

ENGINEERING INVESTIGATIONS AT INACTIVE HAZARDOUS WASTE SITES

PHASE II INVESTIGATION

**93rd Street School
City of Niagara Falls
County of Niagara
Site No. 9-32-078**

DATE: August, 1985



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

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

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

By:
Recra Research, Inc.

TABLE 4-1
ANALYTICAL RESULTS
SOIL SAMPLES
(Total Metals)

MW-1 S-3	MW-2 S-6	MW-2 S-8	MW-3 S-7	MW-4 S-6	MW-4 S-8	MW-1 S-7	MW-2 S-4	MW-3 S-3	MW-4 S-3
Volatile Organic	Volatile Organic	Volatile Organic	Volatile Organic	Volatile Organic	Volatile Organic	Chromium	Chromium	Chromium	Chromium
Chromium	Chromium	Chromium	Chromium	Chromium	Chromium	Copper	Copper	Copper	Copper
Hex. Chromium	Copper	Copper	Copper	Copper	Copper	Iron	Iron	Iron	Iron
Copper	Iron	Iron	Iron	Iron	Iron	Lead	Lead	Lead	Lead
Iron	Lead	Lead	Lead	Lead	Lead	Nickel	Nickel	Nickel	Nickel
Lead	Nickel	Nickel	Nickel	Nickel	Nickel	Zinc	Zinc	Zinc	Zinc
Nickel	Zinc	Zinc	Zinc	Zinc	Zinc				
Silver									2,3,7,8-TCDD
Zinc									

Volatile Organic - Indicates positive detection of Volatile Halogenated Organics (greater than 1 ppb). This is a screening technique, and not designed for qualification or quantification of any specific organic compound.

Metals - Those total metals indicated above detectable limits. The detectable limits vary for each metal. Refer to Appendix or analytical documentation records at the end of Appendix 5.0.

Surface Water Route Work Sheet						
Rating Factor	Assigned Value (Circle One)	Multi- plier	Score	Max. Score	Rel. (Section)	
1 Observed Release	0 45	1	45	45	4.1	
If observed release is given a value of 45, proceed to line 4 . If observed release is given a value of 0, proceed to line 2 .						
2 Route Characteristics					4.2	
Facility Slope and Intervening Terrain	0 1 2 3	1		3		
1-yr. 24-hr. Rainfall	0 1 2 3	1		3		
Distance to Nearest Surface Water	0 1 2 3	2		6		
Physical State	0 1 2 3	1		3		
Total Route Characteristics Score				15		
3 Containment	0 1 2 3	1		3	4.3	
4 Waste Characteristics					4.4	
Toxicity/Persistence	0 3 6 9 12 15 18	1	18	18		
Hazardous Waste Quantity	0 1 2 3 4 5 6 7 8	1	8	8		
Total Waste Characteristics Score			26	26		
5 Targets					4.5	
Surface Water Use	0 1 2 3	3	9	9		
Distance to a Sensitive Environment	0 1 2 3	2	2	6		
Population Served/Distance to Water Intake Downstream	0 4 6 8 10 12 16 18 20 24 30 32 35 40	1	0	40		
Total Targets Score			11	55		
6 If line 1 is 45, multiply 1 x 4 x 5 If line 1 is 0, multiply 2 x 3 x 4 x 5			12870	64,350		
7 Divide line 6 by 64,350 and multiply by 100			S _{sw} = 20.0			

FIGURE 7
SURFACE WATER ROUTE WORK SHEET

ANALYTICAL SERVICES REQUEST FORM

1. Project #: 2EM84001.4000
2. Initiator of Request: SFF
3. Sales Contact: CJS
4. Date of Request: 7-26-84
5. Requested Completion Date: 8/1/84
6. Client Name and Address:

RECRA-SUPERFUND

Lockport City Landfill*

93rd St. School

ATTN: Gary Cox

7. ☐ Carbon Copy
8. Telephone # ()
9. Chain of Custody ☒ Y ☐ N
10. Sample Date:
☐ See Log for Sample Dates
11. ☐ See Log for Full Sample I.D.
12. Preserved in Field ☐ Y ☒ N
17. Sample History *Report heading.

Job #: 84-512E
ASRF (Job) Date: 7-26-84
Samples Received: _____
Quote #: _____
A.S.D. USE ONLY

13. Collected By ☒ Recra ☐ Client
14. ☐ Field Report
15. Sample Type ☐ Soil ☐ Sludge
☒ Water ☐ Oil
☐ Other
16. Expected Levels ☐ L ☐ M ☐ H ☒ U
This is the last site.

18. Anticipated Number of Samples _____

19. ANALYTICAL PARAMETERS

Inorganic		Organic	
WQ	Metals	GC/LC	GC/MS
2,3,7,8-TCDD to Envirodyne Engineers			
Sample I.D.: <u>water</u> MW-1 MW-3 1W 2W	Actual # of Samples <u>soil</u> MW-2 S-4 MW-4 S-3	Sample I.D.:	Actual # of Samples VOA ☐ Field Blank ☐ pts x ☐ Vials

Specific Requirements: ie. report content, special handling, safety, preserved or filtered in field, etc.

Signature
(Customer Service Representative)
Signature
(Sample Custodian)

Above Info. Checked for Accuracy

Above Info. Checked for Accuracy

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

93rd Street School
City of Niagara Falls, Niagara County, New York
NYSDEC Number 9-32-078

August 15, 1984

Prepared For
Division of Solid and Hazardous Waste
New York State Department of Environmental Conservation
50 Wolf Road
Albany, New York 12233-0001

Prepared By
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Amherst, New York 14226

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SECTION 1

1.0 EXECUTIVE SUMMARY

The 93rd Street School is located within the City of Niagara Falls, Niagara County, New York. The location of the school is within one mile of Love Canal (a National Priority List hazardous waste site). A site location map is shown in Figure 1. The elementary school was closed in 1980 by the City Board of Education with expectations that the school will eventually be reopened as part of the revitalization of the Love Canal area (Ref. 1). Figure 2 illustrates general site features including sampling and borehole locations. Bergholtz Creek flows along the northern edge of the property and enters Cayuga Creek, a tributary of the Niagara River, about 0.3 miles west of the site (Ref. 4). The site topography results in surface run-off to Bergholtz Creek. The surrounding areas bordering the site are largely residential. Storm sewers are present in the vicinity of the playground. A more detailed discussion of on-site characteristics is presented in Section 4.0.

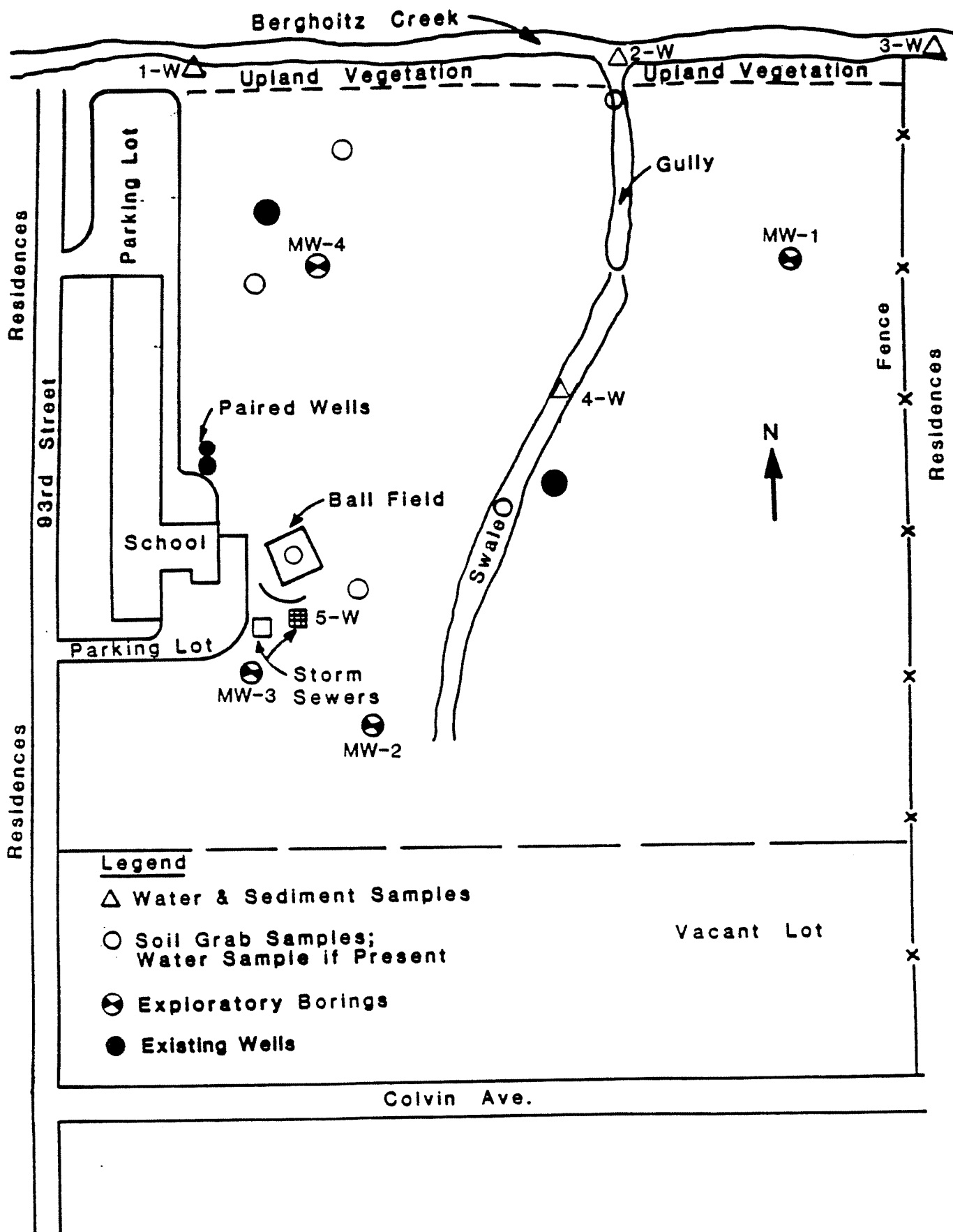
In 1954, the Niagara Falls Board of Education contracted to have approximately 3,000 cubic yards of fly ash and BHC cake hauled from the Love Canal to the 93rd Street School for use as fill (Ref. 2). The fill layer is covered by approximately one to three feet of topsoil. The horizontal extent of the fill, as well as the thickness of the layer, is uncertain. Previous testing has shown the presence of benzene, toluene, BHC, dioxin, and lindane in on-site soils and nearby storm sewers, surface waters, and sediments (Section 4.4). Previous investigations did not establish the horizontal extent and thickness of the contaminated fill layer on-site, or differentiate between the effects of off-site contamination caused by

the school fill from that attributable to Love Canal sources (Black Creek). No measures have thus far been taken to control infiltration and run-off or provide containment.

Phase II investigation activities involved expanding the informational requirements for a more complete hazard ranking system score. Preliminary remedial alternatives were also assessed. The Phase II activities included:

- o screening of on-site air quality;
- o exploratory boring and monitoring well installation;
- o groundwater, surface water, sediment and soil sampling and analysis;
- o surveying; and
- o evaluation of all Phase II and previously existing data for development of remedial options and associated cost estimates.

Results of this study have confirmed the presence of volatile organics, halogenated organics, β and α BHC, and 2,3,7,8-TCDD (Dioxin) in some soil and surface water samples indicating that off-site migration of contaminants may be occurring. Details of investigative methods and findings of Phase II activities are presented in Sections 3.0 and 4.0, respectively. HRS Scoring is presented in Section 5.0. Based on Phase II findings, preliminary remedial options have been developed and are presented in Section 6.0.



Not To Scale

SITE MAP
93rd STREET SCHOOL
Niagara Falls N. Y.

Figure 2

SECTION 2

2.0 PURPOSE/OBJECTIVES

The purpose of this Phase II study is to finalize a Hazardous Ranking System score (HRS) and develop further understanding of the site with respect to the data limitations and inadequacies which were itemized in Section 6.0 of the Phase I Summary Report (Ref. 12). A NYSDEC approved Phase II Work Plan was developed and implemented which, to the extent designed, has provided information to assist in the attainment of project objectives. These objectives included the determination of: (1) the effects of the landfill on the environment, (2) the immediate extent and magnitude of contamination based on site specific hydrogeologic conditions, (3) recommendations for cost-effective remedial actions and/or further investigative considerations, and (4) a final HRS score for the site.

It must be noted that Phase II investigations are not a substitute for detailed remedial approach determinations but rather were designed to supply the information necessary to develop budget level cost estimates for remedial action options. Further, more detailed investigative efforts may be necessary for the development of the specific remedial program recommended for the site.

SECTION 3

3.0 SCOPE OF WORK

The primary purpose of this study was to fill the data gaps identified in the Phase I preliminary assessment so as to permit a more complete site characterization/ranking (HRS) and engineering evaluation of remedial alternatives. To facilitate these determinations, the Phase II field investigation utilized the following techniques:

- o Air Monitoring
- o Subsurface Investigation
- o Monitoring Well Installation
- o Sampling and Analysis
- o Surveying

Details of the specific items involved in this program are summarized in the following sections.

Throughout the investigative effort, field activities were performed in accordance with established safety protocol presented in Recra Research, Incorporated's Operation Manual - Field and Analytical Services, which was submitted to NYSDEC by Recra as part of the prequalifying submission for Phase I investigations.

3.1 Air Monitoring

Prior to the implementation of the various field investigative techniques associated with this work plan, an initial screening of overall ambient air quality was conducted using an HNU photoionizer. For this screening, a grid system was established using pace and compass methods and air

quality readings were recorded at chosen intervals and areas of interest. All readings recorded during air monitoring were within acceptable limits for level D protective equipment measures. Level D protective requirements are skin contact preventive procedures, which necessitates the use of face shields (or safety glasses with side shields), tyvex suits, hard hats, rubber gloves, and rubber boots when working in close proximity to potentially hazardous substances. Respirators are not required, but were maintained and readily accessible to individuals working in the hazardous area. Photoionizer readings were also taken periodically during the various field activity tasks. Acceptable levels were also recorded during those tests.

3.2 Subsurface Investigation

The Phase II investigative program was designed and conducted to assess the impact of landfilling activities on the immediate site area. To facilitate this determination, four subsurface borings were advanced at the locations shown on Figure 2 with subsequent installation of shallow groundwater monitoring wells (MW-1 through MW-4). Boring and monitoring well locations were selected based upon interpretation of all available data to insure well placement in areas considered to represent contaminant migration routes and areas of interest (see also Site Map, Plate A, Appendix 1).

Drilling activities began on April 28, 1984 in the eastern portion of the site. This area was chosen for the upgradient background monitoring well (MW-1) location based on existing information and site features.

Following completion of MW-1, a total of 3 additional borings (MW-2, MW-3, MW-4), were completed around the perimeter of the fill areas.

The boring program was conducted during the period April 28, 1984 through May 17, 1984 with the assistance of Empire Soil Investigations of Orchard Park, New York. All borings were advanced with a CME-45C trailer mounted rig utilizing 3-3/4 inch ID continuous flight, hollow stem augers. The entire back end of the drill rig and all drilling tools were decontaminated with high pressure steam prior to advancing each boring. A bulldozer used to move the drill right during inclement weather was also steam cleaned between borings. All borings were advanced to the bedrock surface which occurred at a depth of approximately 25.0 feet.

Representative soil samples were recovered from all borings (at intervals chosen by the Recra geologist) by means of a split spoon sampler. Standard penetration measurements were recorded for each sampling attempt in accordance with ASTM-D-1586. Soil samples were collected continuously to the bedrock surface in boring MW-1 in order to permit an accurate determination of the natural unconsolidated geology of the area. Additionally, a sample of the upper five feet of bedrock at all well locations was recovered by means of an NX diameter core barrel to allow identification of the local bedrock type and structure. Selected soil samples from each boring were collected in pre-cleaned 16 ounce glass jars, sealed with teflon gaskets and screw-on caps. The samples were delivered to Recra Environmental Laboratories for analysis of the parameters listed in Table 3-1. All sampling tools were cleaned with soap and water and rinsed with distilled water, acetone, and again with distilled

water prior to recovery of each sample.

