for Toxic Substances and Disease Registry (ATSDR) will evaluate the public health significance of this site. More specifically, ATSDR and NYS DOH will determine whether health effects are possible and will recommend actions to reduce or prevent possible health effects. ATSDR is a federal agency within the U.S. Department of Health and Human Services and is authorized by the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) of 1980 to conduct public health assessments at hazardous waste sites.

A. Site Description and History

The 102nd Street Landfill is an inactive landfill that was used for the disposal of industrial and hazardous wastes. The site is near the intersection of 102nd Street and Buffalo Avenue in the City of Niagara Falls in Niagara County, New York (Appendix A, Figure 1). Buffalo Avenue forms the northern boundary of the site and the Niagara River forms the southern site boundary. Griffon Park is directly west of the site and another landfill, the Belden site, is to the east. Both the Belden site and Griffon Park are listed on the New York State (NYS) registry of inactive hazardous waste sites.

The 102nd Street Landfill is listed on the NYS registry of inactive hazardous waste sites as two sites, separated according to ownership. Occidental Chemical Corporation (OCC) owns the western 15.6 acres and Olin owns the eastern 6.5 acres (Appendix A, Figure 2). However, due to the proximity and nature of contamination on the two properties, both companies have worked together on the Remedial Investigation/Feasibility Study (RI/FS) and are working together to remediate the site.

OCC, Olin and their respective predecessors disposed of industrial and hazardous waste at this site. Ownership of different portions of the site was acquired by Oldbury Electrochemical Company in 1924, Niagara Alkali in 1945 and Hooker Electrochemical Company (Hooker) in 1947. Disposal rights were gained by Hooker for its portion in 1942, and the company began using the site in 1943. These three companies merged in 1955 to form Hooker Electrochemical, which is now known as OCC.

Mathieson Chemical Corporation, now known as Olin, acquired ownership of its portion in 1948, and begin disposing of its wastes in the same year. Both Hooker (OCC) and Olin ceased landfilling in December of 1970, as directed by the Buffalo District Army Corps of Engineers.

The wastes disposed at the site included "black cake", graphite, concrete, flyash, lime sludge, brine sludge and other mercury

containing wastes, phosphorus, and chlorinated organic chemicals. An inventory of the wastes disposed by OCC and Olin is given in Appendix B, Tables 1 and 2. These wastes were disposed in bulk or in drums as solids or liquids. All of the wastes, except phosphorus, were disposed at the ground surface. Phosphorus was buried below the water table to prevent spontaneous combustion.

Some remedial activities have occurred at the site, including construction of a bulkhead along the river side of the site and installation of fencing along the site perimeter. A soil cap was installed over the entire site in 1974. A dense vegetative cover has taken root, but does not cover all areas of the site. Access roads were installed at the site to prevent compromise of the soil cover. The bulkhead was constructed under the direction of the Buffalo District Army Corps of Engineers. The primary goal of this effort was to stabilize the river bank and prevent erosion. Surface water drains were installed to divert surface water runoff back onto the site. A portion of this bulkhead was extended along the Griffon Park shoreline. The original construction was completed sometime between 1972 and 1973. Repairs and improvements were made to the Olin section of the bulkhead between 1982 to 1984.

A preliminary health assessment was completed by the New York State Department of Health (NYS DOH) under a cooperative agreement with the Agency for Toxic Substances and Disease Registry (ATSDR) in June 1989. The potential human exposure pathways identified in the preliminary health assessment to site contaminants included ingestion of contaminated fish; ingestion, inhalation and dermal contact exposure to particulates by on-site workers and exposure to contaminated air particulates by off-site receptors during site remediation activities.

B. Actions Implemented During the Public Health Assessment Process

Bulk fill material (soil) has been brought to the site in preparation for site remediation. Remediation of the site, as outlined in the September 1990 Record of Decision (ROD), will include excavation of contaminated off-site soils and Niagara River sediments, placement of the contaminated soils and sedimenton-site, and capping of the site. Non-aqueous phase liquid (NAPL) will be extracted and incinerated. Groundwater migration will be controlled by a slurry wall, a barrier to groundwater flow, and groundwater levels within the landfill will be kept lower than those outside. Contaminated off-site soils north of Buffalo Avenue have been removed as of November 1993.

NYS DOH has recommended to the NYS DEC that fish from the upper Niagara River and Lake Ontario be sampled and analyzed for organochlorine contaminants including alpha-, beta-, delta-, and gamma-hexachlorocyclohexane.

Fish from the Niagara River and Lake Ontario have been monitored for persistent chemicals which tend to accumulate in fish. NYS DOH has issued a health advisory for fish in the upper Niagara River which recommends that carp from this section of the river should not be eaten more than once a month and that women of childbearing age and children under 15 should not eat any fish taken from this area. The health advisory for the Niagara River below the falls and Lake Ontario is extensive (see Appendix C for complete advisory).

C. Site Visit

On October 29, 1987, a perimeter inspection was performed at the 102nd Street Landfill by New York State Department of Health (NYS DOH) staff. Access to the site itself was not possible. The three land bound sides of the site are fenced and secured, and the fourth (southern edge) of the site is the Niagara River shoreline. The weather prior to the site inspection had been cold and dry, limiting the amount of standing water that may have been present.

The fence line along the western site perimeter and Griffon Park, is shrouded by scrub trees; surface water run-off from the site could accumulate in some areas along this boundary. To the north, along Buffalo Avenue, the general grade appears to be even; however, there is one low area near the entrance road to the Olin section of the site where surface water could collect. Surface water could drain to the east along a drainage swale and any intermittent flow would be to the Niagara River.

There is one residence on Buffalo Avenue, across the street from the landfill and there are several residences east of the site.

Successive visits since 1987, have shown little change in site conditions. The last site visit was made by Dawn Hettrick of the NYS DOH in October of 1993.

D. Demographics, Land Use, and Natural Resource Use

Demographics

The 102nd Street Landfill site lies within census tract 220, and census tract 224.01 lies just to the north. The total area these tracts cover is about 1.5 square miles. The 1990 population for this area was 5,583, of which 5.7% are under 5 years old, 18.2% are between the ages of 5 year and 19 years, 55.8% are 20 to 64 years of age, and 20.4% are 65 years or older. The ethnic distributions are 97.6% white, 1.3% black, and 1.1% other races. The mean household income in 1979 was $19,444, with 8.2% of families below the poverty level.

Between 1979 and 1989, the population decreased by about one third because of the permanent relocation of residents from the Love Canal area in 1980. The local population is expected to increase somewhat as the Love Canal area is reinhabitated.

Land Use

The area near the site is a mixture of residential and commercial properties. Many residences in the nearby community are vacant due to the evacuation of the nearby Love Canal site in 1980. Griffon Park, which is owned by the City of Niagara Falls, borders the site to the west and the Belden Landfill site is to the east. Both Griffon Park and the Belden Landfill site are on the NYS Registry of Inactive Hazardous Waste Sites.

Griffon Park is listed on the hazardous site registry because it was used as a municipal landfill from 1949 until 1953. Branches and other landscaping wastes were also disposed and burned at this site intermittently between 1943 and 1963, when the site was converted to a public park. Griffon Park was host to many activities including Little League baseball until 1986. Currently, only the boat launching facilities are active.

The Belden Landfill was used for the disposal of industrial fill and rubble and received thiazole polymer blends from the Goodyear Tire and Rubber Company. Household refuse and demolition debris are also evident.

Cayuga Island is a well developed, residential area and is situated west of the site across the Little Niagara River.

A water main, a gas main, a storm sewer and telephone lines parallel the site along Buffalo Avenue. A section of the 100th Street storm sewer runs through the site, discharging into the Niagara River.

The Love Canal site is about 1,000 feet north of the 102nd Street Landfill. Homes adjacent to the Love Canal were evacuated beginning in 1978; in 1980, more than 500 families from residential properties on 232 acres surrounding the Canal (called the Emergency Declaration Area or EDA) were permanently relocated. In 1988, areas of the EDA north of Colvin Boulevard and west of the Love Canal were declared habitable. Areas south and east of the Love Canal did not meet the criteria for normal residential use without remediation of contaminated soil. One area of the EDA borders the 102nd Street Landfill, across Buffalo Avenue, to the north.

Natural Resource Use

The Niagara River, which borders the site to the south, is used for many purposes. Boating and fishing are the primary

recreational uses; the river water downstream from this site is used as a drinking water supply for the City of Niagara Falls.

E. Health Outcome Data

The NYS DOH maintains several health outcome data bases which could be used to generate site-specific data, if warranted. These data bases include the cancer registry, the congenital malformations registry, the heavy metals registry, the occupational lung disease registry, vital records (birth and death certificates), and hospital discharge information.

Numerous investigations of various health indicators have been studied among residents of the Love Canal Emergency Declaration Area (EDA). However, no health studies specific to the 102nd Street Landfill site have been conducted.

COMMUNITY HEALTH CONCERNS

Concerns have been expressed by the residents along Buffalo Avenue regarding their exposure to airborne particulates during the operational years of the landfill. Residents of the adjacent Love Canal EDA are worried about their combined exposures to contaminants from the 102nd Street and Love Canal sites. One of these concerns is about possible first and second generation birth defects.

There have been concerns over contamination of the water and sediments of the Little Niagara River, in particular, what effect this would have on swimmers, waders and fish consumers. Some area residents would like the Little Niagara River to be dredged, so the channel can be used, but some residents have expressed concerns about the effects of disturbing contaminated sediments.

At the August 15, 1990, public meeting, the Proposed Remedial Action Plan (PRAP) for the 102nd Street site was presented and several concerns were voiced about the effectiveness and implementation of the remedial alternatives. The main concern dealt with encapsulation of the wastes. Residents want to be assured that site contaminants and contaminated groundwater will not "escape" from the site after remediation and that long term monitoring will occur to monitor the effectiveness of the alternative. One resident at the meeting was opposed to incineration of the Non-Aqueous Phase Liquid (NAPL) and heavily contaminated sediments. Another resident was worried about incineration of material contaminated with mercury and subsequent mercury emissions.

ENVIRONMENTAL CONTAMINATION AND OTHER HAZARDS

To evaluate if a site poses an existing or potential hazard to the exposed or potentially exposed population(s), the site

conditions are characterized. This site characterization involves a review of sampling data for environmental media (e.g., soil, surface water, groundwater, air) both on- and off-site; an evaluation of the physical conditions of the contaminant sources or physical hazards near the site which may pose an additional health risk to the community or receptor population(s).

Contaminants selected for further evaluation are identified based upon consideration of the following factors:

1. Concentrations of contaminant(s) in environmental media;

2. Concentrations of contaminant(s) both on- and off-site;

3. Field data quality, laboratory data quality, and sample design;

4. Comparison of on-site and off-site contaminant concentrations in environmental media with typical background levels;

5. Comparison of contaminant concentrations in environmental media both on- and off-site with health assessment comparison values. These comparison values include Environmental Media Evaluation Guides (EMEGs), Cancer Risk Evaluation Guides (CREGs), drinking water standards and other relevant guidelines; and

6. Community health concerns.

The On-site Contamination subsection and the Off-site Contamination subsection include discussions of sampling data for environmental media. A listed contaminant does not necessarily mean that it will cause adverse health effects from exposure. If a chemical is selected for further evaluation in one medium, that contaminant will be reported in all media, where it is detected.

A summary of the environmental contamination data collected at the 102nd Street Landfill site is presented in Tables 3 through 11 in Appendix B. Contaminants selected for further evaluation are discussed in the Public Health Implications (Toxicological Evaluation) section of this public health assessment to determine whether exposure to site contaminants is of public health significance.

Contamination from the fill material and chemical wastes at the 102nd Street Landfill have been identified in soils, groundwater, the 100th Street storm sewer, and sediments of the Niagara River. The wastes at the site consist of demolition debris, fly ash, and chemical wastes (see Appendix B, Tables 1 and 2). Other possible sources of contamination at or near the site are Love Canal,

Griffon Park, the Belden site, and open sewage disposal into the ditch east of the site.

Many investigations have been conducted at the site by different agencies and the responsible parties. Both Olin and OCC installed wells throughout the site for subsurface explorations between 1973 and 1980. Numerous off-shore sediment investigations were completed between 1976 and 1983. The U.S. Environmental Protection Agency (US EPA) conducted a dioxin sampling program in 1985.

A. On-site Contamination

o Non-Aqueous Phase Liquid (NAPL)

Non-aqueous phase liquid, or NAPL, is a liquid waste product. It is a mixture of chemicals which does not readily combine with water and forms a layer of fluid separate from groundwater. The presence of NAPL was surveyed in April of 1987 and additional data were collected in late 1987 (see Appendix B, Tables 3-5). The heavy NAPL (HNAPL), which is denser (i.e., heavier) than water, forms a separate fluid layer below the water table. The HNAPL is believed to be limited to five localized areas within the site (see Appendix A, Figure 3).

Area 1: This area has the largest ratio of trichlorobenzenes to tetrachlorobenzenes of all HNAPL samples and an abundance of chlorinated aliphatic hydrocarbons. It has a low density and low viscosity.

Area 2: A sample from this area is characterized by a lack of tetrachlorobenzenes and pentachlorobenzene and by having a low density and high viscosity.

Area 3: This HNAPL has relatively large proportions of dichlorobenzenes and trichlorobenzenes.

Area 4: This area is known to have received wastes. Tetrachlorobenzenes, primarily the 1,2,3,4-isomer, were the predominant chemicals disposed here.

Area 5: This area contains a heterogeneous mixture of chemicals thought to have migrated from several disposal areas.

o Soil and Fill Material

On-site surface soil, subsurface soil or fill material has only been analyzed for dioxin. The fill was analyzed for dioxin in April of 1985, and the concentrations of the 2,3,7,8-tetrachlorodibenzo-p-dioxin isomer ranged from not detected to 0.68 milligrams per kilogram (mg/kg).

o Groundwater

Groundwater wells were sampled between February and November, 1987 as part of the remedial investigation (RI). Groundwater in the overburden aquifer is primarily contaminated with benzene, chlorobenzenes, chlorotoluenes, hexachlorocyclohexanes, and chlorophenols (see Appendix B, Table 6).

Groundwater in the bedrock was evaluated during past investigations at the site. The concentrations of total organic halogens were comparable to background levels in upgradient wells and none of the individual compounds analyzed for were detected or found.

The bulkhead seeps are groundwater discharges into the Niagara River. Five seeps were identified along the bulkhead in June, 1984 (see Appendix A, Figure 4). These seeps appear to be at the same level as the bottom of the fill. The flow rates were estimated to range from 0.02 to 0.15 gallons per minute (gal/min). Waste chemicals were detected in all of leachate samples (see Appendix B, Table 7); however, the presence of NAPL was not confirmed in any of the seeps.

Groundwater infiltration into the 100th Street Storm Sewer was observed by an interior video inspection. The pipe appears in good shape, but infiltration was occurring at the joints. Visual estimates of this seepage ranged from 2 to 8 gal/min.

o 100th Street Storm Sewer, Effluent and Sediments

The 100th Street storm sewer discharges into the Niagara River. Sediment samples were collected from the sewer pipe in November, 1989. The upper two inches of sewer pipe sediment were not visibly contaminated with NAPL, but the lower two inches had a brownish-black discoloration, indicating possible NAPL contamination (see Appendix B, Table 8). The fluid in the sediments contained some NAPL. Sewer effluent samples were collected in December 1989 (see Appendix B, Table 9). The water was contaminated; however, there was no visual evidence of NAPL.

Sediments at the sewer outfall are discussed under "River Sediments" in the Off-Site Contamination subsection.

B. Off-Site Contamination

o Surface Water - Niagara River

The Niagara River receives groundwater discharge from seeps in the bulkhead and storm water discharge from the 100th Street Storm sewer. Site contaminants have been detected in both the sewer effluent and the groundwater seeps, however, there is no

analytical data for the Niagara River water near the 102nd Street Landfill.

o River Sediments

Sediment samples from the Niagara River were collected between October, 1986 and December, 1987 (see Appendix B, Table 10). Samples were collected as far out as 528 feet from the shoreline and to a depth of five feet. Contamination was limited to River sediments within 300 feet of the shore and does not extend very far past the site boundaries. This sediment contamination is most likely attributable to contaminant discharges in sewer effluent, surface water runoff and soil erosion from the site prior to construction of the bulkhead. Other contaminants may have been transported here from the Love Canal area via the 100th Street storm sewer.