All drilling fluids and cuttings were transferred to 55 gallon drums for storage until chemical analyses of the materials were completed (Standard well drilling procedures of the Niagara County Health Department, at their request). The drums were grouped and stored next to the school building.

Upon recovery, each sample was inspected for visual signs of contamination, characterized for material physical properties, and classified per ASTM-D-2488. Information on sample characterization and classification was later used to prepare interpretive boring logs which are presented in Appendix 3. Boring logs were then used to construct cross sections of the site area, which are presented in Appendix 2. More detailed descriptions of site specific geology and landfill characteristics are presented in Section 4.0.

3.4 Monitoring Well Installation

3.4.1 Well Construction

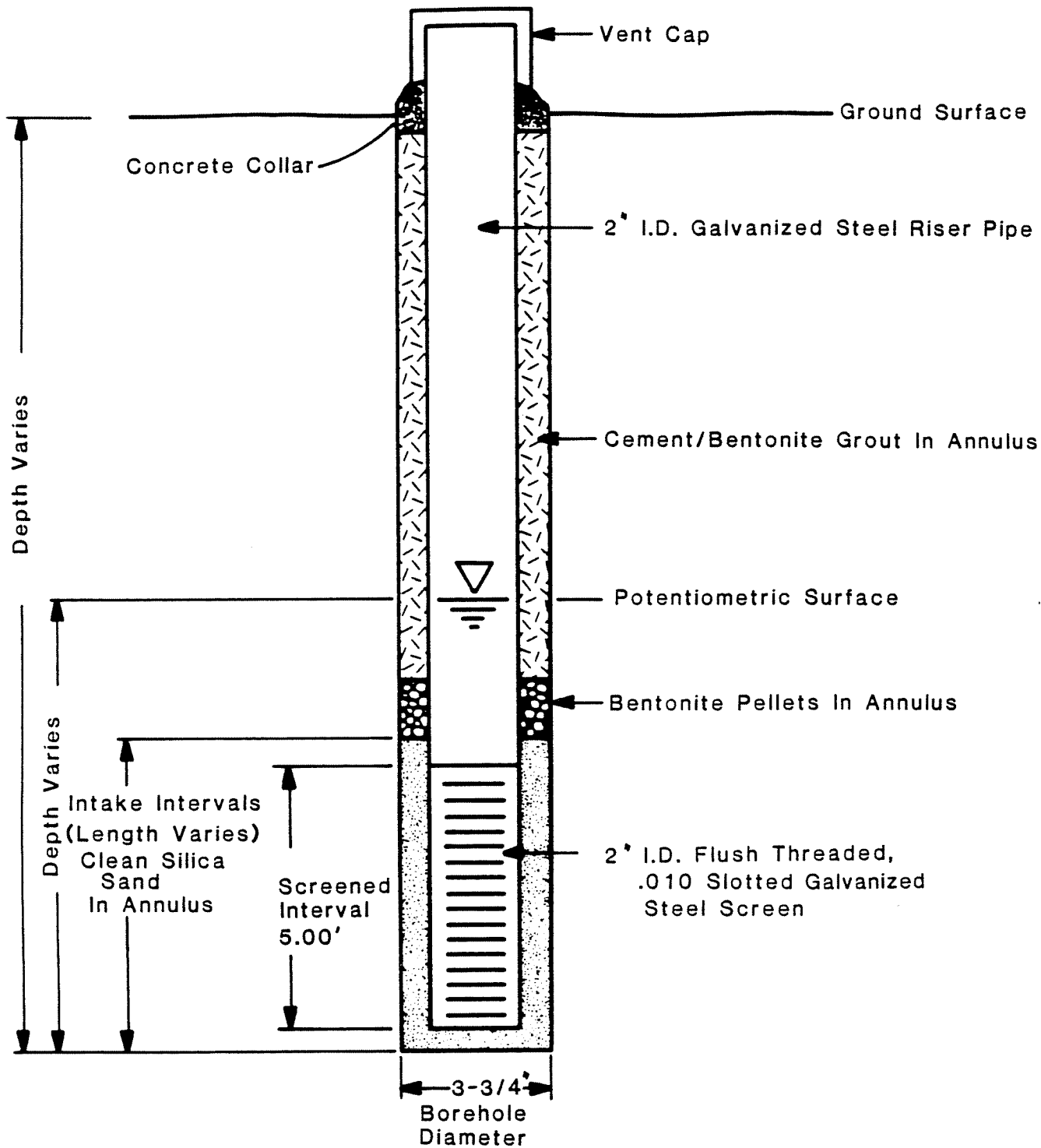
All monitoring wells were installed in the groundwater unit defined per the scope of work developed for this project.

Monitoring well construction utilized two inch ID black steel riser pipe and a five foot Johnson Redhead 0.010 inch slotted wire wound stainless steel well screen. A sand pack was placed in the annular space from the base of the boring up to at least one foot above the top of the screen section. A bentonite pellet seal no less than two feet thick was placed

above the sand pack to prohibit downward migration of surface water entering the borehole. Cement/bentonite grout was placed in the annular space from the top of the bentonite seal to one foot below the ground surface. The remaining annular space was filled with concrete to the ground surface. Each well was then supplied with a steel protective casing and a hinged locking cap. All casings were vented to allow equilibration of static water levels with barometric pressure. The concrete was mounded around the protective steel casing at the ground surface to prohibit ponding of surface water around the well. Typical well construction details are presented in Figure 3. Specific well construction details for each monitoring well are shown on the appropriate boring logs presented in Appendix 3.

3.4.2 Well Development

Monitoring wells MW-1 through MW-4 were developed by Recra Field Services personnel on May 17, 1984. Development was accomplished by over-pumping methods using an ISCO Model 1580 peristaltic pump and appropriate tubing. The tubing was frequently moved up and down the well casing to disturb the water column and suspend any settled or attached particulate matter for removal by the pump. Discharge water was monitored for appearance, pH, and specific conductance during the development process. Wells were considered sufficiently developed when the pH, specific conductance and water color stabilized. Details of well development activities and characteristics are presented in Recra's Field Report for Sampling Activities at 93rd Street, located in Appendix 5.



BRUNING 44-131 61160-1



RECRA RESEARCH INC.
BUFFALO, NEW YORK

Scale: NTS

	By	Date
Dwn.	KMO	
Ckd.	DMW	
Ap'vd.	GWC	
Rev.		

WELL CONSTRUCTION

DIAGRAM

Project No. 2EM84001.7000

NYSDEC
SUPERFUND
SITE

A

Figure 3

3.4.3 Permeability Testing

In-situ permeability testing was conducted on wells following development and sampling activities. Prior to starting the tests, static water level measurements were recorded for each well. A variable head (slug) method and pump tests were employed in order to derive measures of permeability. Due to the rapid recharge encountered, quantitative measurements could not be determined (Section 4.3). However, noting that equilibration after displacement occurred in less than thirty seconds, a conservative estimate for the permeability of the screened zone appeared to be greater than 10^{-3} cm/sec (Ref. 16). This estimated permeability is within the range presented by Freeze and Cherry for limestone and dolomite (i.e. 10^{-4} cm/sec to 10^{-1} cm/sec)(Ref. 17).

3.5 Sampling and Analysis

The following procedures describe the sampling and analysis of groundwater, surface waters, and selected soil samples from the subsurface investigation and surface soil sampling programs. All samples were analyzed for the parameters indicated on Table 3-1.

3.5.1 Groundwater

Following equilibration of water levels within the four newly installed wells, water levels were measured with an electronic water level indicator to determine the depth of the water level below ground surface. Representative groundwater samples were then collected following evacuation of at least three times the volume of standing water within the wells.

Table 3-1

Parameter List
93rd Street School, Niagara Falls, NY
(Water and Soil Samples)

- + pH
- + Specific Conductance
- + Chloride
- + Total Organic Carbon
- Cadmium
- Chromium (Total)
- Chromium (Hexavalent)
- Copper
- Iron
- Lead
- Mercury
- Nickel
- Silver
- Zinc
- Polychlorinated Biphenyls (PCBs)
- Halogenated Organic Scan (HOS)
- BTX Scan (Benzene, Toluene, Xylenes)
- Chlorobenzenes
- Chlorotoluenes
- BHC's α β γ
- Trichlorophenol
- Dioxin (2,3,7,8-TCDD)
- Dry Weight (soils only)

+ Indicates analyses performed on water samples only.

Evacuation of water from the wells and acquisition of samples was accomplished with an ISCO Model 1580 peristaltic pump using separate low density polyethylene tubing for each well. The silicon rubber tubing within the ISCO was changed between wells. An exception to this procedure was employed for recovery of the portion of sample for volatile organic analysis. This portion of sample was recovered by small volume, precleaned galvanized steel bailers dedicated for each well.

Field pH, temperature, and conductivity measurements were recorded upon recovery of the sample. The sample was then placed in appropriate precleaned bottles/septa vials, preserved, labelled, chilled, chain of custody initiated, and delivered to Recra's Tonawanda, New York laboratory for analysis. Chain of custody was maintained through delivery to Recra's lab, analysis and subsequent archiving for possible continued study.

3.5.2 Surface Water

In order to further develop an understanding of the possible pathways for contaminant migration, samples were recovered from the small drainage swale which traverses the site downstream at the confluence of the swale and Bergholtz Creek. A total of three surface water samples were recovered from within the site area for analysis of the chemical parameters specified in Table 3-1. Sampling locations are illustrated on Plate A presented in Appendix 1.

With the exception of the portion recovered for volatile organic analysis, samples were collected directly into pre-cleaned sample containers by means of a pond sampler. The portion of samples recovered for volatile organic analysis was poured from the larger containers directly into 40 milliliter vials in order to prevent excessive spillage and exposure that is possible when sampling directly from the sampling vessel.

The same protocol for quality control, sample collection, field measurements, and preservation utilized in the sampling of groundwater were applied for the collection of surface water samples. (Appendix 5)

3.5.3 Soil

Selected subsurface soil samples were analyzed for physical and chemical parameters in an attempt to characterize the composition and nature of the unconsolidated materials within the site area. Physical parameters addressed during this program were grain size distribution (ASTM-D-422), Atterberg Limits (ASTM-D-423 & 424), and Classification (ASTM-D-248). The results of soil analyses are shown in Appendix 5.

Samples for physical properties analysis were generally selected to represent the various soils encountered on site and from areas of interest. Characterization of soil physical properties was conducted to aid in the design and evaluation of remedial programs.

Generally, a sample from the unsaturated zone and the saturated zone from each boring were selected for chemical analysis.

Upon recovery, samples were placed in pre-cleaned, 16 ounce glass jars, labelled, chilled, and delivered to Recra's lab under chain of custody for subsequent analysis.

3.5.4 Chemical Analyses Methods

The procedures utilized for analysis of water and soil samples during this investigation were in basic accordance with one or more of the following reference texts (see also Appendix 4):

Methods for Chemical Analysis of Water and Wastes, United States Environmental Protection Agency,

NIOSH Manual of Analytical Methods, 2nd Edition, United States Department of Health, Education, and Welfare,

Standard Methods for the Examination of Water and Wastewater, 14th Edition, APHA, AWWA, WPCF.

3.5.5 Quality Assurance Program

An overall Quality Assurance Program is essential for the production of high-quality analytical data. Concerning the Quality Assurance Program in effect at the Laboratories of Recra Research, Inc., the reader is referred to a document previously submitted by Recra Research, Inc. to NYSDEC, entitled, "Operation Manual - Field and Analytical Services."

The following quality control information pertains specifically to analytical data presented in this report (Appendix 4). All samples were collected and maintained under chain of custody. The analytical report presented in Appendix 4 presents copies of the chain of custody records.

Each gas chromatography/mass spectrometry (GC/MS) data page includes quality control information including internal and surrogate standard levels and their respective recoveries for each sample.

Samples 3-W, and 7S were analyzed in duplicate for chlorobenzene, chlorotoluene and trichlorophenol; no positive values resulted. Surrogates were added to all samples prior to solvent extraction.

Specific quality control results are included in Appendix 4 concerning the following:

- o pesticide recoveries from method blanks
- o PCB recoveries from method blanks
- o benzene recovery from sample MW-4
- o benzene recovery from sample MW-3, S-3
- o volatile organic scan replicate from sample MW-4
- o metals and water quality replicates from various samples
- o metals and water quality recoveries from various samples

SECTION 4

4.0 SITE ASSESSMENT

4.1 Site Area Surface Features

Topography and Drainage - The site is generally flat but appears to have been landscaped to direct surface run-off towards Bergholtz Creek. The site slopes gently from the east and west to create a swale in the central portion of the site. The swale terminates at its northern end in a small gully that discharges to Bergholtz Creek. Two inlets to storm sewers are located south of the ball field near the parking lots. These storm sewers may discharge to Bergholtz Creek north of the school, although the actual lines were not traced.

Bergholtz Creek is classified as a Class "D" water resource. Cayuga Creek is classified as Class "C". Cayuga Creek enters the Niagara River about one mile south of the confluence of Bergholtz and Cayuga Creeks. The Niagara River is classified as a Class "A-Special" (International Boundary) water. The best usage of Class "D" waters is for secondary contact recreation. Accordingly, the water conditions must be suitable for fish survival. Class "C" waters are considered suitable for all uses except drinking, culinary, or food processing purposes and primary contact recreation. Class "A-Special" waters are used as sources of water for drinking, culinary or food processing purposes, primary contact recreation, and other usages. (Ref. 8 and 9).

The water intakes of the Niagara Falls water treatment plant are approximately 2.6 miles from the site. These intakes are the only surface water intakes for drinking water located within three miles of the site (Ref. 4).

4.1.1 Environmental Setting

The 93rd Street School is located in a predominantly residential section of Niagara Falls (Ref. 14 and 15). Bergholtz Creek flows along the northern edge of the site (Ref. 4). The northern portion of the site is in the 100 year floodplain of the creek. There are no critical habitats of endangered species in the vicinity of the site. A Class II freshwater wetland is located about one-half mile southeast of the school property. A second wetland has been tentatively identified about one mile northwest of the site.

The school site is regularly maintained and the entire grounds are mowed. A vacant lot with tall weeds and a few scattered trees is located south of the schoolgrounds. A narrow band of upland trees and vegetation separates the schoolyard from Bergholtz Creek to the north. Wetland vegetation, including a willow tree, is found in the gully running from the site into Bergholtz Creek. All other areas, including north of Bergholtz Creek, are residential (Ref. 12).

4.1.2 Groundwater Usage

There are no known drinking water wells in the vicinity of the school. Area residents receive water supplied by the water departments of the City of Niagara Falls, the Towns of Niagara and Wheatfield, and Niagara

County. Although there are a number of industrial wells in the City of Niagara Falls, no wells are closer than 2.6 miles from the 93rd Street School (Ref. 6).

4.2 Geology

The Lockport Dolostone, which is of Silurian Age, forms the bedrock beneath the site (Ref. 5, 6, and 7). The Lockport Dolostone is composed almost entirely of dolomite, a slightly soluble calcium magnesium carbonate. However, a relatively thin section of limestone is encountered near the base of the formation. The Lockport Dolostone reaches a thickness of about 150 feet and dips gently in a southerly direction at a rate of approximately 30 feet per mile (Ref. 13).

The Silurian Age bedrock is unconformably overlain by unconsolidated Pleistocene deposits. The overburden generally varies from 25 to 27 feet in thickness in the area of the site (Boring logs, Appendix 3). Deposits of glacial till overlain by clay, silt, and fine sand layers form the general surficial geology. Area geologic profiles are provided in Appendix 2. At the 93rd Street School site, a fill layer and topsoil have been placed on top of the natural overburden (Ref. 3, 5, 6, and 13). Permeabilities in the glacial till and the clay, silt, and fine sands deposits can reach as low as 10^{-7} cm/sec (Ref. 5, 6, and 7).

4.3 Site Hydrogeology

As depicted on Figure 4, groundwater on a regional basis occurs both in the bedrock (Lockport Dolostone) and the unconsolidated deposits. The first water bearing zone at the 93rd Street site occurs in the silty

93rd. Street School, Niagara Falls, N. Y.

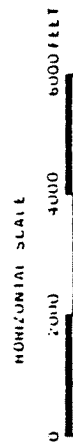
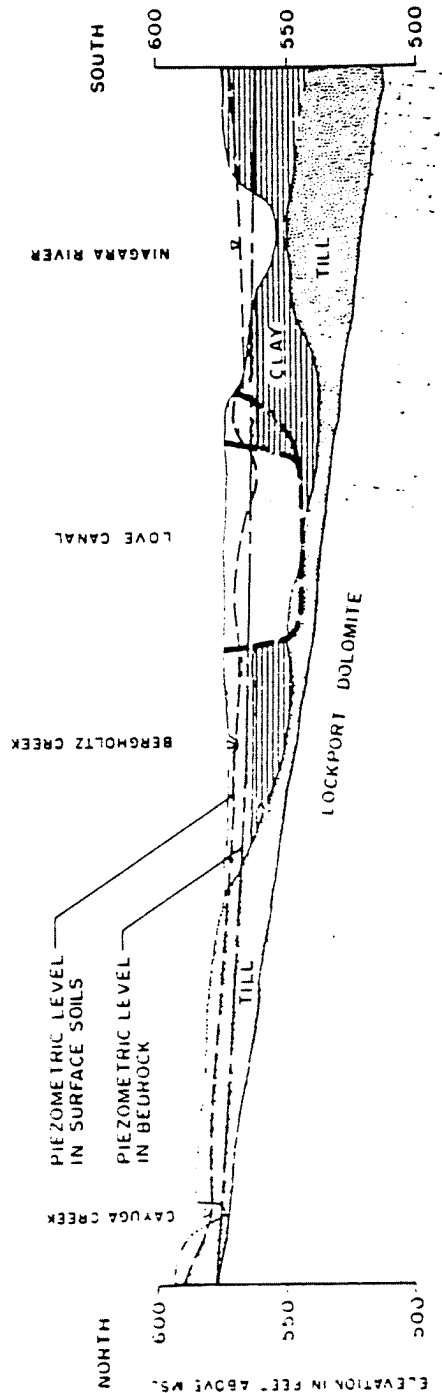
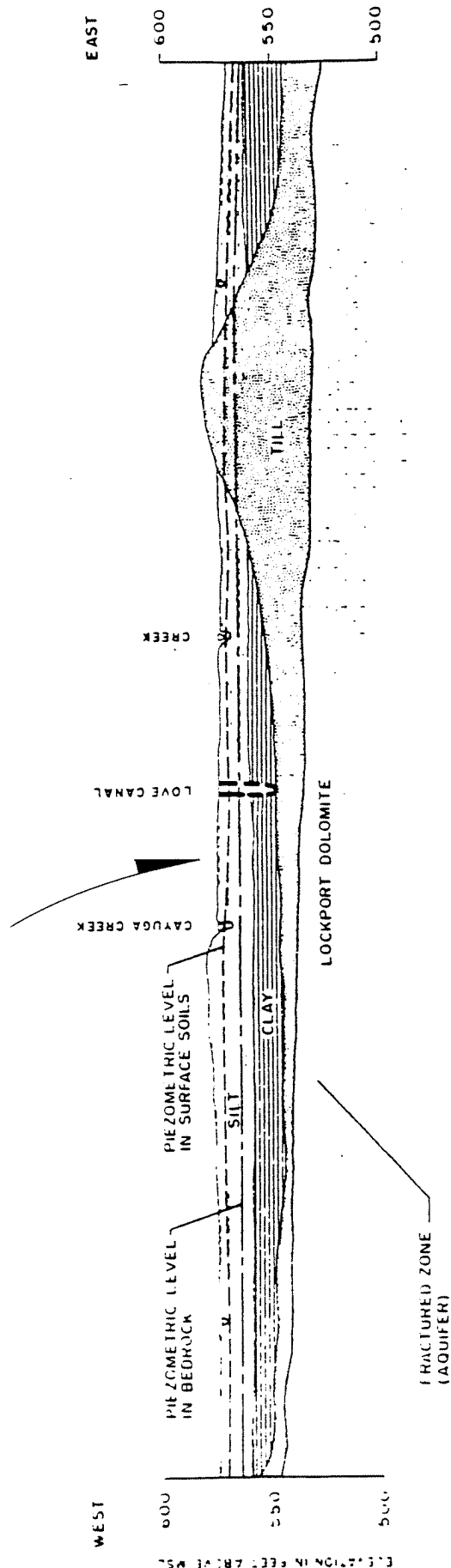


Figure 4
(REF. 13)

EAST-WEST AND NORTH-SOUTH GEOLOGIC PROFILES
OF THE LOVE CANAL AREA AND VICINITY
LOVE CANAL REMEDIAL PROJECT (TASK V)

ECJORDANCO

clays within 10 to 15 feet of the ground surface. In terms of transmissive zones, the uppermost principal transmissive zones occurs along the interface between these silts and clays and underlying bedrock. The permeabilities associated with this interface, which includes the upper few feet of fractured bedrock, are orders of magnitude greater than the permeabilities of the uppermost saturated portions of the silts and clays (1×10^{-2} , 10^{-3} versus 1×10^{-5} , 10^{-6}). Correspondingly, rates of lateral flow of groundwater within this zone would be much greater than within the overlying silts and clays. It is for this reason that the monitoring wells were constructed such that the well intakes span this interface zone.

Groundwater flow directions on site are difficult to assess. As shown on Plate D (Appendix 2) water level elevations in the wells installed indicate very low gradient exists within the zone monitored. A change in water level elevation of 0.07 feet across the site is too close to the degree of accuracy and precision associated with the methods utilized to make a clear determination of groundwater flow directions. However, an inferred direction of groundwater flow, based on the water level elevations, would be to the west-southwest (see Plate D, Appendix 2).

Several factors may contribute to the flatness of the groundwater gradient on site. One is the relative flatness of site topography; unconfined shallow groundwater typically mimics surface topography. Secondly, although on a regional basis groundwater flow in the Lockport Dolostone is in a southerly direction, the proximity of Bergholtz Creek to the site probably has a moderating effect on groundwater flow in the uppermost

portions of bedrock and along the bedrock/unconsolidated materials interface. The elevation of water in Bergholtz Creek during the period of study was approximately one foot below the average water level elevations measured in the monitoring wells during this same period. This would indicate that Bergholtz Creek could be a discharge point for shallow occurring groundwater on site. Were this strictly the case, shallow groundwater flow across the site would be anticipated to be in a northerly direction. Countering the potential effect of Bergholtz Creek on groundwater flow directions is the regional dip of the Lockport Dolostone which is to the south. This direction contributes to the southerly direction of groundwater flow within the Lockport Dolomite on a regional basis.

The combination of these factors, the flat topography, Bergholtz Creek, and the structural dip of the Lockport Dolostone, have probably contributed to the pattern of distribution of water level elevations observed during this study. It is likely that, given the flat gradients observed, groundwater flow directions within the zone monitored will fluctuate with fluctuating seasonal conditions such as rainfall, flow volumes in Bergholtz Creek and prolonged periods of non-infiltration such as typically occur during winter months.

4.4 Analytical Results

4.4.1 Previous Air Quality Data

Benzene was detected in residences east of the school from air samples analyzed by the USEPA in 1982 (Ref 7). Values ranged from 6.6 ug/m³ outside the houses, to 7.2 ug/m³ inside a house, and 8.7 ug/m³ in a basement.

4.4.2 Soil Analytical Data

Previous Soil Analytical Data

Soil samples from the 93rd Street School have been analyzed by the USEPA in 1982. Low-level lindane (γ BHC) contamination was detected in the fly ash fill layer. The fly ash was also found to contain 380 parts per trillion (ppt) of dioxin (Ref. 3). Core samples from the upper six inches of sediments contained cadmium ranging from 1200-1700 ug/kg. Traces of benzene (not exceeding 25 ug/kg) were also found in soil from the school grounds. In those particular samples, BHC contamination was not detected (Ref. 7). In samples obtained from the homeplate area of the school's ballfield, hexachlorocyclohexane contamination was detected (Ref. 3). Contamination of school soils by trichlorobenzene and tetrachlorobenzene has been reported by NYSDEC (Ref. 2). Benzene, toluene, and α BHC have been detected in sediments in Bergholtz Creek near the site. However, the levels did not exceed concentrations measured in upstream samples (Ref. 7). Sediment in a storm sewer possibly discharging from the school area into Bergholtz Creek was found to contain 20 ppb of dioxin (Ref. 3).

Phase II Soil Analytical Data

Results from the analytical tests on soils are shown on Table 4-1. Complete test results are included in Appendix 4. Also included in Appendix 4 are methods and results of dioxin testing conducted by EnviroDyne Engineers, St. Louis, Missouri. Tests confirm the presence of dioxin (2,3,7,8-TCDD) in one soil sample collected from test location MW-4 at the four to six foot interval in fill material containing a fly ash type substance. Analytical results indicated non-detectable quantities of trichlorotoluenes, dichlorotoluenes, tetrachlorotoluenes, and the chlorophenol group (at a detection limit of 30 ug/g [dry]).

Geotechnical

Geotechnical tests were conducted on representative soil samples. These tests included moisture and grain size analysis. The results show close compatability with the visual classification noted on the boring logs in Appendix 2, being dominantly silty clays with high percentages of materials (>75.0 %) less than the .075 mm range (CLAY according to ASTM D 2487-69). Complete results are shown in Appendix 5.

4.4.3 Groundwater Analytical Data

Previous Groundwater Analytical Data

Some data on groundwater quality was obtained during the USEPA investigation of Love Canal (Ref. 7). Groundwater at the school was found to contain traces of benzene (not exceeding 20 ug/l) and toluene (not exceeding 25 ug/l). These contaminants were detected in samples from

TABLE 4-1
ANALYTICAL RESULTS
SOIL SAMPLES
(Total Metals)

MW-1 S-3	MW-2 S-6	MW-2 S-8	MW-3 S-7	MW-4 S-6	MW-4 S-8	MW-1 S-7	MW-2 S-4	MW-3 S-3	MW-4 S-3
Volatile Organic	Volatile Organic	Volatile Organic	Volatile Organic	Volatile Organic	Volatile Organic	Chromium	Chromium	Chromium	Chromium
Chromium Hex.	Chromium	Chromium	Chromium	Chromium	Chromium	Copper	Copper	Copper	Copper
Chromium	Copper	Copper	Copper	Copper	Copper	Iron	Iron	Iron	Iron
Copper	Iron	Iron	Iron	Iron	Iron	Lead	Lead	Lead	Lead
Iron	Lead	Lead	Lead	Lead	Lead	Nickel	Nickel	Nickel	Nickel
Lead	Nickel	Nickel	Nickel	Nickel	Nickel	Zinc	Zinc	Zinc	Zinc
Nickel	Zinc	Zinc	Zinc	Zinc	Zinc				
Silver	2,3,7,8-TCDD			2,3,7,8-TCDD					
Zinc									

Volatile Organic - Indicates positive detection of Volatile Halogenated Organics (greater than 1 ppb). This is a screening technique, and not designed for qualification or quantification of any specific organic compound.

Metals - Those total metals indicated above detectable limits. The detectable limits vary for each metal. Refer to Appendix or analytical documentation records at the end of Appendix 5.0.

both the bedrock and the overburden. Monitoring wells installed as part of the EPA study are still in existence (Ref. 12).

Phase II Groundwater Analytical Data

Results of Phase II analytical tests are presented in Table 4-2 (with respect to presence above detectable limits) with the complete results included in Appendix 4. Also included in Appendix 4 are dioxin results for water samples from MW-1 and MW-3, which showed no detectable quantities (at a detection limit of 0.001 ppb). Halogenated organics and volatile organics, as well as the metals chromium, lead, zinc, and iron, were detected in groundwater samples. All samples were also particularly high in sulfates and to a lesser degree, chloride. Chlorophenols and chlorotoluenes were not detected in any groundwater samples (at a 5.0 ug/l detection limit).

4.4.4 Surface Water Analytical Data

Previous Surface Water Analytical Results

Lindane (γ BHC), in concentrations varying from 15 to 97 ug/l, was detected in storm sewers on 93rd Street adjacent to the school (Ref. 3). In addition, traces of benzene and lindane were measured in Bergholtz Creek. The levels of these contaminants were similar (or greater) in samples upstream of the site (Ref. 7).

TABLE 4-2
ANALYTICAL RESULTS

Groundwater
(Compounds Detected)

MW-1	MW-2	MW-3	MW-4
Halogenated Organic	Halogenated Organic	Halogenated Organic	Halogenated Organic
Soluble Chromium	Volatile Organic	Volatile Organic	Volatile Organic
Soluble Zinc	Soluble Iron	Soluble Lead	Soluble Zinc
	Soluble Zinc	Soluble Zinc	

Halogenated Organic - Indicates positive detection of halogenated compounds (greater than 1 ppb) using a Halogenated Organic Scan (ECD). This technique is used for screening purposes only, and is not designed for quantification or qualification of any specific halogenated organic compound.

Volatile Organic - Indicates positive detection of Volatile Halogenated Organics (greater than 1 ppb). This also is a screening technique, and not designed for qualification or quantification of any specific organic compound.

Metals - Those total metals indicated above detectable limits. The detectable limits vary for each metal. Refer to Appendix or analytical documentation records at the end of Section 4.0.

Phase II Surface Water Analytical Results

A summary of surface water analytical results are shown in Table 4-3. Results indicate the presence of a more varying content of metals (i.e. cadmium, nickel, copper) as compared to groundwater. Total organic carbon (TOC) was also found to be markedly higher in surface water as compared to groundwater, with sulfate being lower, except for 5-W (storm sewer sample), which showed a value comparable to the MW-1 groundwater sample. This is also reflected by higher conductivity values for groundwater versus surface water (Appendix 5). Halogenated organics in the surface water exhibited comparable values to groundwater with volatile organics higher in groundwater. The only detectable quantity of volatile organics was from surface water sample 2-W. Additionally, α BHC was detected in three samples (2-W, 3-W and 5-W) and β BHC in sample 5-W.

Dioxin (2,3,7,8-TCDD) was also confirmed as present in surface waters near detection limits (1-W and 2-W). Sample 2-W, located at the confluence of the swale draining surface water from the site and Bergholtz Creek, showed the higher level of contamination. This surface water sample location, in addition to the presence of TCDD detected in site soils, is indicative of off-site migration; however, additional sampling points would be required to quantify potential migration and differentiate that potential from other drainage entering Bergholtz Creek (i.e. Black Creek). The presence of fly ash in the soil sampled intervals tested which contained dioxin (and the probable association of dioxin within the fly ash), in addition to the shallow presence of fly

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ash detected in hand auger samples (Appendix 5), would also indicate the potential for off-site migration of dioxin by surface water routes. Further testing could also confirm whether the fly ash is the contributing source of dioxin.

TABLE 4-3
ANALYTICAL RESULTS

Surface Water Sampling
(Compounds Detected)

1-W	2-W	3-W	5-W
Halogenated Organic	α -BHC	α -BHC	α β -BHC
Cadmium	Halogenated Organic	Halogenated Organic	Halogenated Organic
Iron	Volatile Organic	Copper	Volatile Organic
Nickel	Cadmium	Iron	Cadmium
Zinc	Iron	Nickel	Copper
2,3,7,8-TCDD	Nickel	Zinc	Iron
	Zinc		Zinc
	2,3,7,8-TCDD		

Halogenated Organic - Indicates positive detection of halogenated compounds (greater than 1 ppb) using a Halogenated Organic Scan (ECD). This technique is used for screening purposes only, and is not designed for quantification or qualification of any specific halogenated organic compound.