The highest concentrations for both the total organic indicator compounds and mercury were found in a sample collected near the sewer outfall. Most of the contamination was found in the upper 6 inches of sediment.

o Surface Soils

Off-site surface soils were sampled as far west as the Griffon Park boat launch, north to the LaSalle Expressway fence line and 25 feet past the drainage ditch, to the east (see Appendix B, Table 11). One hundred and thirteen soil samples were collected between October, 1986 and November, 1987. Contaminant concentrations were highest along the site boundaries and decreased with distance from the site. Contamination along the north side of Buffalo Avenue, near the northwest corner of the site, is attributed to trucks tracking contaminated soils when leaving the site, while the site was still an active landfill. Contaminated soils north of Buffalo Avenue were removed November 1993.

To the north, between the site fence and Buffalo Avenue, dioxins were found in three surface soils samples with concentrations of 2,3,7,8-tetrachlorodibenzo-p-dioxin (2,3,7,8-TCDD) up to 0.005 mg/kg, and total tetrachlorodibenzo-p-dioxin concentrations up to 0.030 mg/kg. This area was then covered with a foot of clean gravel to prevent direct contact exposure. Mercury analysis of samples taken in this same area showed concentrations up to 9.2 mg/kg. Mercury was detected in waste samples and in surface soils at concentrations up to 4.76 mg/kg in Griffon Park.

C. Quality Assurance and Quality Control

The preparation of this public health assessment relies on the information provided in the referenced documents. Adequate quality assurance and quality control (QA/QC) procedures were

followed for the recent investigations. Chain of custody, laboratory procedures and data reporting appear to be consistent with accepted US EPA or State of New York procedures. The validity of the analysis and conclusions drawn for this public health assessment is determined by the availability and reliability of the referenced information.

D. Physical and Other Hazards

Site access is currently restricted by fencing on three sides of the site and warning signs have also been posted. The Niagara River forms the southern site boundary. Other than water hazards associated with the Niagara River there are no other physical hazards at this site. Historically, it is unknown what, if any, physical hazards were present at the site. During site operations, there was fencing on the western border of the site and along Buffalo Avenue.

E. Toxic Chemical Release Inventory (TRI)

To identify other facilities that could contribute to site-related contaminants in groundwater, surface water, soil and/or air at or near the 102nd Street Landfill, NYS DOH searched the Toxic Chemical Release Inventory (TRI) data for 1989. The TRI has been developed by the US EPA from chemical release (air, water, soil) information provided by certain industries that are required to report contaminant emissions and releases on an annual basis.

NYS DOH uses a simple mathematical model to estimate if potential contaminant concentrations resulting from air emissions at a facility may be contributing to community (receptor population) exposures to contaminants at a site. This model uses information about the facility location (distance from the exposed population) and annual air emission data to calculate the radial distance from the facility at which contaminant concentrations in ambient air have been diluted to 1 microgram per cubic meter of air (mcg/m^3). NYS DOH then evaluates what portion, if any, of the population living within this distance from the manufacturing facility may also be exposed to contaminants originating at the site.

Carborundum Abrasives Company is 2.4 miles from the site. Two additional facilities that are classified as major emitters were also identified, although they are further than 2.5 miles from the site. The Niacet Corporation is 3.2 miles from the site and the "Energy from Waste" (EFW) facility, currently owned by American Ref-Fuel, is 3.0 miles from the site (see Appendix B, Table 12 for a summary of the contaminant emissions from these facilities).

Based on TRI data and air emissions modeling, air emissions from one of the TRI facilities were found to exceed a screening value of 1 microgram per cubic meter (mcg/m^3). Occidental Corporation reported that the "Energy from Waste" facility released 4,560,000 pounds of hydro-chloric acid during 1989. This contaminant of concern will be further evaluated in the Public Health Implications section.

PATHWAYS ANALYSIS

This section of the public health assessment (PHA) identifies potential and completed exposure pathways associated with past, present and future use of the site. An exposure pathway is the process by which an individual may be exposed to contaminants originating from a site. An exposure pathway is comprised of five elements: 1) a source of contamination, 2) environmental media and transport mechanisms, 3) a point of exposure, 4) a route of exposure, and 5) a receptor population.

The source of contamination is the source of contaminant release to the environment (any waste disposal area or point of discharge); if the original source is unknown, it is the environmental media (soil, air, biota, water) which are contaminated at the point of exposure. Environmental media and transport mechanisms "carry" contaminants from the source to points where human exposure may occur. The exposure point is a location where actual or potential human contact with a contaminated medium may occur. The route of exposure is the manner in which a contaminant actually enters or contacts the body (i.e., ingestion, inhalation, dermal adsorption). The receptor population is the persons who are exposed or may be exposed to contaminants at a point of exposure.

An exposure pathway is categorized as a completed or potential exposure pathway. Completed pathways exist when all five elements of the exposure pathway exist and that exposure to a contaminant has occurred in the past, is currently occurring, or will occur in the future. Potential exposure pathways exist when any one of the five elements comprising an exposure pathway is missing. Potential pathways indicate that exposure to a contaminant could have occurred in the past, could be occurring now, or could occur in the future. An exposure pathway can be eliminated if at least one of the five elements has not existed in the past, does not exist in the present, and will never exist in the future. The discussion that follows incorporates only those pathways that are important and relevant to the site.

Niagara River water and sediments are being contaminated by groundwater and sewer effluent discharges from the site. Humans have been and are being exposed to contaminants from this site and others that accumulate in Niagara River or Lake Ontario fish.

Surficial soils off-site have been contaminated by surface water run-off, air borne particulates and vehicular tracking. Contaminants may be released during remedial activities and procedures should be in place to minimize this occurrence.

The site itself is fenced and has a vegetated soil cover over the wastes, and interior roads have been installed to further protect the integrity of this cover. As long as this cover remains undisturbed, contaminant transport by fugitive dust emissions and/or by vehicular tracking will not occur.

A. Completed Exposure Pathways

Fish

Ingestion of fish from the Niagara River is a completed exposure pathway to site contaminants. Contaminants that bioaccumulate in fish are being discharged from the 102nd Street Landfill in bulkhead seeps and sewer effluent to the Niagara River. People who catch fish from Lake Ontario or from the Upper Niagara River may consume the fish and it is likely that people are being exposed to site contaminants, although there is no fish data to evaluate the public health significance of these exposures. The 102nd Street Landfill would not be the sole contributor to contamination which may be found in fish, since there are other sources of chemical loading to the Niagara River and the fish move throughout the river system. There are no analytical data for site-specific compounds in fish from the upper Niagara River to assess the contribution of the landfill to fish contamination and human health risk. Based upon PCB data, which is not a chemical found at 102nd Street, the NYS DOH has issued an advisory recommending that no more than one meal of carp be consumed per month and that women of childbearing age and children under 15 consume no fish from this area (see Appendix C).

On-Site Surface Soils

Prior to surface soils on-site being covered with clean material in 1974, it is very likely that they were contaminated. However, there are no analytical data to substantiate this or quantify the degree of contamination. Reportedly, children played on the site prior to it being covered with clean soil. In addition to contaminated soils, waste materials, including NAPL, may have also been present on the surface. This could have been partially attributed to disposal of waste material directly on the ground surface. Any past exposures cannot be evaluated since no analytical data are available. Currently, the surface soils on-site consist of clean soils used to cover the contamination. Furthermore, the site is fenced and access is restricted.

Off-Site Surface Soils

Soils north of Buffalo Avenue were contaminated with chemicals from the site. Residents that lived in these areas were most likely exposed to contaminants through direct contact, incidental ingestion or inhalation of dust particulates. The soils in this area were removed.

B. Potential Exposure Pathways

Surface Soil

Off-site surface soils were contaminated by surface water run-off, vehicular tracking, and dust dispersion prior to the site being covered. The off-site soils can be split into three areas - Griffon Park, areas north of the fence line, and areas east of the fence line. There may be on-going and future exposures to contamination in soils at Griffon Park as well as in soils north and east of the site, by persons living in and visiting the area.

Currently, only the boat launch at Griffon Park, which lies on the western section of the park, away from the 102nd Street Landfill, is being used. At one time, two baseball diamonds in the park were used for baseball games. Therefore, in the past, baseball participants could have been exposed to 102nd Street contaminants that are present in the soil at the baseball diamonds through dermal contact with soil, incidental ingestion and inhalation of dust particulates. Other park visitors could have also been exposed to contaminated surface soils in Griffon Park.

Contaminated soils have been identified in areas north and east of the site. Soils in an area north of the site, between the fence and along Buffalo Avenue, contain dioxins and were subsequently covered with gravel, and the potential for exposure to contaminated soils in this area has been minimized. A partially built house used to be present on the property bordering the landfill to the east and has since burned down, and there are other homes east of the site. Olin currently has control of a house immediately east of the site and plans to demolish it.

Groundwater

Groundwater in the overburden aquifer at the landfill is contaminated. However, there are no public or private wells in the direction of groundwater flow that would be used for potable or other domestic purposes. The only potential exposures to contaminated groundwater would be via direct contact with seep discharges at the bulkhead. Groundwater, downgradient of the site, discharges into the Niagara River.

Surface Water

Contaminated surface water runoff from the site may have discharged to the Niagara River or to the drainage ditch which runs outside of the fence line east of the site. Since there are no analytical data for surface water, any exposure pathways for these media can not be quantitatively evaluated. Persons may be exposed to site contaminants through dermal contact, incidental ingestion, and inhalation while swimming or wading in the Niagara River or by wading in the ditch. However, since there is no beach area, the likelihood of persons swimming or wading is small. Also, it would be expected that contamination downstream of the site would be diluted to the extent that it would be immeasurable and would not pose a threat to pubic health from infrequent exposures.

The Niagara River is a source for municipal water. About 70,000 persons are served by the City of Niagara Falls Water Treatment Plant. Other municipalities on both the United States and Canadian sides of the river use this water as well. However, available analytical data indicate that the public water supplies are not significantly affected by contaminants at the 102nd Street site. A monitoring program at the City of Niagara Falls Water Treatment Plant (CNFWTP) analyzes the finished water on a daily basis and raw water on a weekly basis. Finished water has consistently met drinking water standards since the inception of a monitoring program at the CNFWTP in 1979.

Sediment

As with the surface water pathways, exposures to contaminated sediments via direct contact could result from swimming or wading along the Niagara River shoreline or by wading in the drainage ditch. The sediments along the shoreline of 102nd Street Landfill in the Niagara River are contaminated; however, due to the limited accessibility of this shoreline, human exposures are not likely to occur. There are no available data to evaluate sediments in the ditch.

Air

Air monitoring performed during the Remedial Investigation did not show any releases of site-related contaminants. However, this monitoring was done to determine if any releases occurred during the investigations, so that they could be minimized. Currently, it is not expected that exposures to contaminants in air is occurring.

In the past, it is unknown what releases of volatile organic compounds or contaminated dust may have occurred during the years of active disposal at the site.

Remedial Work

Workers may be exposed to waste material at the site during remediation through direct contact with waste material and groundwater, and inhalation of dust particulates and volatile chemicals. However, a health and safety plan will be developed and followed to minimize worker exposures and those of nearby residents.

The possibility of exposures to contaminated off-site surface soils, sediments, and dust particulates, will be eliminated after the remedy, as outlined in the Record of Decision (ROD), is in place.

C. Eliminated Exposure Pathways

Currently, there are no residents in the area north of Buffalo Avenue. The Love Canal Area Revitalization Agency (LCARA) owns this property and plans on converting it to an open area. LCARA has no plans to re-habit this area.

The removal of contaminated soil from this area was completed in November 1993. Therefore, it is unlikely that people will be exposed to site-related contaminants in this area in the future.

PUBLIC HEALTH IMPLICATIONS

A. Toxicological Evaluation

Off-site surface soils, sediments and surface waters are contaminated with chemicals at levels of concern for past, present, and future human exposure pathways (see Tables in Appendix B). Contaminants selected for further evaluation are identified with an asterisk in the appropriate tables. An assessment of the toxicological implications of past, present, and future human exposure pathways of concern is presented below. To evaluate the potential health risks from contaminants of concern associated with the 102nd Street Landfill site, the NYS DOH has assessed the risks for cancer and noncancer health effects. The health effects are related to contaminant concentration, exposure pathway, exposure frequency and duration. For additional information on how the NYS DOH determined and qualified health risks applicable to this health assessment, refer to Appendix D.

1. Past inhalation, dermal contact, and ingestion exposure to off-site surface soils north and east of the site.

   Off-site surface soils have been contaminated by this site (Table 11). Most residents were evacuated from the area in 1980, but some residents remained. On the north side of the

site, along Buffalo Avenue, 2,3,7,8-tetrachlorodibenzo-p-dioxin (TCDD), 1,4-dichlorobenzene, hexachlorobenzene and (alpha, beta, gamma)-hexachlorocyclohexane have been identified. These chemicals cause cancer in laboratory animals exposed to high levels over their lifetimes (ATSDR, 1988; 1989b; 1990a; 1992a). Chemicals that cause cancer in laboratory animals may also increase the risk of cancer in humans who are exposed to lower levels over long periods. Chronic exposure to these chemicals at the highest concentrations found in these off-site surface soils would pose a high increased cancer risk. 1,4-Dichlorobenzene, hexachlorobenzene and (alpha, beta, gamma)-hexachlorocyclohexane also produce several noncarcinogenic health effects (primarily liver, kidney and neurological effects) at levels several orders of magnitude greater than past exposures from off-site soil. The most common adverse effects associated with exposure to TCDD are dermal toxicity, damage to the liver and immune system, birth defects and reproductive toxicity. Long-term exposure to mercury can lead to damage to the kidneys and nervous system (ATSDR, 1992b). Chemicals that cause effects in humans and/or animals at high levels of exposure may also pose a risk to humans who are exposed to lower levels over long periods of time. Although the risks of noncarcinogenic effects from possible exposures to contaminated soil are not completely understood, the existing data suggest that they would be minimal for 1,4-dichlorobenzene; low for hexachlorobenzene, (alpha, beta, gamma)-hexachlorocyclohexane and mercury, and could be high for TCDD. However, because the area containing the highest levels of TCDD is now covered with a foot of gravel, exposure and, therefore, health risks from this contaminant are greatly reduced.

Surface soils east of the site contain alpha and beta-hexachlorocyclohexane and mercury at concentrations which would pose a low level of increased risk of adverse health effects from possible exposures to contaminated soil, particularly to persons who may have eaten fruits or vegetables grown in contaminated soil over a long period of time. The health risks from possible exposure to alpha- and beta-hexachlorocyclohexane are reduced because they were detected but only in some soil samples.

2. Past potential inhalation, dermal contact, and ingestion exposure to off-site soils at Griffon Park.

Off-site soils in Griffon Park are contaminated with 1,4-dichlorobenzene, (alpha, beta, gamma)-hexachlorocyclohexane and mercury. The toxicological properties of these chemicals have already been discussed (see #1 above). Past potential exposures to these chemicals by Little League

baseball participants and other park users at the highest concentrations found in the park's soil would pose a minimal health risk to these individuals. 1,4-Dichlorobenzene and alpha- and beta-hexachlorocyclohexane were detected in only a few of the soil samples.

3. Past, present, and future ingestion of contaminated fish from the upper Niagara River and Lake Ontario.

   People eat fish from Lake Ontario and it is likely that people eat fish from the Upper Niagara River. Contaminants that bioaccumulate in fish are being discharged from the 102nd Street Landfill in bulkhead seeps and sewer effluent to the river. Adequate data are not available to assess the toxicological implications of exposure to site contaminants via ingestion of fish.

4. Past inhalation, dermal contact, and ingestion exposure to on-site soils and NAPL.

   Prior to the installation of a soil cover and fence on all landbound sides at the site in 1974, residents had direct access to the site and could have been exposed to contaminants in on-site soil and NAPL. The concentrations of TCDD (Table 5) and other organic chemicals in NAPL (Tables 3 and 4) are extremely high. Adequate exposure data are not available to assess the toxicological implications of this exposure pathway. However, the data suggest that these contaminants could have posed a public health threat if persons were repeatedly exposed to these materials.

5. Present potential and future potential exposure to contaminants in off-site soils via inhalation, dermal contact, and ingestion.

   The area north of Buffalo Avenue is not expected to be re-inhabited in the future and contaminated soil in this area has been removed, eliminating related future exposure pathways.

   If Griffon Park were to be actively used again, the increased health risks would remain minimal because the anticipated recreational exposure is intermittent and infrequent as discussed in items 1 and 2 above.

6. Potential past, present, and future ingestion, dermal, and inhalation exposure of persons engaged in recreational activities (fishing, swimming, wading) to contaminated sediments and groundwater discharged to the Niagara River.