Volatile Organic - Indicates positive detection of Volatile Halogenated Organics (greater than 1 ppb). This also is a screening technique, and not designed for qualification or quantification of any specific organic compound.

α -BHC

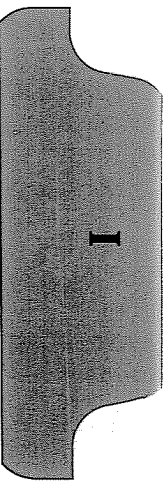
β -BHC

2,3,7,8-TCDD

- Detected Halogenated Compounds for which specific tests were conducted for quantification (Appendix 4).

CONTENTS FOR SECTION 5.0
Hazardous Ranking System Scoring

- i Narrative Summary
- ii U.S.G.S., Quadrangle; Tonawanda West, N.Y., 1965
- iii HRS Worksheets
- iv HRS Documentation Records
- v EPA Form 2070-13
Site Inspection Report



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NARRATIVE
SUMMARY

93RD STREET SCHOOL (NYSDEC Number 9-32-078)
CITY OF NIAGARA FALLS
NIAGARA COUNTY, NEW YORK STATE 14301

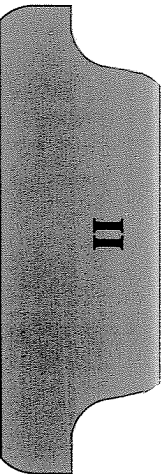
The 93rd Street School is located within the City of Niagara Falls, Niagara County, New York, within one mile of Love Canal (a National Priority List hazardous waste site). The elementary school was closed in 1980 by the City Board of Education. Bergholtz Creek flows along the northern edge of the property and enters Cayuga Creek, a tributary of the Niagara River, about 0.3 miles west of the site. The site topography results in surface run-off to Bergholtz Creek. Storm sewers are present in the vicinity of the playground (Figure 2). The surrounding areas bordering the site are largely residential.

In 1954, the Niagara Falls Board of Education (owner of the site) contracted to have approximately 3,000 cubic yards of fly ash and BHC cake hauled from the Love Canal to the 93rd Street School for use as fill. Previous testing of soil and water has shown the presence of benzene, toluene, γ -BHC (lindane), and dioxin in on-site soils and nearby storm sewers, surface waters, and sediments.

Results of this study have confirmed the presence of volatile organics, halogenated organics, α and β BHC, and 2,3,7,8-TCDD (Dioxin) in soil and/or surface waters, indicating that contaminant migration off-site may be occurring.

The initial HRS (Hazardous Ranking System) from Phase I activities scored an Sm (surface migration) equal to 32.8. The revised HRS Score, derived from compilation of Phase II results, was determined to have an Sm value equal to 12.09, a SFE (Fire Explosion) equal to 0, and a SDC (Direct Contact) of 62.5. To date, there has not been any enforcement actions taken against responsible parties.

Due to the types of chemical compounds detected and their potential for off-site migration by surface waters, rapid remedial procedures should be designed and employed to prevent contaminants entering Bergholtz Creek. The site should also be rendered inaccessible to the public.



Facility name: 93rd Street School
 Location: Niagara Falls, Niagara County
 EPA Region: 2
 Person(s) in charge of the facility: Superintendent of Schools
Board of Education, Niagara Falls, New York
 Name of Reviewer: Recra Research, Inc. Date: August 22, 1984
 General description of the facility:
 (For example: landfill, surface impoundment, pile, container; types of hazardous substances; location of the facility; contamination route of major concern; types of information needed for rating; agency action, etc.)
Closed public school. 3,000 cubic yards of fly ash and BHC cake
placed as fill on site in 1954. Analysis of soils, surface waters,
and groundwater detect the presence of dioxin, lindane, benzene,
toluene and heavy metals. May be contaminating adjacent storm
sewers, Bergholtz Creek, Niagara River and groundwater. (Ref. 2 and
this study).
 Scores: $S_M = 12.09$ $S_{GW} = 6.12$ $S_{SW} = 20.0$ $S_a = N/A$)
 $S_{FE} = 0$
 $S_{DC} = 62.5$

FIGURE 1
HRS COVER SHEET

Ground Water Route Work Sheet						
Rating Factor	Assigned Value (Circle One)	Multi-plier	Score	Max. Score	Ref. (Section)	
1 Observed Release	0 15	1	45	45	3.1	
If observed release is given a score of 45, proceed to line 4 . If observed release is given a score of 0, proceed to line 2						
2 Route Characteristics					3.2	
Depth to Aquifer of Concern	0 1 2 3	2		6		
Net Precipitation	0 1 2 3	1		3		
Permeability of the Unsaturated Zone	0 1 2 3	1		3		
Physical State	0 1 2 3	1		3		
Total Route Characteristics Score				15		
3 Containment	0 1 2 3	1		3	3.3	
4 Waste Characteristics					3.4	
Toxicity/Persistence	0 3 6 9 12 15 18	1	18	18		
Hazardous Waste Quantity	0 1 2 3 4 5 6 7 8	1	8	8		
Total Waste Characteristics Score			26	26		
5 Targets					3.5	
Ground Water Use	0 1 2 3	3	3	9		
Distance to Nearest Well/Population Served	0 4 6 8 10 12 16 18 20 24 30 32 35 40	1	0	40		
Total Targets Score			3	49		
6 If line 1 is 45, multiply 1 x 4 x 5 If line 1 is 0, multiply 2 x 3 x 4 x 5			3510	57,330		
7 Divide line 6 by 57,330 and multiply by 100			$S_{gw} = 6.12$			

FIGURE 2
GROUND WATER ROUTE WORK SHEET

Surface Water Route Work Sheet						
Rating Factor	Assigned Value (Circle One)	Multi- plier	Score	Max. Score	Ref. (Section)	
1 Observed Release	0 45	1	45	45	4.1	
If observed release is given a value of 45, proceed to line 4 . If observed release is given a value of 0, proceed to line 2 .						
2 Route Characteristics					4.2	
Facility Slope and Intervening Terrain	0 1 2 3	1		3		
1-yr. 24-hr. Rainfall	0 1 2 3	1		3		
Distance to Nearest Surface Water	0 1 2 3	2		6		
Physical State	0 1 2 3	1		3		
Total Route Characteristics Score				15		
3 Containment	0 1 2 3	1		3	4.3	
4 Waste Characteristics					4.4	
Toxicity/Persistence	0 3 6 9 12 15 18	1	18	18		
Hazardous Waste Quantity	0 1 2 3 4 5 6 7 8	1	8	8		
Total Waste Characteristics Score			26	26		
5 Targets					4.5	
Surface Water Use	0 1 2 3	3	9	9		
Distance to a Sensitive Environment	0 1 2 3	2	2	6		
Population Served/Distance to Water Intake Downstream	0 4 6 8 10 12 16 18 20 24 30 32 35 40	1	0	40		
Total Targets Score			11	55		
6 If line 1 is 45, multiply 1 x 4 x 5 If line 1 is 0, multiply 2 x 3 x 4 x 5			12870	64,350		
7 Divide line 6 by 64,350 and multiply by 100			$S_{sw} = 20.0$			

FIGURE 7
SURFACE WATER ROUTE WORK SHEET

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

FIGURE 11
FIRE AND EXPLOSION WORK SHEET

Air Route Work Sheet						
Rating Factor	Assigned Value (Circle One)	Multi- plier	Score	Max. Score	Ref. (Section)	
1 Observed Release	0 45	1		45	5.1	
Date and Location:						
Sampling Protocol:						
If line 1 is 0, the $S_a = 0$. Enter on line 5 . If line 1 is 45, then proceed to line 2 .						
2 Waste Characteristics					5.2	
Reactivity and Incompatibility	0 1 2 3	1		3		
Toxicity	0 1 2 3	3		9		
Hazardous Waste Quantity	0 1 2 3 4 5 6 7 8	1		8		
Total Waste Characteristics Score				20		
3 Targets					5.3	
Population Within 4-Mile Radius	{ 0 9 12 15 18 21 24 27 30	1		30		
Distance to Sensitive Environment	0 1 2 3	2		6		
Land Use	0 1 2 3	1		3		
Total Targets Score				39		
4 Multiply 1 x 2 x 3				35,100		
5 Divide line 4 by 35,100 and multiply by 100				$S_a = N/A$		

FIGURE 9
AIR ROUTE WORK SHEET

Direct Contact Work Sheet						
Rating Factor	Assigned Value (Circle One)	Multi- plier	Score	Max. Score	Ref. (Section)	
1 Observed Incident	① 45	1	0	45	8.1	
If line 1 is 45, proceed to line 4 If line 1 is 0, proceed to line 2						
2 Accessibility	0 1 2 ③	1	3	3	8.2	
3 Containment	0 ①5	1	15	15	8.3	
4 Waste Characteristics Toxicity	0 1 2 ③	5	15	15	8.4	
5 Targets					8.5	
Population Within a 1-Mile Radius	0 1 2 3 4 ⑤	4	20	20		
Distance to a Critical Habitat	① 1 2 3	4	0	12		
Total Targets Score			20	32		
6 If line 1 is 45, multiply 1 x 4 x 5 If line 1 is 0, multiply 2 x 3 x 4 x 5			13500	21,600		
7 Divide line 6 by 21,600 and multiply by 100			SDC = 62.5			

FIGURE 12
DIRECT CONTACT WORK SHEET

	S	S ²
Groundwater Route Score (S _{gw})	6.12	37.45
Surface Water Route Score (S _{sw})	20.0	400
Air Route Score (S _a)	0	0
$S_{gw}^2 + S_{sw}^2 + S_a^2$		437.45
$\sqrt{S_{gw}^2 + S_{sw}^2 + S_a^2}$		20.9
$\sqrt{S_{gw}^2 + S_{sw}^2 + S_a^2} / 1.73 = S_M =$		12.09

FIGURE 10
WORKSHEET FOR COMPUTING S_M

INSTRUCTIONS: The purpose of these records is to provide a convenient way to prepare an auditable record of the data and documentation used to apply the Hazard Ranking System to a given facility. As briefly as possible summarize the information you used to assign the score for each factor (e.g., "Waste quantity = 4,230 drums plus 800 cubic yards of sludges"). The source of information should be provided for each entry and should be a bibliographic-type reference that will make the document used for a given data point easier to find. Include the location of the document and consider appending a copy of the relevant page(s) for ease in review.

FACILITY NAME: 93rd Street School

LOCATION: 93rd Street, Niagara Falls, New York

GROUND WATER ROUTE

1 OBSERVED RELEASE

Contaminants detected (5 maximum):

Benzene, toluene (Ref. 7)

Volatile and halogenated organics, heavy metals (Phase II Recra Research, 1984, Appendix 4)

Rationale for attributing the contaminants to the facility:

Chemical analysis of groundwater and soils

(Phase II, Recra Research, 1984, Appendix 4)

* * *

2 ROUTE CHARACTERISTICS

Depth to Aquifer of Concern

Name/description of aquifer(s) of concern:

Fractured zone of bedrock (top of bedrock - Lockport Dolostone)

(Phase II, Recra Research, 1984,

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

Less than 10 feet

(Phase II, Recra Research, 1984)

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

Estimated 25 feet

(Phase II, Recra Research, 1984, Appendix 3)

Net Precipitation

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

34 inches (mean annual)

(Ref. 14)

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

27 inches (mean annual)

(Ref. 14)

Net precipitation (subtract the above figures):

7 inches

Permeability of Unsaturated Zone

Soil type in unsaturated zone:

Glacial till; glacio-lacustrine silts, clays and fine sands

(Phase II Investigation, Recra Research, 1984, Appendix 3)

Permeability associated with soil type:

Approximately 10^{-7} cm/sec. (Ref. 7)

Physical State

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

Solid (Ref. 2)

* * *

3 CONTAINMENT

Containment

Method(s) of waste or leachate containment evaluated:

No containment

Method with highest score:

Open landfill (no liner)

4 WASTE CHARACTERISTICS

Toxicity and Persistence

Compound(s) evaluated:

Dioxin; benzene; lindane; BHC; toluene; heavy metals including cadmium (Ref. 2, 3 and Phase II Investigation, Recra Research, 1984, Appendix 4)

Compound with highest score:

Dioxin (2, 3, 7, 8-TCDD)

Hazardous Waste Quantity

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

3,000 cubic yards of fly ash and BHC cakes (Ref. 2)

Basis of estimating and/or computing waste quantity:

Based on NYSDEC survey conducted on disposal sites in New York State - information provided by NYSDEC

* * *

5 TARGETS

Ground Water Use

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

6 industrial wells located within 3 miles of site (Ref. 6)

Drinking water wells located on Witmer Road, Town of Niagara,
just outside of 3-mile radius

Distance to Nearest Well

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

2.5 miles southwest of site along Buffalo Avenue
between I-190 and Hyde Park Blvd. (Ref. 6)

Distance to above well or building:

2.5 miles (Ref. 6)

Population Served by Ground Water Wells Within a 3-Mile Radius

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

6 industrial wells (Ref. 6)

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

N/A

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

Wells used for industrial purposes only (Ref. 6)

SURFACE WATER ROUTE

1 OBSERVED RELEASE

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

γ -BHC (lindane) and benzene (Ref. 3)

2,3,7,8-TCDD (Dioxin), cadmium, α -BHC, β -BHC (Phase II Investigation, Recra Research, 1984, Appendix 4)

Rationale for attributing the contaminants to the facility:

Chemical analysis (1982 Ref. 3, 7; and this study, Phase II Investigation, Recra Research, 1984)

(Contaminants detected in soil, surface water, and groundwater)

* * *

2 ROUTE CHARACTERISTICS

Facility Slope and Intervening Terrain

Average slope of facility in percent:

$\leq 3\%$

Name/description of nearest downslope surface water:

Bergholtz Creek, adjacent to northern edge of Site A

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

$\leq 10\%$ (Phase II Investigation, Recra Research, 1984)

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

No

Is the facility completely surrounded by areas of higher elevation?

No

1-Year 24-Hour Rainfall in Inches

2.1 inches (Ref. 14)

Distance to Nearest Downslope Surface Water

Immediately adjacent

Physical State of Waste

Solid (Ref. 2)

* * *

3 CONTAINMENT

Containment

Method(s) of waste or leachate containment evaluated:

No containment

Method with highest score:

No containment

4 WASTE CHARACTERISTICS

Toxicity and Persistence

Compound(s) evaluated

Dioxin, lindane, benzene and BHC, various metals

Compound with highest score:

Dioxin

Hazardous Waste Quantity

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

3,000 cubic yards

Basis of estimating and/or computing waste quantity:

Based on NYSDEC survey conducted on disposal sites in
New York State - information provided by NYSDEC

* * *

5 TARGETS

Surface Water Use

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

Bergholtz Creek - Class "D" Water Resource suitable for
secondary contact recreation

Cayuga Creek - Class "C", suitable for all purposes excepting
drinking and culinary

City of Niagara Falls water intakes approximately 3.4 stream-miles
downstream (Ref. 8 and 9)

Is there tidal influence?

No

Distance to a Sensitive Environment

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

N/A

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

Class II Freshwater Wetlands .5 mile northwest of site

Phase II Investigation, Recra Research, 1984, p.