   As indicated in Tables 6 and 7, contaminated groundwater from the site is being discharged from bulkhead seeps and

the 100th Street storm sewer into the Niagara River. River sediments have been contaminated from these discharges (Tables 9 and 10). There are no known analytical data on the Niagara River water near 102nd Street Landfill. The contaminant concentrations in the groundwater, bulkhead seeps, and storm sewer discharges exceed the drinking water or groundwater standards for many of the chemicals. These standards are primarily to ensure that drinking water is of acceptable quality. In this situation, this water is not used "as is" for drinking water. The nearest public drinking water supply intake is about three miles downstream of the site along the Niagara River. There is a stringent water monitoring program in place for this supply, at the City of Niagara Falls Drinking Water Treatment Plant, in conjunction with another site, the S-Area Landfill, thereby limiting the potential hazards of this route. Monitoring of water leaving the water treatment plant for distribution has been shown to pass New York State drinking water standards since 1979. Across the Niagara River, the City of Niagara Falls, Ontario, Canada, also uses the Niagara River for the source of its municipal water supply. There are other water intakes further downstream on both the American and Canadian sides of the Niagara River. The Niagara River eventually empties into Lake Ontario. The area of the river near 102nd Street does not have a beach or fishing area and so people do not come into direct contact with the discharges. Because people are not coming into contact or ingesting the contaminated groundwater, bulkhead seeps and sewer discharges, adverse health effects are unlikely.

7. Future potential inhalation, dermal and ingestion exposure of persons engaged in on-site clean-up activities.

   Persons engaged in on-site clean-up (remediation) activities have a potential for exposure by multiple routes to organic chemicals and metal contaminants and could be at increased risk of adverse health effects. Adequate data are not available to assess the toxicological implications of this potential exposure. However, use of proper procedures, appropriate dust suppression methods, and monitoring of ambient air for organic vapors during clean-up would minimize any low level increased risk to workers and nearby residents.

B. Toxic Chemical Release Inventory

The screening evaluation of the Toxic Chemical Release Inventory identified one industrial facility (Occidental Chemical Corporation) whose emissions of hydrochloric acid could affect ambient air quality in the area around the 102nd Street Landfill site. Hydrogen chloride is a strong irritant which causes eye, nose and throat irritation at exposure levels several orders of

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CERTIFICATION

The Public Health Assessment for the Hooker 102nd Street site was prepared by the New York State Department of Health under a cooperative agreement with the Agency for Toxic Substances and Disease Registry (ATSDR). It is in accordance with approved methodology and procedures existing at the time the public health assessment was initiated.

Technical Project Officer, SPS, RPB, DHAC

The Division of Health Assessment and Consultation (DHAC), ATSDR, has reviewed this Public Health Assessment and concurs with its findings.

Division Director, DHAC, ATSDR

future exposures to hazardous substances at or near the site. Included, is a commitment on the part of ATSDR and/or the NYS DOH to follow up on this plan to ensure that it is implemented. The public health actions to be implemented by ATSDR/NYS DOH are as follows:

1. ATSDR and NYS DOH will coordinate with the appropriate environmental agencies to develop plans to implement the recommendations contained in this Public Health Assessment.

2. ATSDR will provide an annual follow up to this PHA, outlining the actions completed and those in progress. This report will be placed in repositories that contain copies of this Public Health Assessment, and will be provided to persons who request it.

3. Fish data that is collected by NYS DEC from the Upper Niagara River will be reviewed by NYS DOH. The presence of organochlorine contaminants in fish tissue will be evaluated to determine the possible public health significance of exposure to contaminants that may be originating from the 102nd Street Landfill site and other sources.

4. NYS DOH is committed to conducting a long-term follow-up health study of people who lived in the Love Canal EDA, a portion of which is near the 102nd Street Landfill site.

5. A Record of Decision for site remediation calls for recovery and incineration of NAPL, excavation of contaminated off-site soils and Niagara River sediments. The off-site soils and sediments will be placed on-site. A slurry wall will be installed around the perimeter of the site and the site capped, encapsulating the wastes. Groundwater will be pumped to maintain an inward gradient across the slurry wall.

ATSDR will reevaluate and expand the Public Health Action Plan when needed. New environmental, toxicological, or health outcome data, or the results of implementing the above proposed actions may determine the need for additional actions at this site.

that women of childbearing age and children under 15 years of age not eat fish from this area.

RECOMMENDATIONS

1. NYS DOH fish advisory guidelines should be followed to minimize exposures to contaminants that bioaccumulate in the food chain.

2. Contaminated surface soils off-site should be isolated to minimize the possibility of further migration or human exposure to site contaminants.

3. Contaminated sediments near the shoreline of the site should be remediated to minimize the potential for bioaccumulation of these contaminants in fish.

4. Contaminated groundwater and NAPL should be contained to prevent further migration of site contaminants to the Niagara River.

5. Because of planned remedial activities, no sampling activities are warranted to further evaluate exposures to site contaminants at this time. Additionally, once the elements of the ROD are in place, potential exposures to site contaminants will be eliminated.

HEALTH ACTIVITIES RECOMMENDATION PANEL (HARP) RECOMMENDATION

The data and information developed in the public health assessment for the Hooker 102nd Street site in the City of Niagara Falls, Niagara County, New York, has been reviewed by ATSDR's Health Activities Recommendations Panel (HARP) for appropriate follow-up with respect to health actions. Because of the proximity of the site to the Love Canal Emergency Declaration Area and the follow-up health actions performed in relation to the Love Canal site, the panel determined that no other follow-up health actions are appropriate for this site.

PUBLIC HEALTH ACTIONS

The Public Health Action Plan for the 102nd Street Landfill site contains a description of actions to be taken by ATSDR and/or the NYS DOH at and near the site, following completion of this public health assessment. For those actions already taken at the site, please refer to the Background section of this Public Health Assessment. The purpose of the PHAP is to ensure that this health assessment not only identifies public health hazards, but provides a plan of action designed to mitigate and prevent adverse human health effects resulting from past, present and/or

contamination in surface soil. However, past exposures to these chemicals by Little League baseball participants and other park users at the highest levels found in the park's soil would pose a minimal health risk to the exposed individuals.

(b) Contaminated groundwater is being discharged into the Niagara River via seepage at the bulkhead. Sediments in the Niagara River are contaminated. Since the 102nd Street Landfill does not have a beach or fishing area and people would not come in contact with contaminated groundwater, bulkhead seeps, and sewer discharges, adverse health effects are unlikely.

4. There are no data for surface water. It is expected that contaminant discharges to the river from the site would be diluted by the large volume of water in the Niagara River. Therefore, it is not likely that analyses of river water would show significant levels of site-related contaminants.

5. There are no data for site contaminants that may have bioaccumulated in fish. There are other contributors to contamination in the Niagara River besides the 102nd Street Landfill. It is likely that any contamination found in fish caught in the Niagara River would be from multiple contaminant sources.

6. The community has expressed concerns about their past exposures to contaminants at the 102nd Street Landfill. Community health concerns mainly pertain to combined exposures to contamination associated with both the 102nd Street Landfill and the nearby Love Canal site. Specifically, these concerns related to the possibility of birth defects.

7. Concerns were voiced about the planned remediation and use of incineration to deal with NAPL and heavily contaminated sediments. Heavily contaminated sediments are to be encapsulated within the landfill and are not going to be incinerated. Incineration of NAPL will take place at an off-site facility. Therefore, the community near the 102nd Street Landfill site should not be affected by incineration of contaminated sediments.

8. The remediation outlined in the Record of Decision will, when implemented, eliminate the possibility of public exposures to waste materials and contaminated off-site and on-site soils, sediments, and groundwater.

9. Based upon fish data gathered from the entire upper Niagara River, a NYS DOH fish advisory is in effect which recommends that no more than one meal per month of carp be consumed and

accessibility of the shoreline along the 102nd Street Landfill should eliminate use of that area.

CONCLUSIONS

1. Based on the information reviewed, the 102nd Street Landfill in the City of Niagara Falls, Niagara County, posed a public health hazard because of past exposures to site contaminants in on-site and off-site surface soils and on-site wastes which cannot be characterized because of insufficient data. This site currently poses an indeterminate public health hazard because it is unknown to what extent persons may be exposed to surface soils off-site. Additionally, there is a potential for direct contact with or incidental ingestion of contaminated surface water, and contact with sediments or off-site surface soils. The major public health concern is ingestion of fish caught in the Niagara River or Lake Ontario that have bioaccumulated contaminants from the 102nd Street Landfill. However, there are inadequate data to assess the public health significance of past, present and potential exposures to site contaminants in fish.

2. Completed human exposure pathways to site contaminants are as follows:

   (a) Fish caught from Lake Ontario or the upper Niagara River, which are then consumed, would expose people to 102nd Street contaminants that bioaccumulate in fish. However, adequate data are not available to assess the toxicological implications of exposure to site contaminants via ingestion of fish.

   (b) In the past, it is likely that persons on-site were exposed to contaminated soil and possibly waste material, but adequate exposure data are not available to assess the toxicological implications of this exposure pathway.

   (c) It is likely that persons who lived near the site, to the north and to the east, were exposed to contamination in surface soil. Chronic exposure to the contaminants found would pose a high increased cancer risk. Other health effects might occur to liver, kidney, neurological system, and immune system. Birth defects might also occur.

3. Potential human exposure pathways to site contaminants are as follows:

   (a) People may be exposed to contaminated soils off-site by direct contact, incidental ingestion and inhalation of dust. Children who played baseball at Griffon Park and other persons using the park may have been exposed to

between 1940 and 1978. This study will include the study of adverse pregnancy outcomes, including birthweight, incidence of congenital malformations and spontaneous abortions.

3. Residents are concerned about dredging of the Little Niagara River Channel.

   Sample results indicate that contamination is limited to within 300 feet of the shoreline. This contamination should not interfere with dredging of the main channel.

4. The community is concerned about the effectiveness of the chosen remedy.

   This will be addressed during the design phase of the remedial action. The proposed remediation plan calls for removal of contaminated off-site soils and contaminated sediments. Excavated soils and sediments will be placed on-site within a circumferential slurry wall and a cap, which will encapsulate the contaminated material. Wells will be installed to extract NAPL from the landfill. The recovered NAPL will be incinerated off-site. A pump-and-treat system will be installed for the purpose of maintaining an inward gradient across the slurry wall. This will promote an inward flow of groundwater, thereby minimizing outward migration of contaminants.

5. Residents are concerned about incineration of NAPL and sediments, and the resultant emissions.

   Sediments are not going to be incinerated. The proposed remedy calls for off-site incineration of NAPL, and should not affect residents around 102nd Street Landfill. Incineration will permanently destroy the organic contaminants. Any incinerator used for this remediation will use state of the art technology, emissions control, and monitoring and will meet all state and federal regulatory requirements. The present state of emission control technology is sufficiently advanced so that incineration will not pose a danger to the public.

6. Residents are concerned with the effect of contaminated water and sediments associated with recreational use of the Niagara River.

   The sediment contamination associated with 102nd Street Landfill appears limited to the shoreline area bordering the site. Therefore exposures to 102nd Street chemicals in sediment is not likely to occur for persons using the boat launch facilities at Griffon Park or using the Little Niagara River for recreation. Posting and the limited

magnitude greater than those estimated using the TRI screening model. Chemicals that cause effects in humans and/or animals after high levels of exposure may also pose a risk to humans who are exposed to lower levels over long periods of time. Although the risks of noncarcinogenic effects aren't completely understood, the existing data suggest that they are minimal for hydrogen chloride emissions from the Occidental Chemical Corporation.

C. Health Outcome Data Evaluation

There are no health outcome data specific for the 102nd Street Landfill site. The only health studies that have been conducted in this area have been specific to the Love Canal site and includes numerous studies of various health indicators among residents of the Love Canal EDA. NYS DOH is committed to conducting a long-term study of about 10,000 people who lived near the Love Canal Landfill between 1940 and 1978.

D. Community Health Concerns Evaluation

1. Residents have expressed concern over their exposure to airborne contaminants during the site's operational years.

   There are no analytical data available to evaluate past residential exposures to air contaminants from the site. Furthermore, any follow-up health activities that may be conducted would also have to consider the proximity of this site to contaminant exposures from the Love Canal site.

2. Residents of the adjacent Love Canal EDA are concerned about their combined exposures to chemicals from the 102nd Street and Love Canal sites and the possibility of birth defects in their children and grandchildren.

   Chemical wastes were disposed at the Love Canal site between 1942 and 1954. Disposal activities at the 102nd Street Landfill site occurred between 1948 and 1970. Initial remedial measures at the Love Canal site were initiated in 1978 and remedial measures to control site contamination at the 102nd Street Landfill site began in 1974. Therefore, it is possible that some residents of the Love Canal EDA were exposed to contaminants from both sites.

   Several researchers have investigated the health status of residents of the EDA. Numerous studies of various health indicators including fetal deaths, incidence of low birthweight infants, incidence of congenital malformations and growth rates in children have been studied among residents of the Love Canal EDA. NYS DOH has proposed and is committed to conducting a long-term follow-up study of about 10,000 people who lived near the Love Canal landfill

REFERENCES

Agency for Toxic Substance and Disease Registry (ATSDR). Preliminary Health Assessment for the Hooker Chemical (102nd Street Landfill); June 1989.

Agency for Toxic Substance and Disease Registry (ATSDR). 1988. Toxicological Profile for 2,3,7,8-Tetrachloro-p-dioxin. ATSDR/TP-88/23. U.S. Department of Health and Human Services. Atlanta, Georgia: U.S. Public Health Service.

Agency for Toxic Substance and Disease Registry (ATSDR). 1989. Toxicological Profile for Alpha-, Beta-, Gamma- and Delta-Hexachlorocyclohexane. ATSDR/TP-89/14. U.S. Department of Health and Human Services. Atlanta, Georgia: U.S. Public Health Service.

Agency for Toxic Substance and Disease Registry (ATSDR). 1990. Toxicological Profile for Hexachlorobenzene. ATSDR/TP-90/17. U.S. Department of Health and Human Services. Atlanta, Georgia: U.S. Public Health Service.

Agency for Toxic Substance and Disease Registry (ATSDR). 1992a. Toxicological Profile for 1,4-Dichlorobenzene. Update Draft. U.S. Department of Health and Human Services. Atlanta, Georgia: U.S. Public Health Service.

Agency for Toxic Substance and Disease Registry (ATSDR). 1992b. Toxicological Profile for Mercury. Update Draft. U.S. Department of Health and Human Services. Atlanta, Georgia: U.S. Public Health Service.

Conestoga-Rovers and Associates and Woodward-Clyde Consultants for Occidental Chemical Corporation and Olin Chemical Corporation. Remedial Investigation, Volumes I and II; July 1990.

Gradient Corporation for U.S. Environmental Protection Agency, Office of Waste Programs Enforcement. Baseline Human Health Risk and Environmental Endangerment Assessments; January 1990, and May 1990.

Karel Verschueren. Handbook of Environmental Data on Organic Chemicals, Second Edition; 1983.

New York State Department of Health Site files.