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

None

Population Served by Surface Water

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

City of Niagara Falls water intakes located approximately 3.4 stream-miles downstream of site. Population served: approximately 71,000 people (Ref. 15)

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

N/A

Total population served:

Approximately 71,000

Name/description of nearest of above water bodies:

Bergholtz Creek - adjacent to site
(a tributary of the Niagara River)

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

Approximately 3.4 stream miles (Ref. 4)

AIR ROUTE

1 OBSERVED RELEASE

Contaminants detected:

N/A

Date and location of detection of contaminants

Methods used to detect the contaminants:

Rationale for attributing the contaminants to the site:

* * *

2 WASTE CHARACTERISTICS

Reactivity and Incompatibility

Most reactive compound:

Most incompatible pair of compounds:

Toxicity

Most toxic compound:

Hazardous Waste Quantity

Total quantity of hazardous waste:

Basis of estimating and/or computing waste quantity:

* * *

3 TARGETS

Population Within 4-Mile Radius

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

0 to 4 mi 0 to 1 mi 0 to 1/2 mi 0 to 1/4 mi

Distance to a Sensitive Environment

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

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

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

Land Use

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

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

Distance to residential area, if 2 miles or less:

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

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

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

HAZARDOUS WASTE DISPOSAL SITE REPORT
REVISED

Code: A

Site Code: 9-32-078

Name of Site: 93rd Street School

Region: 9

County: Niagara

Town/City: City of Niagara Falls

Street Address: 93rd Street

Status of Site:

- o In 1954, the Niagara Falls Board of Education contracted to have 3,000 cubic yards of fly ash and BHC hauled from Love Canal for fill at the 93rd Street School. Subsequently, the fill was covered by approximately 3 feet of topsoil and the site was landscaped to direct surface run-off northward towards Bergholtz Creek.
- o The school was closed by the Board of Education in 1980.
- o The site is located within a residential section of Niagara Falls.
- o Benzene, toluene, BHC, lindane, and dioxin have been detected in on-site soil and groundwater and off-site storm sewers, surface waters, and sediments. Past investigations have failed to differentiate off-site impacts of the 93rd Street School site and other Love Canal sources.
- o No measures have been taken to cap or seal the site, to provide containment, or to remove contaminated material from the site.

o Public has unlimited access to site and adjacent bodies of surface water.

Type of site: Landfill

Estimated size: Extent of fill area on schoolgrounds not known.

Hazardous waste disposal: Confirmed

Type and Quantity of Hazardous Wastes: 3,000 cubic yards of fly ash and BHC cake from Love Canal

Present Owner: Niagara Falls Board of Education

Time Period Site was used: 1954

Types of Samples: Soil, Surface Water, and Groundwater

Remedial Action: None

Status of Legal Action: None

Permits Issued: None

Assessment of Environmental Problems: Contamination of on-site soil and groundwater has occurred. Possible contamination of off-site surface waters, storm sewers, groundwaters, and soil and sediments.

Assessment of Health Problems: Possible exposure of public using the site and adjacent surface water bodies to contaminants. May impact (though extremely limited when compared to contamination sources) on the City of Niagara Falls drinking water supplies.

Persons Completing this Form: Kevin C. Owen, Recra Research, Inc.

Date: June 3, 1983

SELECTED DOCUMENTATION
USED FOR HRS SCORING PURPOSES

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47-15-11(2/80)

HAZARDOUS WASTE DISPOSAL SITES REPORT
NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION

REFERENCE 2

Priority Code: A
Site Code: 932078
Name of Site: 93rd Street School Region: 9
County: Niagara Town/City: (C) Niagara Falls
Street Address: 93rd Street

Status of Site Narrative:

In early 1954, the Niagara Falls Board of Education contracted with W. Kozdranshi to haul fly ash and BHC cake from the Love Canal for fill at this site (3000 cubic yards). The soil at the 93rd Street school has been found to be contaminated with trichlorobenzene and tetrachlorobenzene.

Type of Site: Open Dump ☐ Treatment Pond(s) ☐ Number of Ponds _____
Landfill ☒ Lagoon(s) ☐ Number of Lagoons _____
Structure ☐

Estimated Size _____ Acres

Hazardous Wastes Disposed? Confirmed ☒ Suspected ☐

*Type and Quantity of Hazardous Wastes:

TYPE	QUANTITY (Pounds, drums, tons, gallons)
Fly ash and BHC cake removed from Love Canal	3000 cubic yards
_____	_____
_____	_____
_____	_____

*Use additional sheets if more space is needed.

Name of Current Owner of Site: Niagara Falls Board of Education
 Address of Current Owner of Site: _____

Time Period Site Was Used for Hazardous Waste Disposal:

_____, 19____ To _____, 19____

Is site Active ☐ Inactive ☒

(Site is inactive if hazardous wastes were disposed of at this site and site was closed prior to August 25, 1979)

Types of Samples: Air ☐ Groundwater ☐ None ☐
 Surface Water ☐ Soil ☒

Remedial Action: Proposed ☐ Under Design ☐
 In Progress ☐ Completed ☐

Nature of Action:

Status of Legal Action: _____ State ☐ Federal ☐

Permits Issued: Federal ☐ Local Government ☐ SPDES ☐
 Solid Waste ☐ Mined Land ☐ Wetlands ☐ Other ☐

Assessment of Environmental Problems:

Soil contamination has occurred. Potential for ground and surface water contamination. Additional sampling may be needed to verify extent of contamination.

Assessment of Health Problems:

Persons Completing this Form:

G. D. Knowles

Ronald Tramontano

New York State Department of Environmental Conservation
 Date April 16, 1980

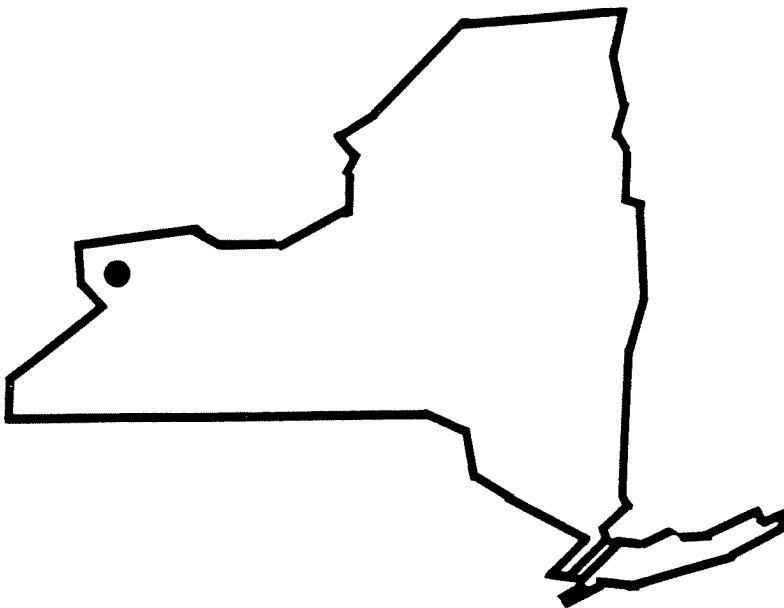
New York State Department of Health
 Date April 16, 1980

REFERENCE 3

A Special Report to the
Governor & Legislature

LOVE

CANAL



Report prepared by:

NEW YORK STATE DEPARTMENT OF HEALTH

David Axelrod, M.D. Commissioner

OFFICE OF PUBLIC HEALTH

Glenn E. Haughe, M.D., Director

DIVISION OF LABORATORIES & RESEARCH

DIVISION OF EPIDEMIOLOGY

DIVISION OF ENVIRONMENTAL HEALTH

OFFICE OF COUNSEL



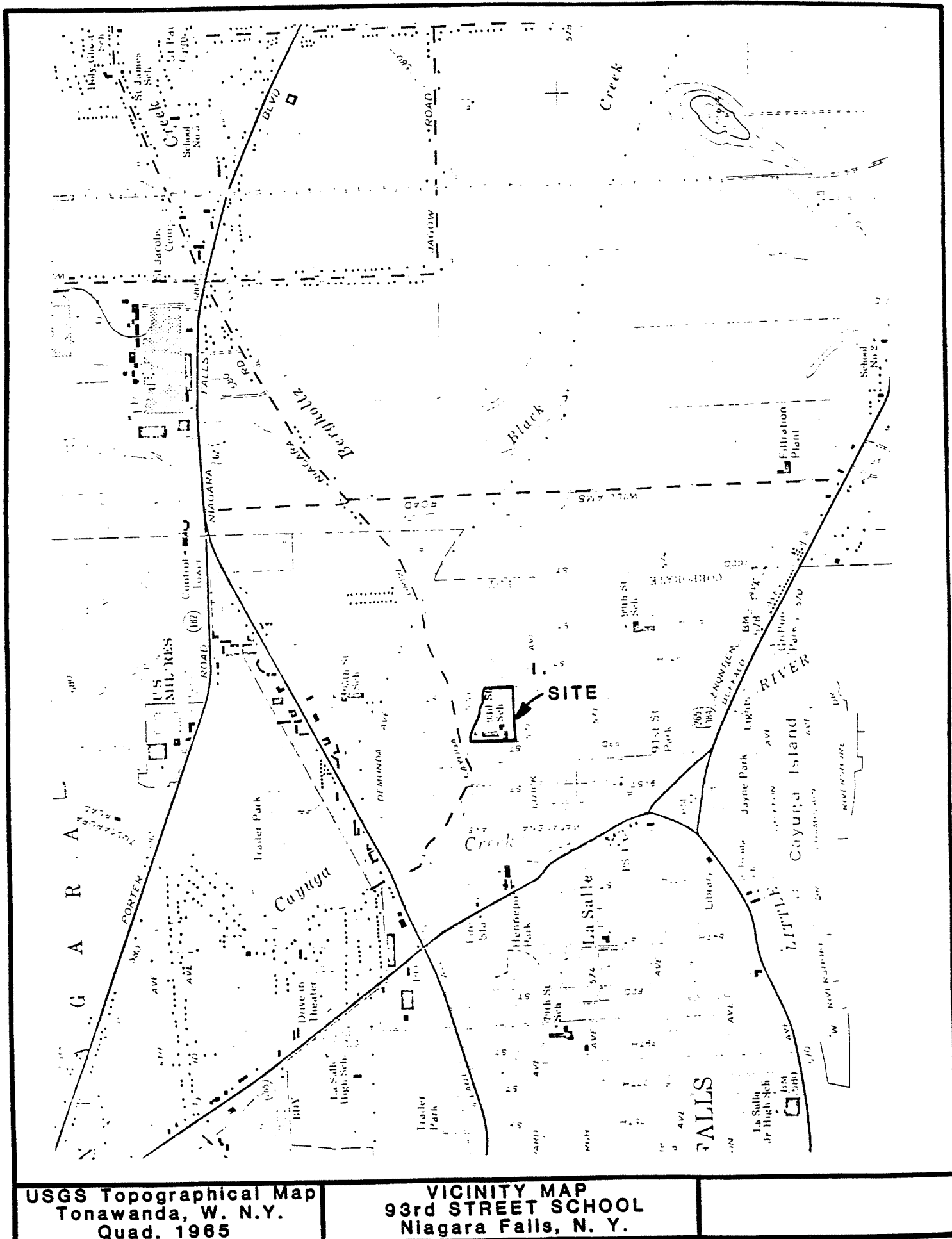
With assistance of:

NYS DEPARTMENT OF TRANSPORTATION

William C. Hennessy, Commissioner

NYS DEPARTMENT OF ENVIRONMENTAL CONSERVATION

Robert F. Flacke, Commissioner



REF.5 Kindle, E. and F. Taylor, "Niagara, New York," Geol. Atlas of the United States, U.S. Geol. Survey, Folio 190, 1913. Available at SUNY at Buffalo library, Capen Hall, Amherst, NY 14226.

REF.6 Johnston, R. H., "Groundwater in the Niagara Falls Area, New York,"
N.Y. Water Res. Comm. Bull. 6W-53, 1964. Available at JEB Consultant,
506 Linwood Avenue, Buffalo, NY 14209.

REFERENCE 7

Note Bergholtz Creek Nearby

EPA - 600/4-82-030a May, 1982
600/4-82-030b Vol. II May, 1982

Environmental Monitoring at Love Canal Vol. I
Map p. 10 93rd Street School in upper NW portion of Area 2 graphic
P. 31 Geol. Lockport Dolomite overlain by till and clay
P. 51 overburden installations #02025, 02026, 02027, 02049, 02057, 01011
in area of 93rd Street School
overburden monitoring wells - "A" wells
Ground H₂O Model in "Final Report on Groundwater Flow Modeling Study of the
Love Canal, New York" from NTIS
"B" wells in bedrock #02025, 02026, 02027, 02049, 01011
P. 50 Rochester Shale beneath Lockport Dolomite
20-45 feet of overburden; till (1-5),
Lake P. 51 till perm approximately 1×10^{-7} cm/sec
Dana clay, silt and fine sand over till (6-29') (perm approximately 1×10^{-8} cm/sec)
Lake Tonawanda above
P. 55 geol. column
P. 69 reg. Lock Dol Potentiometric Surface, flow to S overburden
P. 80 Trace Benzene (<20 µg/l), trace toluene (<25 µg/l)
P. 82 FBHC (NT)
P. 84-86 bedrock trace benzene (<5 µg/l), trace toluene (<10 µg/l) (NT) *BHC
P. 93 soil samples benzene 1st (NT), 2nd trace benzene (<25 µg/kg), *BHCNT
P. 96* (Cd 1200-1700 µg/kg) core sample from upper 6'
P. 115 storm sewer 93rd & Luick γBHC (79 µg/kg)
P. 117 Bergholtz Creek - E of school trace benzene and 45 µg/kg (2nd site)
water trace toluene (<35 µg/l); sediment 15 & 63 µg/g toluene water trace
γBHC, sed. γBHC (21 & 6325 µg/kg)
report relates contain to Love Canal P. 123

REF. 7

EPA-600/4-82-030 a
May 1982

ENVIRONMENTAL MONITORING AT LOVE CANAL

Volume I

Office of Research and Development
U.S. Environmental Protection Agency
401 M Street, S.W.
Washington, D.C. 20460

program are presented. Additional surface water and stream sediment figures are presented in Volume III. In Figure 43 the results obtained for benzene in stream sediment samples are presented; in Figures 44 and 45 the results for toluene are presented for water and sediment samples, respectively; and in Figures 46 and 47, the results for α -BHC are presented. As can be seen in these figures, clear evidence of Love Canal-related contamination was found in Black Creek at, and downstream from, the 96th Street storm sewer outfall in the creek (sites 04015 and 04016). Because a Canal Area-related storm sewer outfall in Black Creek is also located in the underground portion of the creek between 101st and 102nd Streets, the closest point to the outfall that could be sampled was located downstream where Black Creek surfaces near 98th Street (site 04014). At this site too, evidence of Love Canal-related contamination was found. Specific details of the results obtained may be found in Volume II.

The evidence obtained near the 102nd Street outfall (site 97543) was also suggestive of the transport of contaminants from Love Canal. However, due to the proximity of the 102nd Street landfill, it was not possible to identify the contamination present at the site as due totally to the direct migration of contaminants from Love Canal. In particular, substantial concentration levels of identical contaminants were found in sediment samples collected upstream from the outfall. In passing, it should be noted that contaminated sediment was also found in both Cayuga Creek and the Little Niagara River. Given the limited evidence identifying the existence of mechanisms for the direct migration of Love Canal-related contaminants to these waterways, it cannot be concluded unequivocally that the source of contamination is Love Canal.

Before concluding this portion of the report, it may be useful to review the major results obtained thus far. To begin with, a clear, consistent pattern of ground-water, soil, and sump contamination was found in certain ring 1 residences. In addition, both the sanitary and storm sewer lines constructed immediately adjacent to Love Canal were found to be contaminated and were continuing to contribute to the distant transport of contaminants from Love Canal. Finally, the evidence obtained also suggested that creeks and rivers in the immediate vicinity of Love Canal-related storm sewer outfalls, and for some undetermined distance downstream from those outfalls, were contaminated by the direct migration of contaminants from the former canal through the storm sewer system.