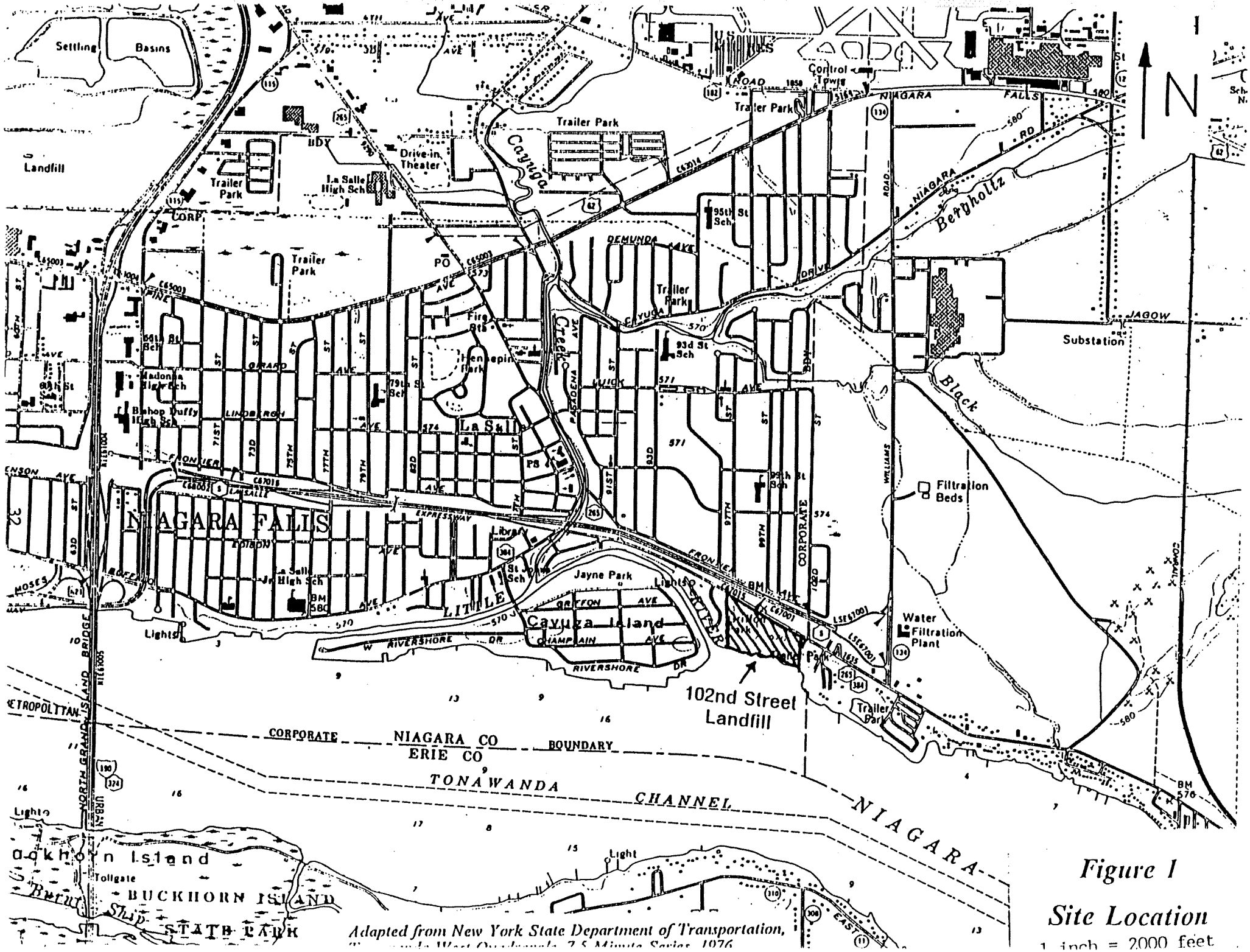
New York State Department of Health. Site Review and Update (Final Draft): Love Canal - Niagara Falls, Niagara County, NY; January 29, 1993.

Shacklette, H.T. and J.G. Boerngen. 1984. Element concentrations in soil and other surficial materials of the conterminous United States. U.S. Geological Survey Professional Paper 1270. Washington, DC: U.S. Government Printing Office.
The Merck Index, 11th Edition; 1989. Merck and Co., Inc.

Sirrine Environmental Consultants for Occidental Chemical Corporation, and Olin Chemical Corporation. Feasibility Study, Volumes I and II and Appendices; February 1990.

United States Environmental Protection Agency. Record of Decision, September 26, 1990.

APPENDIX A



Adapted from New York State Department of Transportation,

Figure 1

Site Location

1 inch = 2000 feet

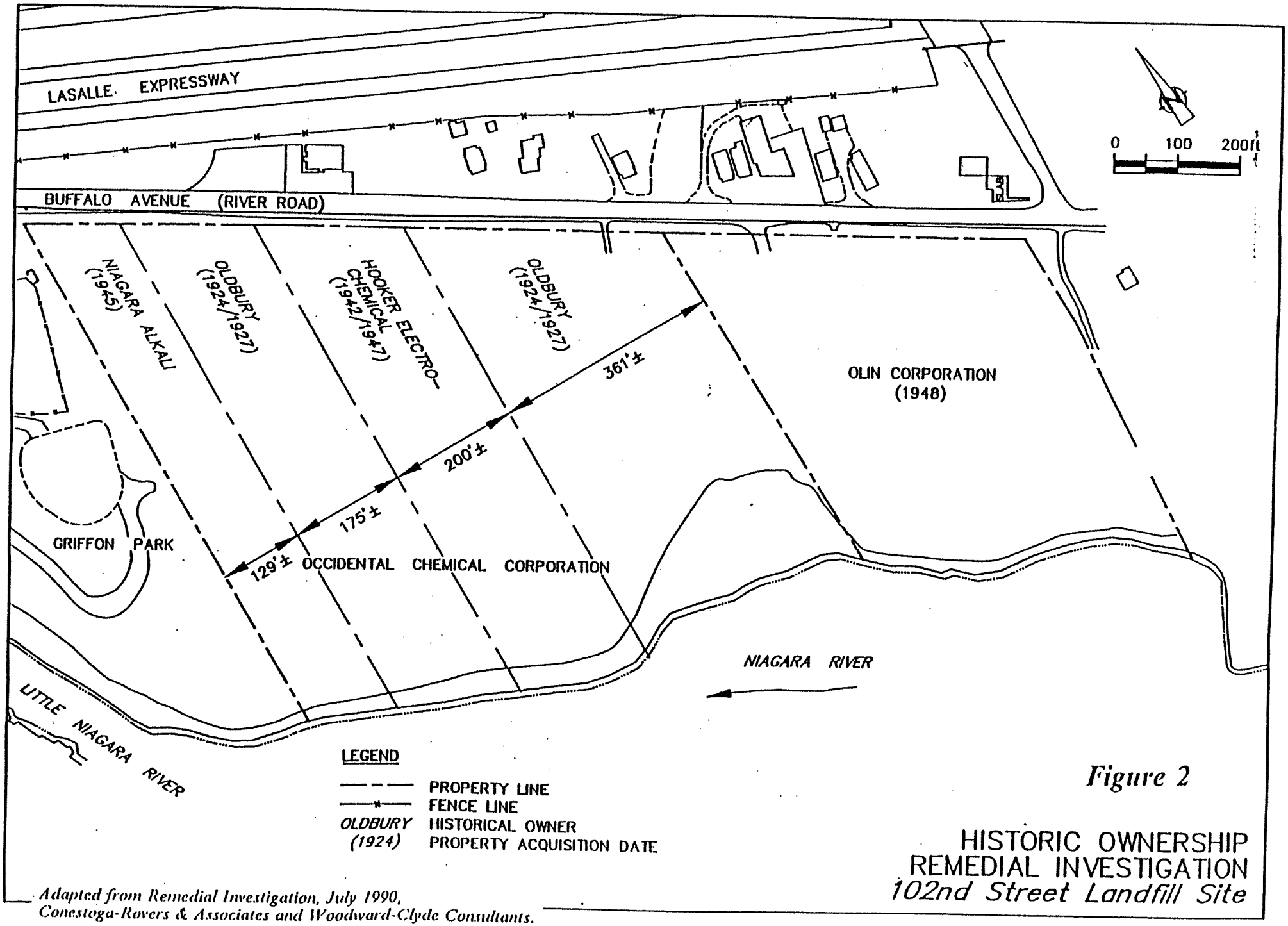


Figure 2

HISTORIC OWNERSHIP
REMEDIAL INVESTIGATION
102nd Street Landfill Site

Adapted from Remedial Investigation, July 1990, Conestoga-Rovers & Associates and Woodward-Clyde Consultants.

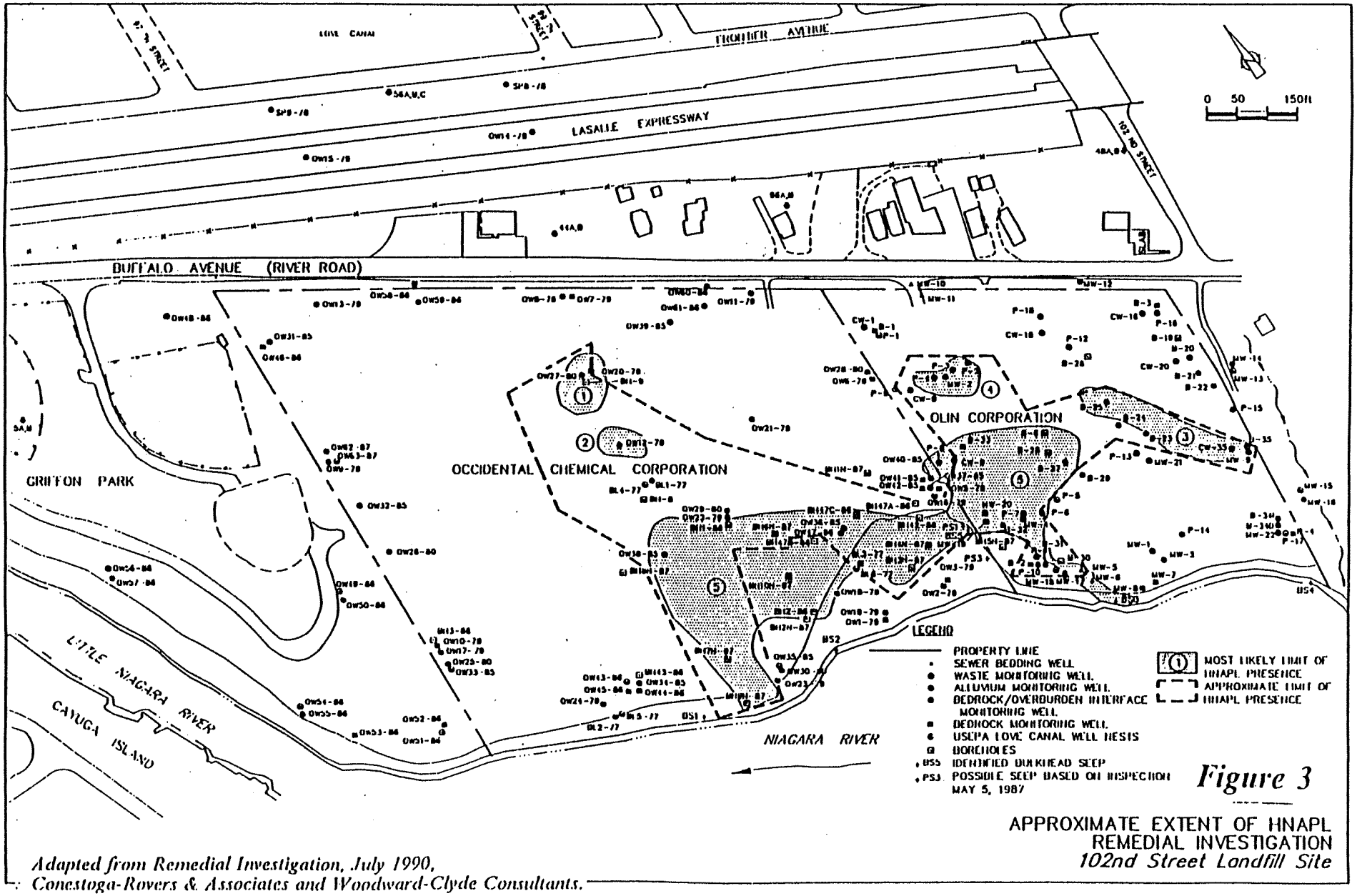


Figure 3

APPROXIMATE EXTENT OF HNAPL
REMEDIAL INVESTIGATION
102nd Street Landfill Site

Adapted from Remedial Investigation, July 1990,
Conestoga-Rovers & Associates and Woodward-Clyde Consultants.

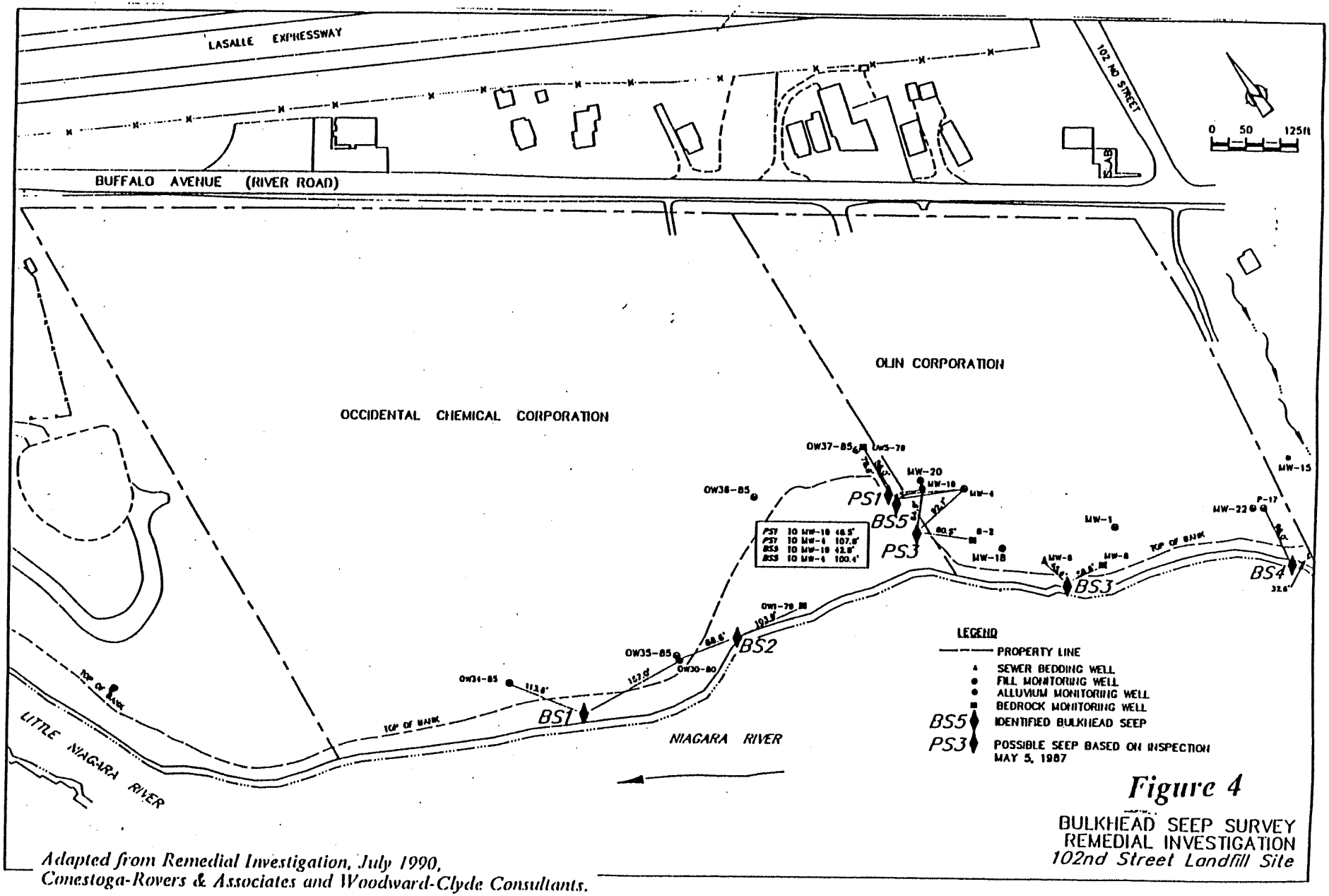


Figure 4

BULKHEAD SEEP SURVEY
REMEDIAL INVESTIGATION
102nd Street Landfill Site

Adapted from Remedial Investigation, July 1990, Conestoga-Rovers & Associates and Woodward-Clyde Consultants.

APPENDIX B

Table 1.

Olin Corporation Chemical Inventory
102nd Street Landfill Site

The following inventory of chemicals was developed from all available records, the Interagency Task Force (ITF) Report on Hazardous Waste (1978) and additional information.

Inorganics

	Reported	Tonnage
Black Cake	19,760 cubic yards	18,673
Graphite	742 tons	742
Concrete	6,625 tons	6,625
Lime Sludge	22,695 cubic yards	22,978
Brine Sludge	15,899 cubic yards	67,186
Flyash	5,472 truckloads	
Total		116,204

Disposal quantities of inorganic were generally based on production factors rather than actual recorded amounts. Inorganics can roughly be translated to tonnages through the use of the conversion factors. Estimated tonnages are as shown.

"Black Cake" resulted from the production of sodium chlorite and had a dry basis composition approximately as follows:

Approximately 2% soluble material (sodium chloride, sodium chlorite, sodium chlorate)

18% carbon

80% calcium carbonate/calcium hydroxide

Organics

	Reported	Tonnage
Benzene Hexachloride (BHC)		
Trichlorophenol (TCP)		
Trichlorobenzene (TCB) and Benzene	295 truckloads	2,000
V-Tetrachlorobenzene	310,550 gallons	2,327
Total		4,327

(continued on next page)

Table 1 (continued).

Olin Corporation Chemical Inventory
102nd Street Landfill Site

Available records indicate truckload shipments of these materials to the landfill. There is no way to determine the specific quantities of the different chemicals, however, there is also no reason to believe they constitute a mixture. Rather, it is believed they were simply loads of some bulk and some drummed material on the same truck. Tetrachlorobenzene is a separate known quantity. Trichloroanisole was a probable impurity in one of the production processes. It was not disposed of as a separate item.

All the organic materials are solids at STP (Standard Temperature and Pressure) except benzene and 1,2,4-trichlorobenzene. The quantity of benzene and 1,2,4-trichlorobenzene (if the 1,2,4-isomer was disposed of at the site) are unknown.

The organic disposal can roughly be translated to tonnages through use of the conversion factors of eight cubic yards per truckload and a density of 0.85 grams per cubic meter (g/cc). Tetrachlorobenzene has a density of 1.8 g/cc.

Adapted from the Remedial Investigation Final Report, Volume I, July 1990; Conestoga-Rovers and Associates and Woodward-Clyde Consultants.

Table 2.

Occidental Chemical Corporation Chemical Inventory
102nd Street Landfill Site

Type of Waste	Physical State	Estimated Quantity (tons)	Container
Organic phosphites	L,S	<100	D
Sodium hypophosphite mud	S	20,000	B
Phosphorus and inorganic phosphorus derivatives (excluding sodium hypophosphite)	L,S	1,300	D
BHC cake (including lindane)	S	300	D
Chlorobenzenes*	S	(?)	(?)
Misc. 10% including cell parts used in chlorate production	S	2,200	D,B
SUB-TOTAL		23,800	
Brine, sludge & gypsum		53,200	
TOTAL WASTE REPORTED		77,000	

*Quantity unknown, but believed to be small.

Notes: L = liquid
S = solid
D = drummed
B = bulk

From Occidental Chemical Corporation's November 17, 1978 and May 23, 1979 responses to the New York State Interagency Task Force.

Adapted from the Remedial Investigation Final Report, Volume I, July 1990; Conestoga-Rovers and Associates and Woodward-Clyde Consultants.

TABLE 3.
HNAPL Analysis from OCC Property*
Ranges of Constituents Found in Percent Weight

	Range	Frequency of Detection in 10 Samples
ALIPHATIC HYDROCARBONS		
(unidentified)	0.02-1.119	5
cyclohexadecane	0.46	1
cyclohexane	0.0078	1
dimethylcyclohexane	0.7	1
hexane	0.0032-2.2	4
hexadecane	0.27	1
methylcyclopentane	0.004	1
trimethylpentene	0.0027-0.053	3
AROMATIC HYDROCARBONS		
(unidentified)	0.017	1
benzene	0.018-1.5	6
benzoic Acid	0.018	1
1,1-biphenyl	0.8	1
diphenyl ether	.017	1
naphthalene	0.017-0.053	2
toluene	0.015-0.36	9
CHLORINATED AROMATIC HYDROCARBONS		
(unidentified)	0.016-28.6	3
chlorobenzene	0.08-1.4	8
dichlorobenzene	0.16-1.9	9
trichlorobenzene	0.038-42.0	9
tetrachlorobenzene	0.48-67.0	8
pentachlorobenzene	0.18-17.0	7
hexachlorobenzene	0.13-2.5	8
chloromethylbenzene	0.046-0.47	3
bromodichlorobenzene	0.056	1
trichloro (methyl,ethyl) benzene	0.25-0.4	2
trichloropropylbenzene	1.2	1
chloroethylbenzene	0.032	1
dichloroethylbenzene	0.005	1
trichloromethoxybenzene	0.029	1
chlorotoluene	0.039-2.1	7
dichlorotoluene	0.023-0.789	4
trichlorotoluene	0.013-0.1	4
tetrachlorotoluene	0.047-0.35	2
pentachlorotoluene	0.17	1
2,4,5-trichlorophenol	0.013-0.019	2
2,4,6-trichlorophenol	0.16	1
chloronaphthalene	0.042-0.11	2
dichloronaphthalene	0.091-1.0	3
trichloronaphthalene	0.017-0.299	3

TABLE 3.
HNAPL Analysis from OCC Property*
Ranges of Constituents Found in Percent Weight (page 2)

	Range	Frequency of Detection in 10 Samples
CHLORINATED AROMATIC HYDROCARBONS (continued)		
chlorobenzotrifluoride	0.077	1
dichlorobiphenyl	0.07-0.59	2
tetrachlorothiophene	0.21-0.77	2
trichlorobiphenyl	0.01-0.24	2
tetrachlorobiphenyl	0.07	1
pentachlorocyclohexene	0.54	1
chlorobenzaldehyde	0.13	1
CHLORINATED ALIPHATIC HYDROCARBONS		
(unidentified)	0.51	1
carbon tetrachloride	0.012	1
chloroform	0.29	1
hexachlorobutadiene	0.02-2.9	6
1-chlorododecane	0.11-49.0	3
1-chlorotetradecane	25.0	1
1-chlorohexadecane	4.9	1
1-chloroctadecane	0.4-1.5	2
methylene chloride	0.06-2.4	2
trichloroethylene	0.015-0.024	2
1,1,2,2-tetrachloroethane	0.031-0.15	3
1,1,2,2-tetrachloroethene	0.076-0.19	2
tetrachloroethylene	0.73	1
PESTICIDES		
alpha-hexachlorocyclohexane	0.43-1.27	4
beta-hexachlorocyclohexane	0.022-0.075	3
delta-hexachlorocyclohexane	0.13-0.67	4
gamma-hexachlorocyclohexane	0.069-0.58	4
Aroclor 1248	0.24-0.4	3
Aroclor 1260	0.21-0.31	3
p,p'-DDT	0.015-0.044	3
p,p'-DDE	0.18	1
p,p'-DDD	0.048-0.14	2
heptachlor	0.021-0.037	2
OTHER		
(minor constituents)	0.085-9.05	9
WATER	0.08-63.8	9
DENSITY (specific gravity)	1.006-1.455	

*HNAPL is considered a contaminant selected for further evaluation.

TABLE 4. HNAPL Analysis from Olin Property
Ranges of Constituents Found in Percent Weight

	Range	Frequency of Detection in 5 Samples
VOLATILE ORGANICS		
trans-1,2-dichloroethene	0.0105	1
chloroform	0.0125-0.029	3
trichloroethene	0.0045-0.0065	1
benzene	0.012-5.5444	5
1,1,2,2-tetrachloroethane	0.0119-5.808	5
tetrachloroethene	0.0147-7.809	5
toluene	0.0064-0.0083	1
chlorobenzene	0.074-5.7884	5
ethylbenzene	0.0569-0.06	1
carbon tetrachloride	0.086-0.088	1
BASE NEUTRALS		
2-chloroethylether	0.0008-0.015	3
dichlorobenzenes (including 1,3; 1,4; 1,2 isomers)	0.019-2.1213	5
1,2,4-trichlorobenzene	4.620-38.2755	5
An Isomeric trichlorobenzene	1.434-13.2447	5
naphthalene	0.0060	1
hexachlorobenzene	0.2021-1.332	5
phenanthrene	0.008-0.0102	2
anthracene	0.007-0.0301	2
fluoranthene	0.011-0.0198	2
pyrene	0.009-0.015	2
benzo(a)anthracene	0.0076-0.0107	2
chrysene	0.0076-0.0105	2
bis-2-(ethylhexyl)phthalate	0.008-0.0807	4
benzo(k)fluoranthene	0.0058-0.029	2
benzo(a)pyrene	0.072	1
1,2,3,4-tetrachlorobenzene	3.5348-72.567	5
1,2,4,5-tetrachlorobenzene	3.8131-42.5893	5
pentachlorobenzene	4.8277-20.144	5
PESTICIDES/PCBs		
Aroclor-1254	0.0196-0.1259	4
Aroclor - 1260	0.038-0.2247	4
alpha-hexachlorocyclohexane	0.5254-3.0393	5
beta-hexachlorocyclohexane	0.009-0.1978	5
gamma-hexachlorocyclohexane	0.110-2.4121	5
delta-hexachlorocyclohexane	0.0724-1.2345	5
heptachlor	0.005	1
endosulfan II	0.0047	1
p,p'-DDD	0.0097	1
p,p'-DDT	0.0121	1
DENSITY (specific gravity)	1.421-1.613	

*HNAPL is considered a contaminant selected for further evaluation.

TABLE 5.

102ND STREET LANDFILL
CHLORINATED DIOXIN AND FURAN RESULTS
FROM HNAPL ANALYSIS
(all values in parts per million)

Chlorodibenzo-p-dioxins*	OCC	Olin
2,3,7,8-tetra CDD	0.059-0.19	ND-0.06
total tetra CDD	0.060-0.78	ND-0.07
1,2,3,7-penta CDD	X	ND-0.03
total penta CDD	0.15-8.9	ND-5.0
2,3,7,8,x,x-hexa CDD	X	ND-2.0
total hexa CDD	2.2-27.0	ND-6.0
2,3,7,8,x,x,x-hepta CDD	X	ND-8.0
total hepta CDD	23.0-49.0	ND-14.0
total octa - CDD	25.0-430.0	ND-10.0

Chlorodibenzofurans*	OCC	Olin
2,3,7,8-tetra CDF	0.11-0.64	ND-0.5
total tetra CDF	0.33-1.7	ND-0.8
2,3,7,8,x-penta CDF	X	ND-0.5
total penta CDF	0.96-8.1	ND-7.0
2,3,7,8,x,x-hexa CDF	X	0.01-10.0
total hexa CDF	5.4-18.0	0.01-11.0
2,3,7,8,x,x,x-hepta CDF	X	ND-12.0
total hepta CDF	11.0-48.0	ND-15.0
total octa CDF	16.0-82.0	ND-6.0

*All chlorodibenzo-p-dioxins and chlorodibenzofurans in HNAPL are contaminants selected for further evaluation.

ND - not detected

X - data not available

Table 6.
102nd Street landfill
Summary of Monitoring Well Data
Remedial Investigation
(all values in micrograms per liter)

Parameter	Fill Groundwater		Native Soil Groundwater		Standards/Guidelines				
					New York State		U.S. EPA		
	Range of Concentration	Number of Wells With Detects (out of 17)	Range of Concentration	Number of Wells With Detects (out of 23)	Groundwater	Drinking Water	Drinking Water	Comparison Value**	Source***
*benzene	5-3600	8	77-79,000	10	0.7	5	5	0.7	NYS CREG
*toluene	12-2300	2	213-320	1	5	5	1,000	1,000	EPA LTHA
*monochlorobenzene	7-5500	9	5-17,000	10	5	5	100	140	EPA RfD
*2-monochlorotoluene	6-36	2	98-150	1	5	5	-	100	EPA LTHA
*4-monochlorotoluene	200-300	1	73-110	1	5	-	-	-	-
*1,2-dichlorobenzene	15-860	6	14-1100	9	4.7e	5	600	600	EPA LTHA
*1,4-dichlorobenzene	15-1500	6	26-4800	8	4.7e	5	75	1.5	EPA CPF
*1,2,3-trichlorobenzene	47-2700	2	94-4500	5	5	5	-	-	-
*1,2,4-trichlorobenzene	31-5300	5	370-15,000	6	5	5	70	70	EPA LTHA
*1,2,3,4-tetrachlorobenzene	22-8100	5	110-40,000	5	5	5	-	-	-
*1,2,4,5-tetrachlorobenzene	97-2400	3	12-6000	5	5	5	-	2	EPA RfD
*hexachlorobenzene	140	1	75-360	1	0.35	5	1	0.02	ATSDR CREG
*alpha hexachlorocyclohexane	33-730	5	23-840	6	ND	5	-	0.15	EPA CPF
*beta hexachlorocyclohexane	10-140	6	11-120	4	ND	5	-	0.02	NYS CREG
*gamma hexachlorocyclohexane	25-440	5	14-720	5	ND	5	0.2	0.03	EPA CPF
*delta hexachlorocyclohexane	66-900	5	19-1200	6	ND	5	-	-	-
*2,5-dichloroaniline	12-14,000	4	18-13,000	3	5	5	-	-	-
3,4-dichloroaniline	ND	0	ND	0	5	5	-	-	-
*phenol	26-120	4	10-180	5	1	50	-	4,000	EPA LTHA
*2-chlorophenol	14-280	4	11-260	4	5	5	-	40	EPA LTHA
*4-chlorophenol	58-1000	4	16-3900	8	5	5	-	-	-
*2,4-dichlorophenol and 2,5-dichlorophenol	14-4200	4	12-3400	8	0.3g	5	-	20	EPA LTHA
*2,4,5-trichlorophenol	95-190	2	10-290	3	5	5	-	700	EPA RfD
*2,4,6-trichlorophenol	190-230	1	10-50	2	5	5	-	3	ATSDR CREG
*2-chlorobenzoic acid	600-860	1	100-450	2	-	50	-	-	-
*3-chlorobenzoic acid	530-860	1	100-220	2	-	50	-	-	-
*4-chlorobenzoic acid	120-2160	2	100-200	2	-	50	-	1,400	EPA RfD
phosphorous	100-205,000	16	130-3,420,000	21	-	-	-	-	-
*mercury	0.6-50	4	1.2-13	3	2	2	2	2	EPA LTHA
arsenic	ND	0	200	1	25	50	50	11	EPA RfD

e = applies to total of 1,2- and 1,4-isomers
g = guidance value
p = proposed maximum contaminant level (MCL)

ND - not detected

*Contaminant selected for further evaluation.
**Comparison value determined for a 70 kilogram adult who drinks 2 liters of water per day.
***ATSDR CREG = ATSDR Cancer Risk Evaluation Guide
EPA CPF = EPA Cancer Potency Factor
EPA RfD = EPA Reference Dose
EPA LTHA = EPA Drinking Water Lifetime Health Advisory
NYS CREG = NYS Cancer Risk Evaluation Guideline

Table 7.

102nd Street Landfill
Ranges of Chemical Concentrations Found in
Bulkhead Seep Samples
(all values in micrograms per liter)

	Concentration Range	Number of Detects (out of 5 samples)
benzene	71-2,000	3
toluene	ND	0
monochlorobenzene	120-2,200	4
1,2-dichlorobenzene	28-400	4
1,4-dichlorobenzene	24-420	4
1,2,3-trichlorobenzene	14-180	3
1,2,4-trichlorobenzene	35-650	4
1,2,3,4-tetrachlorobenzene	340-420	3
1,2,4,5-tetrachlorobenzene	65-74	3
hexachlorobenzene	15	1
alpha-hexachlorocyclohexane	210-700	3
beta-hexachlorocyclohexane	30-150	5
gamma-hexachlorocyclohexane	13-1,400	3
delta-hexachlorocyclohexane	800-4,500	3
2,5-dichloroaniline	580	1
3,4-dichloroaniline	ND	0
phenol	25-28	3
2-chlorophenol	12-54	3
4-chlorophenol	27-240	3
2,4-dichlorophenol	75-97	2
2,5-dichlorophenol	75-97	2
2,4,5-trichlorophenol	72-1,300	3
2,4,6-trichlorophenol	240	1
2-chlorobenzoic acid	130	1
3-chlorobenzoic acid	ND	0
4-chlorobenzoic acid	100	1
phosphorus (dissolved)	100	1
mercury	2.3-31.3	2
arsenic	ND	0
total organic halide (TOX)	130-10,000	5
total kjeldahl nitrogen (TKN)	1,800-4,700	5
total organic carbon (TOC)	80,000-180,000	5

ND - not detected

TABLE 8.

STORM SEWER SEDIMENT ANALYTICAL RESULTS
(from 2 samples)
(all values in milligrams per kilogram (mg/kg) dry weight).

Parameter	Range of Concentration	Typical Background Range**
SITE SPECIFIC INDICATORS		
1,2-dichlorobenzene	810/710	NDT
1,4-dichlorobenzene	220/170	NDT
2-monochlorotoluene	570/510	NDT
4-monochlorotoluene	400/350	NDT
2,4-dichlorophenol	ND/ND*	NDT
2,5-dichlorophenol	ND/ND	NDT
hexachlorobenzene	490/530	NDT
alpha-hexachlorocyclohexane	350/400	NDT
beta-hexachlorocyclohexane	11/9.5	NDT
delta-hexachlorocyclohexane	84/78	NDT
gamma-hexachlorocyclohexane	89/93	<0.01-0.1
pentachlorobenzene	3,500/5,100	NDT
1,2,3,4-tetrachlorobenzene	21,000/22,000	NDT
1,2,4,5-tetrachlorobenzene	1,600/1,600	NDT
1,2,3-trichlorobenzene	890/930	NDT
1,2,4-trichlorobenzene	3,000/4,900	NDT
2,4,5-trichlorophenol	ND/ND	NDT
2,4,6-trichlorophenol	ND/ND	NDT
mercury	36/24	0.01-3.4

ND - not detected
NDT - not determined

*Detection limit at 1.0 mg/kg dry

**References: ATSDR, 1989; Shacklette and Boerngen, 1984.

TABLE 9.