4.2.6 Air Contamination

The air monitoring program was designed to determine the spatial and temporal variability in airborne contamination caused by

pollutants migrating from the former canal. To accomplish this goal, the selection of a sufficient number of air monitoring sites and sampling periods had to be balanced against time, budgetary, and logistical constraints. Consequently, a sampling design was selected for air monitoring purposes that involved partitioning the Declaration Area into homogeneous units (Figure 4). The sampling area scheme adopted was intended to categorize the residences of the Declaration Area according to characteristics that may have been related to the migration of contaminants from Love Canal, including distance and direction from the Canal Area, and proximity to local creeks (Figure 3). In addition, criteria established for the selection of specific residences within each sampling area included the following: (1) adjacency to known former swales; (2) adjacency to historically wet or dry areas (that is, areas where standing water tended to accumulate); and (3) all sites had to be unoccupied throughout the duration of the study period.

A total of 61 sites in the Declaration and Canal Areas, and 4 control sites, were selected for regular air monitoring purposes (Figure 48). The air monitoring control sites were: site 99020, located on Stony Point Road, Grand Island; site 99021, located on West River Parkway, Grand Island; site 99022, located on Pierce Road, Niagara Falls; and site 99023, located on Packard Road, Niagara Falls. At each of the regular air monitoring sites, up to 13 daytime air sampling campaigns (consisting of integrated 12-hour sampling periods) were conducted. Three special air monitoring research studies, an air pollutant transport study, a sump/basement-air study and an occupied/unoccupied study were also conducted at Love Canal. The data from these special studies are included in Volume II, but are not considered in detail in this report.

Prior to the initiation of the air monitoring program, each sampling site was cleared of certain household items, such as cleaning products, aerosol cans, and all other organic consumer products, and was forced-air ventilated for 4 hours. Throughout the duration of the study, all entry points in each air monitoring residence were secured with evidence tape, and doors were padlocked to prohibit unauthorized entrance and potential tampering with sampling equipment.

It should be pointed out that the sampling design used for indoor air monitoring purposes was based, in part, on the results obtained from previous air monitoring studies conducted by various organizations at Love Canal. These previous studies suggested that (among other things) relatively large variations in day-to-day indoor air pollutant concentration levels were likely to be observed, and that such variations were likely to be caused by a number of factors. For example, variability in indoor air pollutant concentration levels could be influenced by: (1) rapid

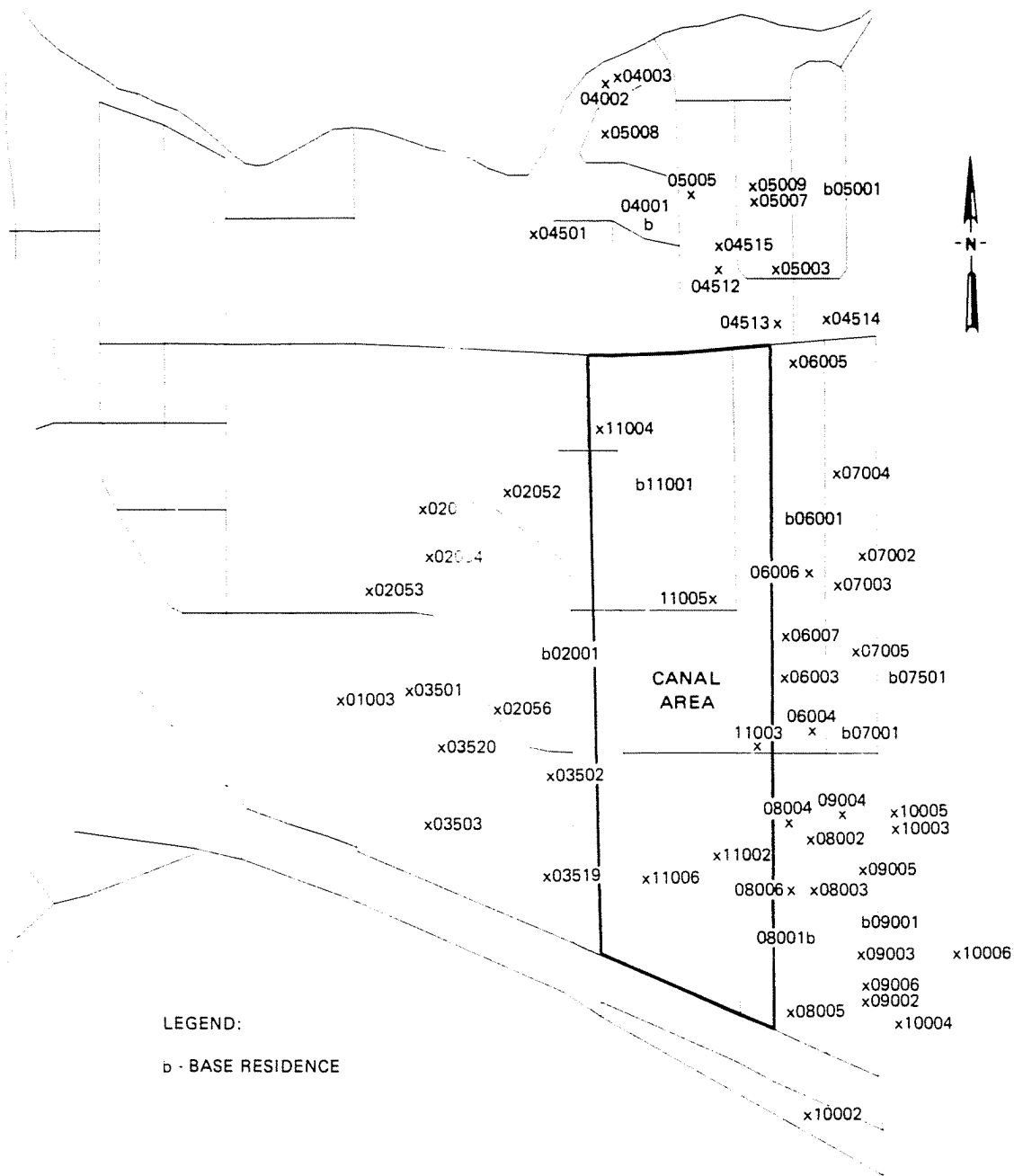


Figure 48. Air Sampling Site Codes.

fluctuations in ambient concentrations; (2) the use or presence of certain consumer products in a residence (particularly when occupied residences are sampled); and (3) differences in the sampling and analytical methodologies used for monitoring purposes. The air monitoring program employed at Love Canal was designed specifically to minimize the confounding effects of these types of problems.

Three different sampling devices were used to collect air samples in the Love Canal area. For suspended particulates, high-volume (HIVOL) samplers employing glass fiber filters were used. The relative volatility of organic vapor phase compounds required the use of two solid sorbents for monitoring purposes. The more volatile compounds were collected on TENAX; polyurethane foam (PFOAM) was used to collect semivolatile compounds in air and to monitor for 2,3,7,8-TCDD. (See Section 4.3.5). Appendix A of this Volume lists those compounds and elements for which air analyses were performed.

High-volume samplers were operated for 24 hours at a flow rate of 50 cubic feet per minute. TENAX samplers were operated for 12-hour sampling periods at a flow rate of 30 cubic centimeters per minute, and polyurethane foam samplers were also operated for 12 hours, but at a flow rate of 1,250 cubic centimeters per minute. On each of the 13 regular daytime sampling periods, all samplers were started at 6 a.m. TENAX and PFOAM sampling periods ended at 6 p.m.; the high-volume samplers continued until 6 a.m. the following day. A total of three nighttime 12-hour sampling periods, immediately preceding regularly scheduled daytime campaigns, were also conducted at some sites. Nighttime sampling began at 6 p.m. and lasted until 6 a.m.; the regular 12-hour daytime samples were collected immediately following the night samples. As a result of this sampling schedule there were three occasions in the study for which night/day comparisons and estimates of 24-hour concentrations could be obtained. The findings of the night/day air pollution comparisons study revealed that no significant differences were observed.

In nine residences, referred to as base residences, multimedia environmental monitoring was performed. In each base residence three different air monitoring locations were sampled simultaneously. The purpose of this design was to permit an overall estimate of indoor pollutant levels and to identify potential pollutant entrance sources. One sampling location, the basement, was intended to permit estimation of the concentration levels of organic compounds potentially evaporating from the sump and through foundations walls. Duplicate samples were collected at a second sampling location, the first floor living area, was intended to permit estimation of pollutant levels occurring in the most commonly occupied area of the residence, and for quality assurance purposes. And finally, a sampling location immediately outside the residence, just above ground level, was selected to

permit estimation of ambient concentration levels of monitored substances. All three sampling locations at base residences contained both TENAX and PFOAM samplers. The outside site also contained a HIVOL sampler. The remaining residences in each sampling area, and the four control area homes, were sampled only in the living area.

In Table 10, the statistically significant results obtained from the air monitoring program are presented. More extensive tabulations of air monitoring data, describing the extent and degree of air contamination found in the general Love Canal area, are presented in Volume III of this report.

As can be seen from the results presented in Table 10, the extent of indoor air contamination in the Declaration Area was significantly ($\alpha=0.10$, one-tailed) greater than at control sites for o-chlorotoluene (in living area samples), and o-dichlorobenzene (also in living area samples). It can also be seen in Table 10 that the only other statistically significant difference found was for chlorobenzene in living area air samples, comparing the Canal Area to the Declaration Area.

The reader is cautioned to interpret these few significant results carefully, and to consider the following points. First, apart from three compounds, detection percentages were low overall. For the three compounds detected most frequently, benzene, toluene, and 1,1,2,2-tetrachloroethylene, a known contamination problem (described in Appendix E) associated with the sampling collection medium TENAX was observed (detection percentages for these compounds on TENAX were, respectively, 95, 86, and 77 percent). Second, relatively high detection percentages should not be equated with the occurrence of relatively high concentration levels. Third, the detection percentages were not found to display any consistent patterns of spatial variability (for example, increased detection was not related to decreased distance from Love Canal). (See Volume III for appropriate tables). Fourth, due to the large number of sequential statistical comparisons that were performed, care must be exercised (because of increased Type I errors) in the interpretation of the few results observed that satisfied a nominal level of significance. Finally, the lack of internal consistency (Table 10) exhibited by the few significant results obtained suggests that these outcomes may be due to chance.

In order to characterize the degree of air contamination found in the Declaration and Canal Areas, the monitoring data were subjected to a number of different statistical analyses. First, at each site the maximum observed concentrations (across all sampling campaigns) of the organic compounds monitored were determined according to source (that is, TENAX or PFOAM) and location. Second, the concentration levels of the organic

compounds monitored at each site were reviewed (according to sampling campaign) for temporal trends. Third, the median concentrations of the organic compounds monitored at each site were computed according to source and location. And finally, the median concentrations of the organic compounds monitored at each site were computed according to sampling campaign. Because quantifiable results for organic compounds monitored on PFOAM were so infrequent, they are not presented in this report. The reader interested in the results obtained from both PFOAM and HIVOL monitoring should consult Volume III for details.

The remainder of this section discusses the air monitoring results for the three most frequently detected compounds; benzene, toluene, and 1,1,2,2-tetrachloroethylene. It should be noted once again that these three compounds are known contaminants of the collection medium TENAX, and therefore must be interpreted in the context of the discussion presented in Appendix E (especially in Table E-4). No other organic compounds were detected frequently enough to permit additional discussion.

To illustrate the results obtained, the maximum concentrations of benzene obtained from air monitoring conducted at each site, across all regular air monitoring campaigns, are presented (respectively) for outside, living area, and basement air monitoring locations in Figures 49 through 51. Additional figures of maximum air pollutant concentrations (for selected compounds) are presented in Volume III. In Table 11, the three highest concentrations of certain organic compounds found in air are reported according to sampling location, and by Declaration, Control, and Canal Areas.

A review of the results presented in Figures 49 through 51, the values reported in Table 11, and the additional tables and figures presented in Volume III, revealed that no consistent patterns were found in the maximum values of air contaminants which could be directly attributed to the migration of those compounds from Love Canal. In light of the findings presented in Section 4.1 and other portions of Section 4.2, and the remedial actions performed at the site, these results are consistent with the implications of the hydrogeologic program and the other data obtained from the monitoring program.

Even though maximum concentration levels are often of considerable interest to individuals, because in some way they may be thought to represent "worst case" estimates of environmental contamination, problems of statistical interpretation exist. Such problems exist because both the occurrence and the reliability of the obtained maximum values may be plagued by measurement problems. To illustrate this point, it is often the case that maximum



Figure 49. Outside Air Sampling Sites, Benzene, Maximum Concentrations (micrograms per cubic meter).

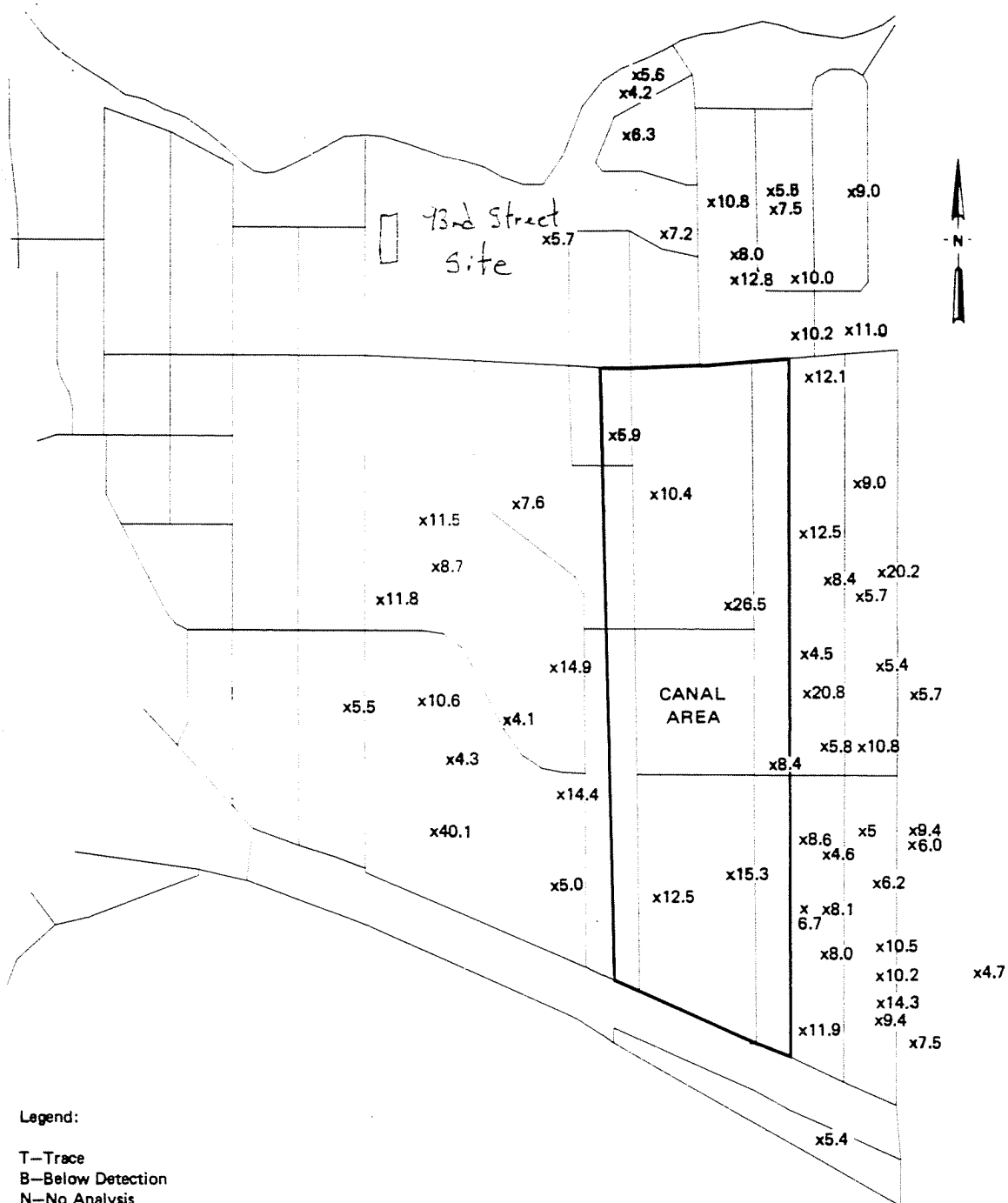


Figure 50. Living Area Air Sampling Sites, Benzene, Maximum Concentrations (micrograms per cubic meter).