102ND STREET LANDFILL
STORM SEWER INFILTRATION
AQUEOUS ANALYTICAL RESULTS
(all concentrations in micrograms per liter)

SITE SPECIFIC INDICATORS (SSI)	UPGRADIENT OF SITE	CONCENTRATION RANGES IN SEWER LINE	CONCENTRATION AT THE OUTFALL
benzene	ND	ND	ND/ND
toluene	ND	ND	ND/ND
monochlorobenzene	ND	ND	330/260
2-monochlorotoluene	ND	ND	28/23
4-monochlorotoluene	ND	ND-7	15/13
1,2-dichlorobenzene	ND	ND	32/40
1,4-dichlorobenzene	ND	ND	110/140
1,2,3-trichlorobenzene	ND	ND	46/55
1,2,4-trichlorobenzene	ND	23-25	280/280
1,2,3,4-tetrachlorobenzene	ND	13-14	300/230
1,2,4,5-tetrachlorobenzene	ND	ND	32/33
hexachlorobenzene	ND	ND	ND/ND
alpha-hexachlorocyclohexane	ND	ND	75/71
beta-hexachlorocyclohexane	ND	ND	ND/ND
gamma-hexachlorocyclohexane	ND	ND	33/37
delta-hexachlorocyclohexane	ND	ND	130/130
2,5-dichloroaniline	ND	ND	ND/ND
3,4-dichloroaniline	ND	ND	ND/ND
phenol	ND	ND	64/76
2-chlorophenol	ND	ND	ND/ND
4-chlorophenol	ND	ND	26/39
2,4-dichlorophenol	ND	ND	ND/ND
2,5-dichlorophenol	ND	ND	ND/ND
2,4,5-trichlorophenol	ND	ND	ND/ND
2,4,6-trichlorophenol	ND	ND	ND/ND
2-chlorobenzoic acid	ND	ND	ND/ND
3-chlorobenzoic acid	ND	ND	ND/ND
4-chlorobenzoic acid	ND	ND	ND/ND
total SSI	ND	39-43	1501/1427
soluble phosphorus	860	ND-270	67/65
mercury	ND	ND	0.41/0.49
arsenic	ND	ND-0.41	ND/ND

ND - not detected

TABLE 10.

102ND STREET LANDFILL
NIAGARA RIVER
SURFACE SEDIMENTS
(all values in milligrams per kilogram)

Parameter	Concentration Range (Excluding Highest Sample, C-75)	Frequency of Detects (out of 87)	Highest Sample (C-75)	Typical Background Range**	Comparison Value***	Source****
2-monochlorotoluene	ND	1	1.47	NDT	1,000	EPA RfD
4-monochlorotoluene	0.15	2	1.55	NDT	--	
1,2-dichlorobenzene	0.11	2	1.19	NDT	4,500	EPA RfD
1,4-dichlorobenzene	0.103-0.649	12	13.2	NDT	30	EPA CPF
1,2,3-trichlorobenzene	ND	1	19.7	NDT	--	
1,2,4-trichlorobenzene	0.128-0.358	3	295.0	NDT	500	EPA RfD
1,2,3,4-tetrachlorobenzene	0.196	2	454.0	NDT	--	
*1,2,4,5-tetrachlorobenzene	0.108-0.799	5	153.0	NDT	15	EPA RfD
*pentachlorobenzene	0.176	2	147.0	NDT	40	EPA RfD
*hexachlorobenzene	0.14-0.236	4	10.1	NDT	0.44	ATSDR CREG
*alpha-hexachlorocyclohexane	0.1-4077.0	6	2550.0	NDT	0.11	EPA CPF
*beta-hexachlorocyclohexane	0.173-15.3	8	310.0	NDT	0.71	EPA CPF
delta-hexachlorocyclohexane	0.21-9.79	3	11.3	NDT	--	
*gamma-hexachlorocyclohexane	0.843-55.4	3	6.82	0.01-0.1	0.45	EPA CPF
2,4-dichlorophenol	0.137-0.208	2	ND	NDT	150	EPA RfD
2,5-dichlorophenol	0.109	1	ND	NDT	--	
2,4,5-trichlorophenol	0.367	1	ND	NDT	5,000	EPA RfD
2,4,6-trichlorophenol	4.3	2	6.45	NDT	65	EPA CPF
*mercury	0.108-10.2	67 (out of 91)	200	0.01-3.4	15	EPA RfD

ND - not detected
NDT - Not determined

*Contaminant selected for further evaluation.

**References: ATSDR, 1989; Shacklette and Boerngen, 1984

***These values are for a nonresidential setting and assume a lifetime exposure through incidental ingestion of soil.

****ATSDR CREG = ATSDR Cancer Risk Evaluation Guide
EPA CPF = EPA Cancer Potency Factor
EPA RfD = EPA Risk Reference Dose

TABLE 11.

102nd Street Landfill
Off-Site Surface Soil
(all values in milligrams per kilogram)

Parameter	Griffon Park		Along Buffalo Avenue		East of Site		Typical Background Range**	Comparison Value***	Source****
	Concentration Range	Frequency of Detection (out of 35)	Concentration Range	Frequency of Detection (out of 47)	Concentration Range	Frequency of Detection (out of 23)			
2-monochlorotoluene	ND	0	0.127-0.881	3	ND	0	NDT	57	NYS RfG
4-monochlorotoluene	0.129-1.43	2	0.113-0.917	6	0.228	1	NDT	--	
1,2-dichlorobenzene	0.137-1.57	2	0.198-5.81	5	0.102-0.12	2	NDT	324	NYS RfG
*1,4-dichlorobenzene	0.103-0.43	5	0.118-4.28	13	0.127-0.164	2	NDT	0.4	NYS CREG
1,2,3,-trichlorobenzene	ND	0	0.108-0.859	3	ND	0	NDT	--	
1,2,4-trichlorobenzene	ND	0	0.114-0.404	15	ND	0	NDT	152	NYS RfG
1,2,3,4-tetrachlorobenzene	0.128	1	0.105-11.3	14	ND	0	NDT	--	
1,2,4,5-tetrachlorobenzene	0.103	1	0.105-4.88	16	ND	0	NDT	4.2	NYS RfG
pentachlorobenzene	0.118	1	0.101-0.736	5	ND	0	NDT	21	NYS RfG
*hexachlorobenzene	ND	0	0.117-9.51	18	ND	0	NDT	0.004	NYS CREG
*alpha-hexachlorocyclohexane	0.266-1.26	2	0.109-4.57	18	0.114-0.46	4	NDT	0.003	NYS CREG
*beta-hexachlorocyclohexane	0.230	1	0.179-7.88	25	0.109-2.8	14	NDT	0.02	NYS CREG
*delta-hexachlorocyclohexane	ND	0	0.15-1.65	3	ND	0	NDT	--	
*gamma-hexachlorocyclohexane	0.185	1	0.113-1.21	4	ND	0	0.01-0.1	0.006	NYS CREG
2,4-dichlorophenol	ND	0	0.115-0.546	6	ND	0	NDT	4.3	NYS RfG
2,5-dichlorophenol	ND	0	ND	0	ND	0	NDT	--	
2,4,5-trichlorophenol	0.253	1	0.132	1	ND	0	NDT	421	NYS RfG
2,4,6-trichlorophenol	ND	0	ND	0	ND	0	NDT	1.5	NYS CREG
*mercury	0.13-4.76	39 (of 42)	0.11-9.29	45 (of 50)	0.153-5.08	22	0.01-3.4	1.6	EPA RfD

ND - not detected
NDT - not determined

*Contaminant selected for further evaluation.

**References: ATSDR, 1989; Shacklette and Boerngen, 1984

***These values are for a residential setting and assume a lifetime exposure through incidental ingestion of soil and homegrown vegetables.

****NYS CREG = New York State Cancer Risk Evaluation Guideline
NYS RfG = New York State Risk Reference Guideline
EPA RfD = EPA Risk Reference Dose

TABLE 12.

Toxic Release Inventory (TRI)
(all values in pounds per year)

Facility Chemical	Air Release Stack Plus Fugitive
Carborundum Abrasives	
formaldehyde	2-20
pseudocumene (trimethylbenzenes)	57,759
phenol	937
zinc compounds	2-20
Niacet	
methanol	517,500
chloracetic acid	501-1,009
phenol	22-898
hydrochloric acid	22-898
chlorine	22-898
glycols	22-898
Energy from Waste Facility	
*hydrochloric acid	4,560,014
sulfuric acid	0
chlorine	0

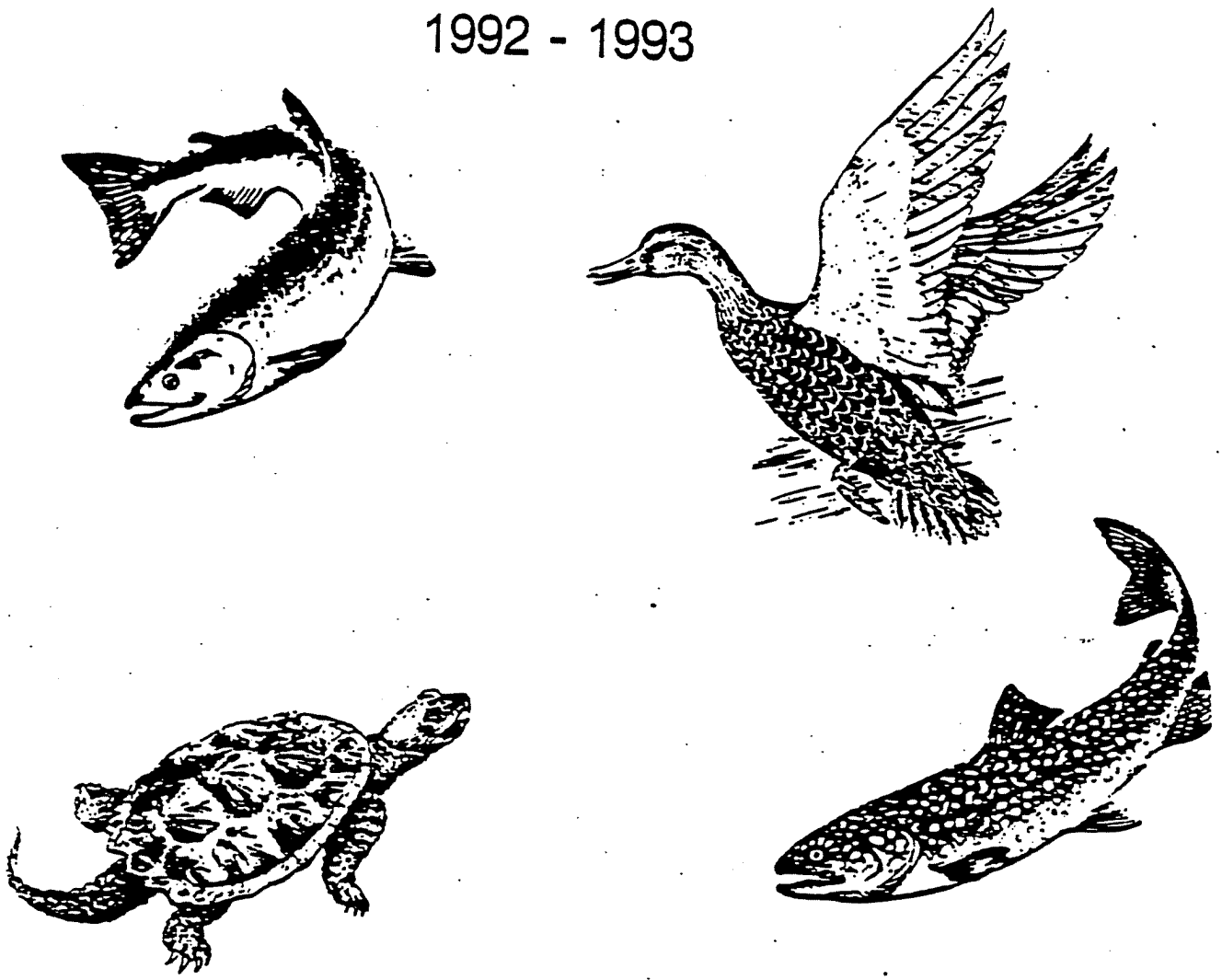
*Contaminant anticipated to exceed 1 microgram per cubic meter within 1/2 mile from the 102nd Street Landfill site.

APPENDIX C

Health Advisory

CHEMICALS IN SPORTFISH AND GAME

1992 - 1993



Prepared by

New York State Health Department

1992-1993 HEALTH ADVISORIES: CHEMICALS IN SPORTFISH OR GAME

SUMMARY

The New York State Department of Health (DOH) issues an advisory on eating sportfish and wildlife taken in New York State because some of these foods contain potentially harmful levels of chemical contaminants. The health advisory is divided into three sections: (1) general advice on sportfish taken from waters in New York State; (2) advice on sportfish from specific water bodies; and (3) advice on wildlife. The advisory is developed and updated yearly and is directed to persons who may be likely to eat large quantities of sportfish or wildlife which might be contaminated.

BACKGROUND

Fishing and hunting provide many benefits including food and recreation. Many people enjoy cooking and eating their own catch. However, some fish and wildlife contain elevated levels of potentially harmful chemicals. These chemicals or contaminants enter the environment through such means as past industrial discharges, leaking landfills and the widespread use of pesticides. Fish and wildlife take in contaminants directly from the environment and from the food they eat. Some chemicals remain in them and then are ingested by people. DDT, PCBs, mirex, chlordane and mercury have been found in some species of fish taken in New York State at levels that exceed federal food standards. Long-term exposure to high levels of these chemicals has been linked to health effects such as cancer (in laboratory animals) or nervous system disorders (in humans).

The federal government establishes standards (tolerance levels or action levels) for chemical residues in or on raw agricultural products, including fish. A tolerance level is the maximum amount of a residue expected when a pesticide is used according to the label directions, provided that the level is not an unacceptable health risk. The federal government estimates of health risks assume that people eat about one one-half pound of fish each month. Action levels are established for chemicals that do not have approved agriculture uses but may unavoidably contaminate food due to their environmental persistence. Fish and wildlife cannot be legally sold if they contain a contaminant at a level greater than its tolerance or action level.

In New York State, the Department of Environmental Conservation (DEC) routinely monitors contaminant levels in fish and wildlife. The contaminant levels are measured in a skin-on fillet which has not been trimmed; the federal government uses this sample in determining whether or not the fish exceeds the tolerance level. When fish from a specific water body are found to contain high contaminant levels, DOH issues a sportfish consumption advisory for that species of fish. Under some circumstances, the state prohibits the sale or offering for sale of fish containing high contaminant levels. Advisories are also developed for contaminated wildlife. These actions are taken to minimize public exposure to contaminated food products.

GENERAL ADVISORY

The general health advisory for sportfish is that an individual eat no more than one meal (one-half pound) per week of fish from the state's freshwaters, the Hudson River estuary, or the New York City harbor area (the New York waters of the Hudson River to the Verrazano Narrows Bridge, the East River to the Throgs Neck Bridge, the Arthur Kill, Kill Van Kull, and Harlem River). This general advisory is designed to protect against consumption of large amounts of fish which may come from contaminated waterways that are as yet untested or which may contain unidentified contaminants. The general advisory does not apply to fish taken from marine waters. Ocean fish, although less tested, are generally less contaminated than freshwater fish, and fish that live further out from shore are likely to be even less contaminated than those that live or migrate close to the shore.

SPECIFIC FRESHWATER ADVISORIES

The second part of the health advisory contains information and recommendations for specific bodies of water. Fish monitoring has identified over thirty water bodies that have fish with a contaminant level that exceeds an action level or a tolerance level. Department of Health recommendations are based on the contaminant levels and suggest either limiting or avoiding eating a specific kind of fish from a particular body of water. In some cases, enough information is available to issue advisories based on the length of the fish. Older (larger) fish are often more contaminated than younger (smaller) fish.

The health advisory contains specific advice for infants, children under the age of fifteen and women of childbearing age. The Health Department recommends that they not eat fish from the specific water bodies listed in the advisory. The reason for this specific advice is that chemicals can have a potentially greater impact on developing organs in young children or in the fetus. Waters which have specific advisories have at least one species of fish with an elevated contaminant level, which means that a contamination source is in or near the water.

MARINE WATERS

The Department of Health has issued specific advisories for marine waters. These apply to striped bass, bluefish, and American eels and are the only marine fish advisories currently in effect. Striped bass, bluefish, and eels have specific habits or characteristics which make them more likely to have contaminants than other marine species.

An advisory has been issued for striped bass because of PCB contamination. Although saltwater fish are generally less contaminated than freshwater fish, fish like striped bass which spend time in Hudson River waters, can be contaminated at levels above food standards. The advisory for striped bass is divided into three geographical areas. For striped bass taken from the Hudson River from the Federal Dam at Troy south to the Tappanzee Bridge, the Health Department recommends against any consumption. For striped bass from the Hudson River from the Tappanzee Bridge south to and including the lower N.Y. Harbor and Long Island Sound west of Wading River, the advisory is to eat no more than one meal per month. The general advisory applies to striped bass from eastern Long Island Sound, the Peconic/Gardiners Bays and Long Island South Shore waters. Women of childbearing age, infants and children under fifteen should not eat striped bass from the Hudson River or lower New York Harbor, and western Long Island Sound.

The Department has extended the general advisory to bluefish and American eels. They are contaminated with PCBs, although to a lesser extent than striped bass from the Hudson River, New York Harbor, and western Long Island Sound. The recommendation for bluefish and American eels caught in New York State's waters is to eat no more than one meal (one-half pound) per week, with an additional recommendation to not eat American eels from the Hudson, Harlem, and East Rivers and New York City harbor area.

OTHER ADVISORIES

The Department has also issued special advisories for crabs in the Hudson River, snapping turtles, and waterfowl which have been found to be contaminated with PCBs. Cooking methods that minimize the amount of contaminants which would be eaten are recommended. The complete advisory is provided at the end of this brochure.

The health implications of eating deformed or cancerous fish are unknown. Any obviously diseased fish (marked by tumors, lesions or other abnormal condition of the fish skin, meat or internal organs) should be discarded.

SHELLFISH

All foods of animal origin, such as meat, poultry, seafoods and dairy products should be thoroughly cooked before consumption. The Health Department specifically recommends that the public not eat raw or partially cooked clams or oysters. This advice is not because of chemical contamination. Raw or partially cooked shellfish illegally harvested from waters contaminated with sewage have been linked to gastrointestinal illness and hepatitis A, caused by bacteria or viruses.

SHOULD I BE CONCERNED ABOUT MEDICAL-TYPE WASTE AND GARBAGE AFFECTING FISH?

The wash-up of medical-type waste and garbage on New York and Long Island beaches has not affected the sanitary condition of marine fish, lobster and crabs. Furthermore, fish do not carry or transmit the AIDS virus. Consumers need not limit consumption of these foods because of these problems. Good sanitary practices should be followed when preparing fish from any waters. Fish should be kept iced or refrigerated until cleaned and filleted and then refrigerated until cooked. Hands, utensils, and work surfaces should be washed before and after handling any raw food, including fish. Seafood should be cooked to an internal temperature of 140° F.

WHAT CAN I DO TO REDUCE MY EXPOSURE TO CHEMICAL CONTAMINANTS FROM FISH?

Fish is an important source of protein and is low in saturated fat. Naturally occurring fish oils have been reported to lower plasma cholesterol and triglycerides, thereby decreasing the risk of coronary heart disease. Increasing fish consumption is useful in reducing dietary fat and controlling weight. By eating a diet which includes food from a variety of protein sources, an individual is more likely to have a diet which is adequate in all nutrients.

Although eating fish has some health benefits, fish with high contaminant levels should be avoided. When deciding whether or not to eat fish which may be contaminated, the benefits of eating those fish can be weighed against the risks. For young women, eating contaminated fish is a health concern not only for herself but also to any unborn or nursing child, since the chemicals may reach the fetus and can be passed on in breastmilk. For an older person with heart disease the risks, especially of long term health effects, may not be as great a concern when compared to the benefits of reducing the risks of heart disease.

Everyone can benefit from eating the fish they catch and can minimize their contaminant intake by following these general recommendations:

1. Choose uncontaminated species from water bodies which are not listed in the Health Department's advisory.
2. Use a method of filleting the fish which will reduce the skin, fatty material and dark meat. These parts of the fish contain many of the contaminants. A pamphlet on this method is available from the DEC.
3. Choose smaller fish, consistent with DEC regulations, within a species since they may have lower contaminant levels. Older (larger) fish within a species may be more contaminated because they have had more time to accumulate contaminants in their bodies.
4. For shellfish, such as crab and lobster, do not eat the soft green substance found in the body section (tomalley, liver). This part of the shellfish has been found to contain high levels of chemical contaminants, including PCBs and heavy metals.
5. Based on limited studies, cooking methods such as broiling, poaching, boiling, and baking, which allow contaminants from the fatty portions of fish to drain out, are preferable. Pan frying is not recommended. The cooking liquids of fish from contaminated waters should be avoided since these liquids may retain contaminants.

The following recommendations are based on evaluating contaminant levels in fish and wildlife. To minimize potential adverse health impacts, the New York State Department of Health recommends:

- Eat no more than one meal (one half pound) per week of fish from the state's freshwaters, the Hudson River estuary, or the New York City harbor area (the New York waters of the Hudson River to the Verrazano Narrows Bridge, the East River to the Throgs Neck Bridge, the Arthur Kill, Kill Van Kull, and Harlem River), except as recommended below.
- Women of childbearing age, infants and children under the age of 15 should not eat fish with elevated contaminant levels. The fish species listed from the waters below have contaminant levels that exceed federal food standards and most fish taken from these waters contain elevated contaminant levels.
- Observe the following restrictions on eating fish from these waters and their tributaries to the first barrier impassable by fish:

Water	Species	Recommendation
*Barge Canal (Tonawanda Creek, Lockport to Niagara River; Erie & Niagara Co.)	Carp	Eat no more than one meal per month.
Belmont Lake (Suffolk Co.)	Carp	Eat None.
Buffalo River and Harbor (Erie Co.)	Carp	Eat none.
Canadice Lake (Ontario Co.)	Lake or Brown trout over 21"	Eat none.
Canandaigua Lake (Ontario-Yates Co.)	Lake trout over 24"	Eat no more than one meal per month.
*Carry Falls Reservoir (St. Lawrence Co.)	Walleye	Eat no more than one meal per month.
Cayuga Creek (Niagara Co.)	All species	Eat none.
East River (NYC)	American eel	Eat none.
Fourth Lake (Herkimer-Hamilton Co.)	Lake trout	Eat none.
Freeport Reservoir (Nassau Co.)	All species	Eat no more than one meal per month.
Gill Creek (Niagara Co.) Mouth to Hyde Park Lake Dam	All species	Eat none.

Grasse River (St. Lawrence Co.) Mouth to dam in Massena; Also see St. Lawrence River	Smallmouth bass, Brown bullhead, Walleye	Eat no more than one meal per month.
Hall's Pond (Nassau Co.)	Carp, Goldfish	Eat none.
Harlem River (NYC)	American eel	Eat none.
Hoosic River (Rensselaer Co.)	Brown and Rainbow trout	Eat no more than one meal per month.
*Hudson River		
- Hudson Falls to Troy Dam	All species	No fishing.
- Troy Dam south to and including the lower N.Y. Harbor	American eel, White perch, Carp, Goldfish, White catfish,	Eat none.
	Walleye, Rainbow smelt, Largemouth bass, Smallmouth bass, Atlantic needlefish, Bluefish, Northern pike, Tiger muskellunge	Eat no more than one meal per month.
- Troy Dam south to Tappan Zee Bridge	Striped bass	Eat none.
- Tappan Zee Bridge south to & including Lower N.Y. Harbor	Striped bass	Eat no more than one meal per month.
	Blue crab	Eat no more than 6 crabs per week.
	- hepatopancreas (mustard, liver or tomalley)	Eat none.
	- cooking liquid	Discard.
Indian Lake (Lewis Co.)	All species	Eat no more than one meal per month.
Irondequoit Bay	Carp	Eat none.
Keuka Lake (Yates-Steuben Co.)	Lake trout over 25"	Eat no more than one meal per month.
Kinderhook Lake (Columbia Co.)	American eel	Eat no more than one meal per month.
*Koppers Pond (Chemung Co.)	Carp	Eat no more than one meal per month.

Lake Champlain		
-whole lake	Lake trout greater than 25", Walleye greater than 19"	Eat no more than one meal per month.
-Bay within Cumberland Head to Valcour Island	American eel, Brown bullhead	Eat no more than one meal per month.
Lake Ontario and Niagara River below the falls	American eel, Channel catfish, Carp, Lake trout, Chinook salmon, Coho salmon over 21", Rainbow trout over 25", Brown trout over 20".	Eat none.
	White sucker, smaller Coho salmon, Rainbow & Brown trout.	Eat no more than one meal per month.
- West of Point Breeze	White perch	Eat none.
- East of Point Breeze	White perch	Eat no more than one meal per month.
Loft's Pond (Nassau Co.)	Carp, Goldfish	Eat no more than one meal per month.
Long Pond (Lewis Co.)	Splake over 12"	Eat none.
Upper Massapequa Reservoir (Nassau Co.)	White perch	Eat no more than one meal per month.
*Meacham Lake (Franklin Co.)	Yellow perch over 12"	Eat none
	Smaller Yellow perch	Eat no more than one meal per month.
Mohawk River Below Lock 7	White perch	Eat none.
	Smallmouth bass	Eat no more than one meal per month.
Nassau Lake (Rensselaer Co.)	All species	Eat none.
Niagara River Above the falls	Carp	Eat no more than one meal per month.
Niagara River Below the falls; also see Lake Ontario	White perch	Eat none
	Smallmouth bass	Eat no more than one meal per month.
Onondaga Lake (Onondaga Co.)	All species	Eat none.
Oswego River (Oswego Co.) Power dam in Oswego to upper dam at Fulton	Channel catfish	Eat no more than one meal per month.
St. James Pond (Suffolk Co.)	All species	Eat no more than one meal per month.

St. Lawrence River		
- Entire River	American eel, Channel catfish, Lake trout, Carp, Chinook salmon, Coho salmon over 21", Rainbow trout over 25", Brown trout over 20"	Eat none.
	White perch, smaller Coho salmon, Rainbow and Brown trout	Eat no more than one meal per month.
- Bay at St. Lawrence-Franklin County line	All species	Eat none.
Salmon River (Oswego Co.) Mouth to Salmon Reservoir; also see Lake Ontario	Smallmouth bass	Eat none.
Saw Mill River (Westchester Co.)	American eel	Eat no more than one meal per month.
*Schroon Lake (Warren & Essex Co.)	Lake trout over 27"	Eat no more than one meal per month.
Sheldrake River (Westchester Co.)	American eel	Eat none.
*Skaneateles Creek from Dam at Skaneateles to Seneca River (Onondaga Co.)	Brown trout over 10"	Eat no more than one meal per month.
Smith Pond Rockville Center (Nassau Co.)	Carp, Goldfish	Eat no more than one meal per month.
Smith Pond Roosevelt Park (Nassau Co.)	Carp, Goldfish	Eat no more than one meal per month.
Spring Pond (Suffolk Co.)	All species	Eat none.
Stillwater Reservoir (Herkimer Co.)	Splake	Eat no more than one meal per month.
Threemile Creek (Oneida Co.)	White sucker	Eat no more than one meal per month.
Valatie Kill - between Co. Rt. 18 and Nassau Lake	All species	Eat none.

Additional Advice

Additional information on the health advisory may be obtained by calling 1-800-458-1158.

The health implications of eating deformed or cancerous fish are unknown. Any grossly diseased fish should probably be discarded. Levels of PCB, mirex and possibly other contaminants of concern can be reduced by removing the skin and fatty portions along the back, sides and belly of smallmouth bass, brown

trout, lake trout, coho salmon, striped bass, and bluefish. (This technique does not reduce mercury levels, however.) A guide to this method can be obtained from any DEC office.

Marine Waters - The general advisory (eat no more than one meal per week) applies to bluefish and American eels but not to other fish species taken from marine waters. American eels from the Hudson, Harlem, and East Rivers and New York Harbor should not be eaten.

*Marine Striped Bass - Eat no more than one meal (1/2 pound) per month of striped bass taken from New York Harbor or Long Island Sound west of Wading River. Eat no more than one meal (1/2 pound) per week of striped bass taken from Eastern Long Island Sound, the Peconic/Gardiners Bays, and Long Island South Shore waters (legal minimum length of marine striped bass is 36"),

Marine Crabs and Lobsters - It is recommended that the hepatopancreas (liver, mustard, or tomalley) of crabs and lobsters not be eaten because this organ has high contaminant levels.

Snapping turtles - Snapping turtles retain contaminants in their fat, liver, eggs and to a lesser extent in the muscle. If you choose to consume snapping turtles, carefully trimming away all fat and discarding the fat, liver, and eggs prior to cooking the meat or preparing soup or other dishes will reduce exposure. Women of childbearing age, and children under the age of 15 should avoid ingesting snapping turtles or any soup or stew made with snapping turtle meat.

Waterfowl - It is recommended that you eat no mergansers since they are the most heavily contaminated waterfowl species. Other waterfowl should be skinned and all fat removed before cooking; stuffing should be discarded after cooking; limit eating to two meals per month. Monitoring data indicate that wood ducks and Canada geese are less contaminated than other waterfowl species with dabbler ducks and then diving ducks having increasingly higher contaminant levels.

*Changes from the 1991-92 Health Advisory

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ADDITIONAL INFORMATION

NEW YORK STATE DEPARTMENT OF HEALTH

For more information on health effects from exposure to chemical contaminants, contact:

Environmental Health Information
1-800-458-1158 (toll-free number)

Leave your name, number and brief message. Your call will be returned as soon as possible.

NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION

For more information on fishing, contact:

Regional Offices

Region 1 SUNY Campus, Bldg. 40 Stony Brook, NY 11794 (516) 751-7900

Region 2 47-40 21st St. Long Island City, NY 11101 (718) 482-4900

Region 3 21 South Putt Corners Rd. New Paltz, NY 12561 (914) 255-54538

Region 4 2176 Guilderland Ave. Schenectady, NY 12306 (518) 382-0680

Region 5 Route 86 Ray Brook, NY 12977 (518) 891-1370

Region 6 State Office Bldg. Watertown, NY 13601 (315) 785-2236

Region 7 615 Erie Blvd. West Syracuse, NY 13204 (315) 426-4700

Region 8 Routes 5 and 20 Avon, NY 14414 (716) 226-2466

Region 9 600 Delaware Ave. Buffalo, NY 14202 (716) 847-4600

For information on contaminant levels, contact:

Bureau of Environmental Protection
50 Wolf Road
Albany, NY 12233
(518) 457-6178

Prepared by:
New York State Department of Health
Division of Environmental Health Assessment
Revised March 1992

90650301

APPENDIX D

PROCEDURE FOR EVALUATING POTENTIAL HEALTH RISKS FOR CONTAMINANTS OF CONCERN

To evaluate the potential health risks from contaminants of concern associated with the 102nd Street Landfill site, the New York State Department of Health assessed the risks for cancer and noncancer health effects.

Increased cancer risks were estimated by using site-specific information on exposure levels for the contaminant of concern and interpreting them using cancer potency estimates derived for that contaminant by the US EPA or, in some cases, by the NYS DOH. The following qualitative ranking of cancer risk estimates, developed by the NYS DOH, was then used to rank the risk from very low to very high. For example, if the qualitative descriptor was "low", then the excess lifetime cancer risk from that exposure is in the range of greater than one per million to less than one per ten thousand. Other qualitative descriptors are listed below:

Excess Lifetime Cancer Risk

Risk Ratio	Qualitative Descriptor
equal to or less than one per million	very low
greater than one per million to less than one per ten thousand	low
one per ten thousand to less than one per thousand	moderate
one per thousand to less than one per ten	high
equal to or greater than one per ten	very high

An estimated increased excess lifetime cancer risk is not a specific estimate of expected cancers. Rather, it is a plausible upper bound estimate of the probability that a person may develop cancer sometime in his or her lifetime following exposure to that contaminant (i.e., there is only about a 5 percent chance that the risk of a response is greater than the estimated value).