Figure 51. Basement Air Sampling Sites, Benzene, Maximum Concentrations (micrograms per cubic meter).

concentrations are reported by only one analytical laboratory and on one particular date, whereas other analytical laboratories may not report concentration levels anywhere near such maxima (and in some cases do not even report concentration levels above the limit of detection).

With this caveat aside, the reader may still choose to cautiously compare the values reported in Table 11 to the existing air pollution standards and recommended work-place limits identified in Appendix B of this Volume. Such a comparison reveals that the maximum concentrations observed at Love Canal were often orders of magnitude less than the corresponding workplace standards and recommended exposure limits. However, it must be acknowledged that the applicability of comparing workplace standards and limits (even after conservative adjustments are attempted) to residential exposure levels is unknown.

The air monitoring data obtained from Love Canal were also reviewed from a temporal (that is, sampling campaign) perspective. Typical examples of the results obtained from this effort, once again for benzene, are presented in Figures 52 and 53. In these two figures, the individual air monitoring results obtained from living area air samples collected in all Canal Area and control sites sampled are presented in conjunction with the sampling campaign date.

As can be seen from the results displayed in Figures 52 and 53, some variability in concentration levels was observed across time. However, most of the variability observed in the sample results could be accounted for by measurement errors. On the basis of other statistical analyses conducted with these data, no significant functional relationships were observed between the obtained concentration levels and such factors as distance from Love Canal, wet/dry residences, proximity to a former swale, diurnal/nocturnal sampling, and sampling campaign. In addition, the infrequent occurrence and isolation of the (relatively) extreme values present in the data displayed in Figures 52 and 53 should be noted.

The air monitoring data obtained from Love Canal were also considered in terms of the median concentration values that were observed. At each site regularly monitored, the median concentration value of all measurements for each substance monitored was determined. Three typical examples of the results obtained from this effort are presented in Figures 54 through 56. In these figures, the living area median concentrations for benzene, toluene, and 1,1,2,2-tetrachloroethylene (respectively) are displayed for each air site regularly monitored. As can be seen from the results displayed in Figures 54 through 56, no pattern of air contamination that was directly related to the migration of these compounds from Love Canal was found (highest median concentrations are indicated in the figures).

CHAPTER X DIVISION OF WATER RESOURCES

ARTICLE 2

Classifications and Standards of Quality and Purity

PART

- 700 Tests or Analytical Determinations**
- 701 Classifications and Standards of Quality and Purity**
- 702 Special Classifications and Standards**
- 703 Ground Water Classifications, Quality Standards and Effluent Standards and/or Limitations**
- 704 Criteria Governing Thermal Discharges**

PART 700**TESTS OR ANALYTICAL DETERMINATIONS**

(Statutory authority: Environmental Conservation Law, § 17-0303)

Sec.
700.1 Collection of samples

Sec.
700.2 Tests or analytical determinations

Historical Note

Part repealed, new filed Apr. 28, 1972; Feb. 25, 1974 eff. 30 days after being filed with the Secretary of State provided, however, if the application, pursuant to Parts 800 to 941 inclusive of Title 6, of any provision of Parts 701 or 702 shall be found to be invalid, the corresponding provision of

Parts 701 or 702 in effect immediately prior to such effective date shall be deemed not to have been repealed and shall remain in effect until such time as the provision, the application of which was found to be invalid, can lawfully be made applicable.

Section 700.1 Collection of samples. In making any tests of analytical determinations to determine compliance or non-compliance of sewage, industrial wastes or other waste discharges with established standards, samples shall be collected in such manner and at such locations as are approved by the commissioner. In approving such locations the commissioner shall be guided by the fact that

- (a) there must be prompt mixing of the discharge with the receiving waters;
- (b) that the mixing will not interfere with biological communities to a degree which is damaging to the eco-system;
- (c) that the mixing will not diminish other beneficial uses disproportionately.

Historical Note

Sec. repealed, new filed Apr. 28, 1972; Feb. 25, 1974 eff. 30 days after being filed with the Secretary of State provided, however, if the application, pursuant to Parts 800 to 941 inclusive of Title 6, of any provision of Parts 701 or 702 shall be found to be invalid, the corresponding provision of

Parts 701 or 702 in effect immediately prior to such effective date shall be deemed not to have been repealed and shall remain in effect until such time as the provision, the application of which was found to be invalid, can lawfully be made applicable.

700.2 Tests or analytical determinations. Tests or analytical determinations to determine compliance or non-compliance with standards shall be made in accordance with the latest edition of (a) *Standard Methods for the Examination of Water and Wastewater** prepared by American Public Health Association (APHA), American Water Works Association (AWWA), and Water Pollution Control Federation (WPCF); (b) *Methods for Chemical Analysis of Water and Wastes** prepared by Environmental Protection Agency (EPA); (c) *Water Standards of the American Society for Testing and Materials** (ASTM); or (d) by other methods approved by the commissioner and the administrator as giving results equal to or superior to methods listed in any of the other documents.

Historical Note

Sec. repealed, new filed Apr. 28, 1972; Feb. 25, 1974 eff. 30 days after being filed with the Secretary of State provided, however, if the application, pursuant to Parts 800 to 941 inclusive of Title 6, of any provision of Parts 701 or 702 shall be found to be invalid, the corresponding provision of

Parts 701 or 702 in effect immediately prior to such effective date shall be deemed not to have been repealed and shall remain in effect until such time as the provision, the application of which was found to be invalid, can lawfully be made applicable.

* [Not filed with the Department State.]

PART 701

CLASSIFICATIONS AND STANDARDS OF QUALITY AND PURITY

(Statutory authority: Environmental Conservation Law, §§ 15-0313, 17-0301)

Sec.	Sec.
701.1 Definitions	701.4 Classes and standards for fresh surface waters
701.2 Conditions applying to all classifications and standards	701.5 Classes and standards for saline surface waters
701.3 Class N	

Historical Note

Part repealed, new filed Apr. 28, 1972; Feb. 25, 1974 eff. 30 days after being filed with the Secretary of State provided, however, if the application, pursuant to Parts 800 to 941 inclusive of Title 6, of any provision of Parts 701 or 702 shall be found to be invalid, the corresponding provision of

Parts 701 or 702 in effect immediately prior to such effective date shall be deemed not to have been repealed and shall remain in effect until such time as the provision, the application of which was found to be invalid, can lawfully be made applicable.

Section 701.1 Definitions. The terms, words or phrases used in Parts 700, 701, 702 and 704 of this Title shall have the following meaning.

(a) *Commissioner* shall mean the Commissioner of the Department of Environmental Conservation.

(b) *Administrator* shall mean the Administrator of the United States Environmental Protection Agency.

(c) *Best usage of waters* as specified for each class shall be those uses as determined by the commissioner and the administrator in accordance with the considerations prescribed by the Environmental Conservation Law and Public Law 92-500.

(d) *Approved treatment* as applied to water supplies shall mean treatment accepted as satisfactory by the authorities responsible for exercising supervision over the sanitary quality of water supplies.

(e) *Source of water supply for drinking, culinary or food processing purposes* shall mean any source, either public or private, the waters from which are used for domestic consumption or used in connection with the processing of milk, beverages or foods. (When water is taken for public drinking, culinary or food processing purposes, refer to New York State Department of Health regulations—10 NYCRR Part 170).

(f) *Primary contact recreation* shall mean recreational activities where the human body may come in direct contact with raw water to the point of complete body submergence. Such uses include swimming, diving, water skiing, skin diving and surfing.

(g) *Secondary contact recreation* shall mean recreational activities where contact with the water is minimal and where ingestion of the water is not probable. Such uses include but are not limited to fishing and boating.

(h) *Saline surface waters* shall mean all waters which are so designated by the commissioner.

(i) *International boundary waters* shall mean those waters to which the water quality standards developed and adopted pursuant to the Boundary Water Treaty of 1909 and the Great Lakes Quality Agreement of 1972 apply.

(j) *Sewage, industrial waste and other wastes* shall have the meanings given in section 17-0105 of the Environmental Conservation Law.

(k) *Estuary* shall mean the tidal portion of a river or stream.

(l) A *thermal discharge* is one which results or would result in a temperature change of the receiving water.

(m) *Heat of artificial origin* shall mean all heat from other than natural sources including, but not limited to, cumulative effects of multiple and proximate thermal discharges.

(n) *Coastal waters* shall mean those marine waters within the territorial limits of the State other than estuaries and enclosed bays. Long Island Sound is designated as coastal waters for the purposes of thermal discharges.

(o) *Enclosed bays* shall mean those marine waters within the territorial limits of New York State, other than coastal waters or estuaries, in which exchange of sea water is severely limited by barrier beaches. For the purposes of thermal discharges, the following are designated as enclosed bays: Jamaica Bay, Hempstead Bay, Great South Bay, Moriches Bay, Shinnecock Bay and Mecox Bay.

Historical Note

Sec. repealed, new filed Apr. 23, 1972; Feb. 25, 1974 eff. 30 days after being filed with the Secretary of State provided, however, if the application, pursuant to Parts 800 to 941 inclusive of Title 6, of any provision of Parts 701 or 702 shall be found to be invalid, the corresponding provision of

Parts 701 or 702 in effect immediately prior to such effective date shall be deemed not to have been repealed and shall remain in effect until such time as the provision, the application of which was found to be invalid, can lawfully be made applicable.

701.2 Conditions applying to all classifications and standards. (a) In any case where the waters into which sewage, industrial wastes or other wastes effluents discharge are assigned a different classification than the waters into which such receiving waters flow, the standards applicable to the waters which receive such sewage or wastes effluents shall be supplemented by the following: "The quality of any waters receiving sewage, industrial wastes or other wastes discharges shall be such that no impairment to the best usage of waters in any other class shall occur by reason of such sewage, industrial wastes or other wastes discharges."

(b) Natural waters may on occasion have characteristics outside of the limits established by the standards. The standards adopted herein relate to the condition of waters as affected by the discharge of sewage, industrial wastes or other wastes.

Historical Note

Sec. repealed, new filed Apr. 23, 1972; Feb. 25, 1974 eff. 30 days after being filed with the Secretary of State provided, however, if the application, pursuant to Parts 800 to 941 inclusive of Title 6, of any provision of Parts 701 or 702 shall be found to be invalid, the corresponding provision of

Parts 701 or 702 in effect immediately prior to such effective date shall be deemed not to have been repealed and shall remain in effect until such time as the provision, the application of which was found to be invalid, can lawfully be made applicable.

701.3 Class N. Best usage of waters. Enjoyment of water in its natural condition and where compatible, as source of water for drinking or culinary purposes, bathing, fishing and fish propagation, recreation and any other usages except for the discharge of sewage, industrial wastes or other wastes or any sewage or waste effluent.

Quality Standards for Class "N" Waters

Items	Specifications
1. Sewage, industrial wastes, or other wastes, waste effluents or any sewage effluents not having had filtration resulting from at least 200 feet* of lateral travel through unconsolidated earth.	None

* A greater distance may be required if an inspection shows that due to peculiar geological conditions this distance is inadequate to protect the water from pollution.

*Items**Specifications*

2. Deleterious substances, hydrocarbons, substances which would contribute to eutrophication or surface runoff containing any of such substances.

None

Historical Note

Sec. amd. filed May 26, 1967; repealed, new filed Apr. 28, 1972; Feb. 25, 1974 eff. 30 days after being filed with the Secretary of State provided, however, if the application, pursuant to Parts 800 to 941 inclusive of Title 6, of any provision of Parts 701 or 702 shall be found to be invalid, the

corresponding provision of Parts 701 or 702 in effect immediately prior to such effective date shall be deemed not to have been repealed and shall remain in effect until such time as the provision, the application of which was found to be invalid, can lawfully be made applicable.

Decisions**1. Quality standards—judicial notice**

Held in a proceeding to review a determination of the Commissioner of Environmental Conservation ordering petitioner to either replace existing sewage treatment facilities or discontinue discharge of sewage into a class "D" creek, that the Court may take judicial notice of the Official Compilation of Codes, Rules and Regulations of the State of New York (CPLR 4511, subd. [a]).

Thus where the quality standards for class "D" waters were officially established (6 NYCRR 701.3) and the creek was officially classified as class "D" (6 NYCRR 876.2[h] [i]) petitioner's contention that there was no legal proof the creek in question was so classified was without merit. *Matter of Wilco Props. Corp. v. Department of Environmental Conservation of the State of N. Y.*, 39 AD 2d 6 (1972).

701.4 Classes and standards for fresh surface waters. The following items and specifications shall be the standards applicable to all New York fresh waters which are assigned the classification of AA, A, B, C, or D, in addition to the specific standards which are found in this section under the heading of each such classification.

Quality Standards for Fresh Surface Waters*Items**Specifications*

1. Turbidity
No increase except from natural sources that will cause a substantial visible contrast to natural conditions. In cases of naturally turbid waters, the contrast will be due to increased turbidity.
2. Color
None from man-made sources that will be detrimental to anticipated best usage of waters.
3. Suspended, colloidal or settleable solids.
None from sewage, industrial wastes or other wastes which will cause deposition or be deleterious for any best usage determined for the specific waters which are assigned to each class.
4. Oil and floating substances.
No residue attributable to sewage, industrial wastes or other wastes nor visible oil film nor globules of grease.
5. Taste and odor-producing substances, toxic wastes and deleterious substances.
None in amounts that will be injurious to fishlife or which in any manner shall adversely affect the flavor, color or odor thereof, or impair the waters for any best usage as determined for the specific waters which are assigned to each class.
6. Thermal discharges.
(See Part 704 of this Title.)

CLASS "AA"

Best usage of waters. Source of water supply for drinking, culinary or food processing purposes and any other usages.

Conditions related to best usage of waters. The waters, if subjected to approved disinfection treatment, with additional treatment if necessary to remove naturally present impurities, will meet New York State Department of Health drinking water standards and will be considered safe and satisfactory for drinking water purposes.

Quality Standards for Class "AA" Waters

Items	Specifications
1. Coliform	The monthly median coliform value for one hundred ml of sample shall not exceed fifty (50) from a minimum of five examinations and provided that not more than twenty percent of the samples shall exceed a coliform value of two hundred forty (240) for one hundred ml of sample.
2. pH	Shall be between 6.5 and 8.5
3. Total Dissolved Solids	Shall be kept as low as practicable to maintain the best usage of waters, but in no case shall it exceed 500 milligrams per liter.
4. Dissolved Oxygen	For cold waters suitable for trout spawning, the DO concentration shall not be less than 7.0 mg/l from other than natural conditions. For trout waters, the minimum daily average shall not be less than 6.0 mg/l. At no time shall the DO concentration be less than 5.0 mg/l. For non-trout waters, the minimum daily average shall not be less than 5.0 mg/l. At no time shall the DO concentration be less than 4.0 mg/l.
5. Phenolic compounds	Shall not be greater than 0.001 milligrams per liter (Phenol).
6. Radioactivity	
a. Gross Beta	Shall not exceed 1,000 picocuries per liter in the absence of Sr ⁹⁰ and alpha emitters.
b. Radium 226	Shall not exceed 3 picocuries per liter.
c. Strontium 90	Shall not exceed 10 picocuries per liter.

Note 1: With reference to certain toxic substances affecting fish-life, the establishment of any single numerical standard for waters of New York State would be too restrictive. There are many waters, which because of poor buffering capacity and composition will require special study to determine safe concentrations of toxic substances. However, most of the non-trout waters near industrial areas in this State will have an alkalinity of 80 milligrams per liter or above. Without considering increased or decreased toxicity from possible combinations, the following may be considered as safe stream concentrations for certain substances to comply with the above standard for this type of water. Waters of lower alkalinity must be specifically considered since the toxic effect of most pollutants will be greatly increased.