There is insufficient knowledge of cancer mechanisms to decide if there exists a level of exposure to a cancer-causing agent below which there is no risk of getting cancer, namely, a threshold level. Therefore, every exposure, no matter how low, to a cancer-causing

compound is assumed to be associated with some increased risk. As the dose of a carcinogen decreases, the chance of developing cancer decreases, but each exposure is accompanied by some increased risk.

There is no general consensus within the scientific or regulatory communities on what level of estimated excess cancer risk is acceptable. Some have recommended the use of the relatively conservative excess lifetime cancer risk level of one in one million because of the uncertainties in our scientific knowledge about the mechanism of cancer. Others feel that risks that are lower or higher may be acceptable, depending on scientific, economic and social factors. An increased lifetime cancer risk of one in one million or less is generally considered an insignificant increase in cancer risk.

For noncarcinogenic health risks, the contaminant intake was estimated using exposure assumptions for the site conditions. This dose was then compared to a risk reference dose (estimated daily intake of a chemical that is likely to be without an appreciable risk of health effects) developed by the US EPA, ATSDR and/or NYS DOH. The resulting ratio was then compared to the following qualitative scale of health risk:

Qualitative Descriptions for
Noncarcinogenic Health Risks

Ratio of Estimated Contaminant Intake to Risk Reference Dose	Qualitative Descriptor
equal to or less than the risk reference dose	minimal
greater than one to five times the risk reference dose	low
greater than five to ten times the risk reference dose	moderate
greater than ten times the risk reference dose	high

Noncarcinogenic effects unlike carcinogenic effects are believed to have a threshold, that is, a dose below which adverse effects will not occur. As a result, the current practice is to identify, usually from animal toxicology experiments, a no-observed-effect-level (NOEL). This is the experimental exposure level in animals at which no adverse toxic effect is observed. The NOEL is then divided by an uncertainty factor to yield the risk reference dose. The uncertainty factor is a number which reflects the degree of uncertainty that exists

when experimental animal data are extrapolated to the general human population. The magnitude of the uncertainty factor takes into consideration various factors such as sensitive subpopulations (for example, children or the elderly), extrapolation from animals to humans, and the incompleteness of available data. Thus, the risk reference dose is not expected to cause health effects because it is selected to be much lower than dosages that do not cause adverse health effects in laboratory animals.

The measure used to describe the potential for noncancer health effects to occur in an individual is expressed as a ratio of estimated contaminant intake to the risk reference dose. If exposure to the contaminant exceeds the risk reference dose, there may be concern for potential noncancer health effects because the margin of protection is less than that afforded by the reference dose. As a rule, the greater the ratio of the estimated contaminant intake to the risk reference dose, the greater the level of concern. A ratio equal to or less than one is generally considered an insignificant (minimal) increase in risk.

APPENDIX E

APPENDIX E
SUMMARY OF PUBLIC COMMENTS AND RESPONSES

This summary was prepared to respond the public's comments and questions on the 102nd Street Landfill draft Public Health Assessment (PHA). The public was invited to review this document during the public comment period which ran from July 8, 1993 to August 13, 1993. However, because of requests for copies of the draft PHA toward the end of the comment period by the public, the comment period was extended until mid-September. Some comments have been consolidated or grouped together to incorporate similar concerns. If you have any questions about this responsiveness summary, contact the Health Liaison Program at the toll-free number 1-800-458-1158, extension 402.

PUBLIC COMMENT

Only one comment was received from the public, as follows:

Comment

A sign should be posted at the public docks at Griffon Park to inform the public about contamination from 102nd Street Landfill and the chances of getting skin reactions if launching boats into the water.

Response

Contaminated sediments from the 102nd Street Landfill are close to the shoreline and do not extend very far beyond the western property line of the landfill. Therefore, people launching boats from the docks at Griffon Park are unlikely to be exposed to contamination from the 102nd Street Landfill.

COMMENTS FROM THE US ENVIRONMENTAL PROTECTION AGENCY

Comment #1

When referring to children at Griffon Park being exposed to contamination, it is not clear whether this contamination is due to migration of surface contamination from the site or contamination unrelated to the 102nd Street site.

Response #1

The data evaluated in this Public Health Assessment were gathered during the remedial investigation (RI) of the 102nd Street Landfill. There may be contamination at Griffon Park from sources other than the 102nd Street Landfill; however, the 102nd Street Landfill is a source of contaminants in soil at Griffon Park. These contaminants were identified during the RI and are summarized in Table 11 of this public health assessment. To assess possible health impacts to the community, total exposures must be evaluated, even if contamination is from more than one source.

Comment #2

There is no acknowledgement of the Record of Decision (ROD) or its contents.

Response #2

The ROD has been added to the References and a discussion of the elements of the ROD has been incorporated in the text (Background Section).

Comment #3

Heavily contaminated sediments are going to be placed inside the slurry wall, thereby eliminating the need to excavate and incinerate.

Response #3

All references to incineration of sediments have been revised in the text.

Comment #4

Groundwater will only be recovered and treated to maintain an inward gradient across the slurry wall.

Response #4

The text has been revised to reflect that the purpose of groundwater recovery is to maintain an inward gradient across the slurry wall.

COMMENTS RECEIVED FROM OCCIDENTAL CHEMICAL CORPORATION AND OLIN CHEMICALS CORPORATION

Comment #1

OxyChem does not agree with the statement on page 2 of the Summary that "Exposures to site-related chemicals could cause an increased risk of cancer. Other health related problems associated with the site contaminants are neurological, liver and kidney effects." This disagreement is based on the EPA/State approved Baseline Risk Assessments, Final Report (Sirrine, July 1990) which stated "The PHA determined that neither the individual exposure routes nor the cumulative effects of the site present any significant risks to health under current conditions."

Response #1

The comment implies that the EPA/State agreed with the conclusions of the OxyChem/Olin baseline risk assessment (Sirrine, 1990). On the contrary, both agencies disagreed with some of the assumptions and the conclusions of the risk assessment. Subsequently, OxyChem/Olin was required to incorporate EPA's Baseline Risk Assessment summary into the Feasibility Study (Sirrine, 1990). As discussed in Chapter 3 and Section 7 of the feasibility study, the EPA risk assessment used conservative but reasonable assumptions to evaluate "reasonable maximum exposures" and concluded that significant health risks could be associated with exposure to site-related contaminants. A significant human health risk was defined as one in one million incremental increase in the chance of getting cancer. Additional information on how health risks were evaluated and qualified in the Public Health Assessment has been included in Appendix D.

Comment #2

Descriptions of Olin's and OCC's wastes are incorrect and should be revised. The correct information can be found in the Consent Order for the Remedial Investigation/Feasibility Study.

Response #2

The text has been revised. I have grouped OCC and Olin waste together since this site is considered one site and knowing who disposed of which wastes isn't important for the discussions of potential public health exposures.

Comment #3

Please revise the last paragraph of Section B of the Background section to reflect that the NYS DOH health advisory on fish is based upon PCBs, which is not a contaminant at the 102nd Street Landfill.

Response #3

The text has been revised to reflect that the fish advisory has been developed based upon concern for chemicals which bioaccumulate in fish. The specific sources of these chemicals can not always be identified.

Comment #4

There are many sources for chemicals that have bioaccumulated in fish caught in the Niagara River or Lake Ontario. It is not appropriate to reference only 102nd Street Landfill when it is only one of many sites that generate this concern. Analysis of fish from the upper Niagara River for organochlorines will not provide data specific to discharges from the site due to the migratory nature of fish and the presence of other organochlorine sources along the upper Niagara River.

Response #4

The Public Health Assessment states that 102nd Street is not the sole contributor of contamination to the Niagara River. It also states that the current fish advisory is based upon PCB data, which is not a chemical of concern at 102nd Street Landfill. We agree that organochlorine analyses of fish caught in the upper Niagara River will not give specific data on the impact of the landfill's discharges on fish. However, 102nd Street does contribute to the total chemical loadings to the Niagara River. Discharges from the site, combined with loadings from other sources could result in persons being exposed to contamination in fish at levels of public health concern. The Public Health Assessment evaluates total exposures to contamination at a specific exposure point and may include both site-related and non-site-related contamination.

Comment #5

The last paragraph of the Background section, section B stating "fish from the Niagara River and Lake Ontario have been monitored extensively..." conflicts with the previous paragraph which recommends further sampling and with the Pathway Analysis, section A, Fish, which states that "There are no analytical data for site specific compounds in fish from the Upper Niagara River...".

Response #5

The word "extensively" has been removed. Many more fish from the lower Niagara River and especially Lake Ontario have been analyzed than from the upper Niagara River. The fish are analyzed for only a few chemicals and not most of the site-related chemicals.

Comment #6

It should be noted in the Public Health Implications section, subsection A, Toxicological Evaluation, item 3 that there is a Health Advisory on fish in place in order to protect human health.

Response #6

The Health Advisory on eating fish caught in the Upper Niagara River has been mentioned in several places in the Public Health Assessment. This section discusses potential health effects that might occur from exposure to site related contamination through various pathways. Since we do not have site-specific fish data, we did not include the discussion of the Health Advisory in this section.

Comment #7

The off-site soil sampling included analysis for 2,3,7,8-tetrachlorodibenzo-p-dioxin (2,3,7,8-TCDD) and total TCDD. No other analyses for dioxin isomers or chlorinated dibenzofurans were performed.

Response #7

The text has been revised to reflect these corrections.

Comment #8

The site has be fenced along Buffalo Avenue and on the western side of the site since commencement of landfilling, in the early 1940's, thus restricting access on those sides and exposure to on-site soils.

Response #8

This information has been included in the revised text. However, if access to the site was not restricted on all the land bound sides of the site, then access to the site by the public could have been possible and the past exposure scenario remains correct. Furthermore, due to the maintenance and condition of this fence, it may not have been an effective barrier at all times.

Comment #9

Why has the public health hazard been described as "indeterminate" when the exposures were characterized and evaluated in the "Baseline Risk Assessment - Final Report" prepared by Sirrine Environmental Consultants in July 1990 which was approved by the EPA/State including the NYS DOH. As stated in the Sirrine report, "The PHA determined that neither the individual exposure routes nor the cumulative effects of the site present any significant risks to human health under current conditions."

Response #9

The Public Health Assessment evaluates both known (i.e., completed) and potential human exposure scenarios for the past, current, and future. Human exposure pathways are considered complete if there is an identified source of contamination, an environmental media which has been contaminated from the source, an exposure point for humans, a route of human exposure (i.e., ingestion, inhalation),and an identified receptor population. If one or more of these factors does not exist, then it may be considered as a potential pathway. Specific guidelines have been developed by ATSDR to determine public health hazards that a site poses. Based on the information reviewed during development of the PHA, the site currently poses an indeterminate public health hazard because it is unknown to what extent persons may be exposed to surface soils off-site. Additionally, there is a potential for direct contact with or incidental ingestion of contaminated surface water, and contact with sediments or off-site surface soils. The major public health concern is ingestion of fish caught in the Niagara River or Lake Ontario that have bioaccumulated contaminants from the 102nd Street Landfill. However, there are inadequate data to assess the public health significance of past, present and potential exposures to site contaminants in fish. In addition, the comment implies that the EPA/State agreed with the conclusions of the OxyChem/Olin baseline risk assessment (Sirrine, 1990). Please refer to the response to comment #1 for a discussion of this issue.

Comment #10

Inhalation or ingestion of airborne soil particulates is unlikely. Such exposure is potentially possible during remedial activities. However, appropriate measures to control fugitive dust emissions will be implemented during the performance of remedial activities.

Response #10

We agree that dust is unlikely to be generated under current site conditions. However, in the past this was a possible exposure route. The text has been revised to clarify that exposure to contaminated dusts and particulates may have occurred in the past.

Comment #11

Remediation of the area north of Buffalo Avenue was completed in November 1993. The subject item should be revised accordingly.

Response #11

This was incorporated in the Public Health Assessment.

Comment #12

Sediment "hot spots" are not going to be excavated and incinerated. They will be contained in place.

Response #12

The text was revised accordingly.

Comment #13

On page 7, 4th full paragraph - Why is there concern related to surface water discharges to the north or west of the site?

Response #13

This section relates observations made during a site visit. These are observations made by the staff person who conducted the visit and is considered as part of the historical record for the site. The exposure pathway analysis section discusses known potential human exposure routes of concern.

Comment #14

Page 10, 1st full paragraph, last sentence - Sediment sampling and analyses have shown that the contamination is limited to within 300 feet of the shoreline and the sediments of the Little River have not been impacted.

Response #14

This section is titled "Public Health Concerns" and discusses concerns that have been expressed by the public that may or may not have been address previously. Concern about dredging of the Little River has been addressed in the Record of Decision and in this Public Health Assessment.

Comment #15

The site is not the only source of chemicals present in soils, groundwater, sewer water, and sediments of the Niagara River.

In addition, for many years the swale to the east was an open cesspool which discharged directly to the River. The origin of the sewage was the trailer park to the northeast. The periodic damming of the discharge by natural wave action at the river shore created a stagnant, open sewer which was the most significant health hazard at or near the site. The potential for disease pathogens in the untreated, raw sewage and the many chemicals discharged in average household effluent specifically contributed to the sediment and surface water problems at the site.

Response #15

The text has been revised, where appropriate, to clarify that sources other than the 102nd Street site are contributing to contamination of the Niagara River.

The discharge from the ditch east of the site may have contributed to contamination in the Niagara River. However, household effluent is unlikely to contribute greater chemicals contamination than the site. Therefore, this point will be mentioned, but not evaluated in this Public health Assessment.

Comment #16

The correct name for the "Energy Furnace" is "Energy from Waste" (EFW). The current owner is American Ref-Fuel.

Response #16

The text has been revised.

Comment #17

Air data were collected during the Remedial Investigation activities (a "worst case" situation) and did not show a problem. The data should be reviewed and the subject paragraph revised accordingly.

Response #17

Air was not specifically sampled as part of the Remedial Investigation. Air was monitored as part of the health and safety activities. The purpose of this type of air monitoring is to warn of any potential releases of site contamination so that corrective action can be taken.

The "worst case" situation would have been expected to have occurred during dumping activities at the site.

Comment #18

Prior to initiating any remedial activities, a Health and Safety Plan (HASP) will be in place to minimize the release of chemicals during the implementation of remedial activities at the site. Therefore, impacts during the performance of remedial activities will be negligible.

Response #18

A discussion of the past and proposed remedial measures to minimize public exposures to site contaminants is given in the Background section of this document. As part of the selected remedial action, a Health and Safety Plan will be in place to minimize exposure to site contaminants by remedial workers and nearby residents, as mentioned in the Pathways section of this document.

Comment #19

The off-site soil survey performed during the site RI showed that the chemical presence in Griffon Park due to the site did not extend into the playing area of the two baseball diamonds. Since the chemical presence did not extend onto the baseball diamonds, the potential for dermal contact by the baseball participants would have been minimal. In addition, the area which has shown chemical presence was and is heavily vegetated and it is unlikely that exposure to dust particulates occurred. This is supported by the Public Health Implications section which states in item 4 of Section A, "past exposures to these chemicals by the Little League baseball participants and other park users at the highest concentrations found in the park's soil would pose a minimal health risk".

Response #19

We agree that site contaminants were not found in most of the samples collected in the area of the baseball diamonds. However, from the diagrams provided in the RI, some site-related contaminants were found in the area of the baseball diamonds. Since most of the samples collected from the baseball diamonds have not contained site-related contaminants, the discussion of human exposure via this pathway will be changed from a completed pathway to a potential pathway for past exposure to site-related contamination.

Comment #20

The area north of Buffalo Avenue is on the NYS DOH "not habitable" list and the Love Canal Area Revitalization Agency's (LCARA's) current plans are to convert this area into an open area. There are no plans to re-habit the area. Conversion to an open area will not

occur until remedial activities are completed. Olin has control of the house immediately east of the site through a 99 year lease. It has been vacant for several years.

Response #20

These points are noted and the text has been revised where appropriate.

Comment #21

The statement of the Toxicological Evaluation section, item 2, that "exposures...would pose a minimal health risk to (persons exposed to surface soils at Griffon Park)" should be incorporated into the Conclusions section, item 2(c).

Response #21

The text will be revised accordingly. The Toxicological Evaluation section will be used to revise all relevant conclusions.

Comment #22

OxyChem and Olin should be placed on the mailing list for the annual follow-ups to the Public Health Assessment.

Response #22

OxyChem and Olin will be placed on the appropriate mailing lists.