Ammonia or
Ammonium
Compounds

Not greater than 2.0 milligrams per liter expressed as NH₃ at pH of 8.0 or above.

Cyanide	Not greater than 0.1 milligrams per liter expressed as CN.
Ferro—or Ferricyanide	Not greater than 0.4 milligrams per liter expressed as Fe(CN) ₆ .
Copper	Not greater than 0.2 milligrams per liter expressed as Cu.
Zinc	Not greater than 0.3 milligrams per liter expressed as Zn.
Cadmium	Not greater than 0.3 milligrams per liter expressed as Cd.

CLASS "A"

Best usage of waters. Source of water supply for drinking, culinary or food processing purposes and any other usages.

Conditions related to best usage of waters. The waters, if subjected to approved treatment equal to coagulation, sedimentation, filtration and disinfection, with additional treatment if necessary to reduce naturally present impurities will meet New York State Department of Health drinking water standards and will be considered safe and satisfactory for drinking water purposes.

Quality Standards for Class "A" Waters

<i>Items</i>	<i>Specifications</i>
1. Coliform	The monthly median coliform value for one hundred ml of sample shall not exceed five thousand from a minimum of five examinations and provided that not more than twenty percent of the samples shall exceed a coliform value of twenty thousand for one hundred ml of sample and the monthly geometric mean fecal coliform value for one hundred ml of sample shall not exceed two hundred (200) from a minimum of five examinations.
2. pH	Shall be between 6.5 and 8.5.
3. Total Dissolved Solids	Shall be kept as low as practicable to maintain the best usage of waters, but in no case shall it exceed 500 milligrams per liter.
4. Dissolved Oxygen	For cold waters suitable for trout spawning, the DO concentration shall not be less than 7.0 mg/l from other than natural conditions. For trout waters, the minimum daily average shall be not less than 6.0 mg/l. At no time shall the DO concentration be less than 5.0 mg/l. For non-trout waters, the minimum daily average shall not be less than 5.0 mg/l. At no time shall the DO concentration be less than 4.0 mg/l.
5. Phenolic Compounds	Shall not be greater than 0.005 milligrams per liter (Phenol).

<i>Items</i>	<i>Specifications</i>
6. Radioactivity	
a. Gross Beta	Shall not exceed 1,000 picocuries per liter in the absence of Sr ⁹⁰ and alpha emitters.
b. Radium 226	Shall not exceed 3 picocuries per liter.
c. Strontium 90	Shall not exceed 10 picocuries per liter.

Note 1: Refer to Note 1 under Class "AA" which is also applicable to Class "A" standards.

CLASS "B"

Best usage of waters. Primary contact recreation and any other uses except as a source of water supply for drinking, culinary or food processing purposes.

Quality Standards for Class "B" Waters

<i>Items</i>	<i>Specifications</i>
1. Coliform	The monthly median coliform value for one hundred ml of sample shall not exceed two thousand four hundred from a minimum of five examinations and provided that not more than twenty percent of the samples shall exceed a coliform value of five thousand for one hundred ml of sample and the monthly geometric mean fecal coliform value for one hundred ml of sample shall not exceed two hundred (200) from a minimum of five examinations. This standard shall be met during all periods when disinfection is practiced.
2. pH	Shall be between 6.5 and 8.5.
3. Total Dissolved Solids	None at concentrations which will be detrimental to the growth and propagation of aquatic life. Waters having present levels less than 500 milligrams per liter shall be kept below this limit.
4. Dissolved Oxygen	For cold waters suitable for trout spawning, the DO concentration shall not be less than 7.0 mg/l from other than natural conditions. For trout waters, the minimum daily average shall not be less than 6.0 mg/l. At no time shall the DO concentration be less than 5.0 mg/l. For non-trout waters, the minimum daily average shall not be less than 5.0 mg/l. At no time shall the DO concentration be less than 4.0 mg/l.

Note 1: Refer to Note 1 under Class "AA" which is also applicable to Class "B" standards.

CLASS "C"

Best usage of waters. Suitable for fishing and all other uses except as a source of water supply for drinking, culinary or food processing purposes and primary contact recreation.

Quality Standards for Class "C" Waters

<i>Items</i>	<i>Specifications</i>
1. Coliform	The monthly geometric mean total coliform value for one hundred ml of sample shall not exceed ten thousand and the monthly geometric mean fecal coliform value for one hundred ml of sample shall not exceed two thousand from a minimum of five examinations. This standard shall be met during all periods when disinfection is practiced.
2. pH	Shall be between 6.5 and 8.5
3. Total Dissolved Solids	None at concentrations which will be detrimental to the growth and propagation of aquatic life. Waters having present levels less than 500 milligrams per liter shall be kept below this limit.
4. Dissolved Oxygen	For cold waters suitable for trout spawning, the DO concentration shall not be less than 7.0 mg/l from other than natural conditions. For trout waters, the minimum daily average shall not be less than 6.0 mg/l. At no time shall the DO concentration be less than 5.0 mg/l. For non-trout waters, the minimum daily average shall not be less than 5.0 mg/l. At no time shall the DO concentration be less than 4.0 mg/l.

Note 1: Refer to Note 1 under Class "AA" which is also applicable to Class "C" standards.

CLASS "D"

Best usage of waters. These waters are suitable for secondary contact recreation, but due to such natural conditions as intermittency of flow, water conditions not conducive to propagation of game fishery or stream bed conditions, the waters will not support the propagation of fish.

Conditions related to best usage of waters. The waters must be suitable for fish survival.

Quality Standards for Class "D" Waters

<i>Items</i>	<i>Specifications</i>
1. pH	Shall be between 6.0 and 9.5.
2. Dissolved Oxygen	Shall not be less than 3 milligrams per liter at any time.

Note: Refer to Note 1 under Class "AA" which is also applicable to Class "D" standards.

Historical Note

Sec. repealed, new filed Apr. 28, 1972; 30 days after being filed with the Secretary
Feb. 25, 1974; amd. filed Sept. 20, 1974 eff. of State.

701.5 Classes and standards for saline surface waters. The following items and specifications shall be the standards applicable to all New York Saline Surface

Waters which are assigned the classification of SA, SB, SC or SD, in addition to the specific standards which are found in this section under the heading of each such classification.

Quality Standards for Saline Surface Waters

<i>Items</i>	<i>Specifications</i>
1. Garbage, cinders, ashes, oils, sludge or other refuse.	None in any waters of the marine district as defined by Environmental Conservation Law (§ 17-0105).
2. pH	The normal range shall not be extended by more than one-tenth (0.1) pH unit.
3. Turbidity	No increase except from natural sources that will cause a substantial visible contrast to natural conditions. In cases of naturally turbid waters, the contrast will be due to increased turbidity.
4. Color	None from man-made sources that will be detrimental to anticipated best usage of waters.
5. Suspended, colloidal or settleable solids.	None from sewage, industrial wastes or other wastes which will cause deposition or be deleterious for any best usage determined for the specific waters which are assigned to each class.
6. Oil and floating substances.	No residue attributable to sewage, industrial wastes or other wastes, nor visible oil film nor globules of grease.
7. Thermal discharges.	(See Part 704 of this Title.)

CLASS "SA"

Best usage of waters. The waters shall be suitable for shellfishing for market purposes and primary and secondary contact recreation.

Quality Standards for Class "SA" Waters

<i>Items</i>	<i>Specifications</i>
1. Coliform	The median MPN value in any series of samples representative of waters in the shellfish growing area shall not be in excess of seventy (70) per one hundred ml.
2. Dissolved Oxygen	Shall not be less than 5.0 mg/l at any time.
3. Toxic wastes and deleterious substances.	None in amounts that will interfere with use for primary contact recreation or that will be injurious to edible fish or shellfish or the culture or propagation thereof, or which in any manner shall adversely affect the flavor, color, odor or sanitary condition thereof or impair the waters for any other best usage as determined for the specific waters which are assigned to this class.

CLASS "SB"

Best usage of waters. The waters shall be suitable for primary and secondary contact recreation and any other use except for the taking of shellfish for market purposes.

Quality Standards for Class "SB" Waters

<i>Items</i>	<i>Specifications</i>
1. Coliform	The monthly median coliform value for one hundred ml of sample shall not exceed two thousand four hundred from a minimum of five examinations and provided that not more than twenty percent of the samples shall exceed a coliform value of five thousand for one hundred ml of sample and the monthly geometric mean fecal coliform value for one hundred ml of sample shall not exceed two hundred (200) from a minimum of five examinations. This standard shall be met during all periods when disinfection is practiced.
2. Dissolved Oxygen	Shall not be less than 5.0 mg/1 at any time.
3. Toxic Wastes and deleterious substances.	None in amounts that will interfere with use for primary contact recreation or that will be injurious to edible fish or shellfish or the culture or propagation thereof, or which in any manner shall adversely affect the flavor, color, odor or sanitary condition thereof, or impair the waters for any other best usage as determined for the specific waters which are assigned to this class.

CLASS "SC"

Best usage of waters. The waters shall be suitable for fishing and all other uses except for primary contact recreation and for the taking of shellfish for market purposes.

Quality Standards for Class "SC" Waters

<i>Items</i>	<i>Specifications</i>
1. Coliform	The monthly geometric mean total coliform value for one hundred ml of sample shall not exceed ten thousand and the monthly geometric mean fecal coliform value for one hundred ml of sample shall not exceed two thousand from a minimum of five examinations. This standard shall be met during all periods when disinfection is practiced.
2. Dissolved Oxygen	Shall not be less than 5.0 mg/1 at any time.
3. Toxic wastes and deleterious substances.	None in amounts that will interfere with use for secondary contact recreation or that will be injurious to edible fish or shellfish or the culture or propagation thereof, or which in any manner shall adversely affect the flavor, color, odor or sanitary

condition thereof or impair the waters for any other best usage as determined for the specific waters which are assigned to this class.

CLASS "SD"

Best usage of waters. All waters not primarily for recreational purposes, shell-fish culture or the development of fishlife and because of natural or man-made conditions cannot meet the requirements of these uses.

Quality Standards for Class "SD" Waters

<i>Items</i>	<i>Specifications</i>
1. Dissolved Oxygen	Shall not be less than 3.0 mg/l at any time.
2. Toxic wastes and deleterious substances.	None alone or in combination with other substances or wastes in sufficient amounts to prevent survival of fish life or impair the waters for any other best usage as determined for the specific waters which are assigned to this class.

Historical Note

Sec. repealed, filed Mar. 20, 1967; new eff. 30 days after being filed with the Sec-
filed Feb. 25, 1974; amd. filed Sept. 20, 1974 retary of State.

PART 702

SPECIAL CLASSIFICATIONS AND STANDARDS

(Statutory authority: Environmental Conservation Law, §§ 15-0313, 17-0301)

Sec.	Sec.
702.1 Class A-Special (International boundary waters)	Long Island Sound, Suffolk County, Upper East River, Long Island Sound drainage basins, within Queens, Bronx and Westchester Counties and Jamaica Bay drainage basin within Kings and Queens Counties including a certain portion of Rockaway Inlet
702.2 Class AA-Special (Lake Champlain drainage basin)	
702.3 Special classes and standards for the lower Hudson River, Arthur Kill, Kill Van Kull, Harlem River, Raritan Bay and Lower East River drainage basins, New York Bay area, Nassau County including	702.4 Class AA-Special (Upper Hudson River drainage basin)

Historical Note

Part repealed, new filed Apr. 28, 1972; F.b. 25, 1974 eff. 30 days after being filed with the Secretary of State provided, however, if the application, pursuant to Parts 800 to 941 inclusive of Title 6, of any provision of Parts 701 or 702 shall be found to be invalid, the corresponding provision of Parts 701 or 702 in effect immediately prior to such effective date shall be deemed not to have been repealed and shall remain in effect until such time as the provision, the application of which was found to be invalid, can lawfully be made applicable.

Section 702.1 Class A—Special (International boundary waters).

(GREAT LAKES WATER QUALITY AGREEMENT OF 1972)

Best usage of waters. Source of water supply for drinking, culinary or food processing purposes, primary contact recreation and any other usages.

Conditions related to best usage. The waters, if subjected to approved treatment, equal to coagulation, sedimentation, filtration and disinfection with additional treat-

ment, if necessary, to reduce naturally present impurities, meet or will meet New York State Department of Health drinking water standards and are or will be considered safe and satisfactory for drinking water purposes.

**Quality Standards for Class A—Special Waters
(International Boundary Waters)**

<i>Items</i>	<i>Specifications</i>
1. Coliform	The geometric mean of not less than five samples taken over not more than a thirty-day period should not exceed 1,000 per 100 ml total coliform nor 200 per 100 ml fecal coliform.
2. Dissolved Oxygen	In the rivers and upper waters of the lakes not less than 6.0 mg/l at any time. In hypolimnetic waters, it should be not less than necessary for the support of fishlife, particularly cold water species.
3. Total Dissolved Solids	Should not exceed 200 milligrams per liter.
4. pH	Should not be outside the range of 6.7 to 8.5.
5. Iron	Should not exceed 0.3 milligrams per liter as Fe.
6. Phosphorus	Concentrations should be limited to the extent necessary to prevent nuisance growths of algae, weeds and slimes that are or may become injurious to any beneficial water use.
7. Radioactivity	Should be kept at the lowest practicable levels and in any event should be controlled to the extent necessary to prevent harmful effects on health.
8. Taste and odor-producing substances, toxic wastes and deleterious substances	None in amounts that will interfere with use for primary contact recreation or that will be injurious to the growth and propagation of fish, or which in any manner shall adversely affect the flavor, color or odor thereof or impair the waters for any other best usage as determined for the specific waters which are assigned to this class.
9. Suspended, colloidal or settleable solids	None from sewage, industrial wastes or other wastes which will cause deposition or be deleterious for any best usage determined for the specific waters which are assigned to this class.
10. Oil and floating substances	No residue attributable to sewage, industrial wastes or other wastes nor visible oil film nor globules of grease.
11. Thermal Discharges	(See Part 704 of this Title.)

To meet the water quality objectives referred to in the "Great Lakes Water Quality Agreement of 1972," the standards listed above shall be subject to revision from time to time after further hearings on due notice.

Note: Refer to Note 1 under Class "AA" which is also applicable to Class A-Special (International Boundary Waters) standards.

Historical Note

Sec. repealed, new filed: Apr. 28, 1972; 30 days after being filed with the Secretary of State.
Feb. 25, 1974 amd. filed Sept. 20, 1974 eff.

702.2 Class AA—Special (Lake Champlain drainage basin)

CLASS AA—SPECIAL

Best usage of waters. Any usage except for disposal of sewage, industrial wastes or other wastes.

Quality Standards for Class AA—Special Waters (Lake Champlain Drainage Basin)

<i>Items</i>	<i>Specifications</i>
1. Floating solids; settleable solids; oil; sludge deposits; toxic wastes; deleterious substances; colored or other wastes or heated liquids.	None attributable to sewage, industrial waste or other wastes.
2. Sewage or waste effluents.	None into waters of this class.

Historical Note

Sec. repealed, new filed Apr. 28, 1972; Feb. 25, 1974 eff. 30 days after being filed with the Secretary of State provided, however, if the application, pursuant to Parts 800 to 941 inclusive of Title 6, of any provision of Parts 701 or 702 shall be found to be invalid, the corresponding provision of Parts 701 or 702 in effect immediately prior to such effective date shall be deemed not to have been repealed and shall remain in effect until such time as the provision, the application of which was found to be invalid, can lawfully be made applicable.

702.3 Special classes and standards for the Lower Hudson River, Arthur Kill, Kill Van Kull, Harlem River, Raritan Bay and Lower East River drainage basins, New York Bay area, Nassau County including Long Island Sound, Suffolk County, Upper East River, Long Island Sound drainage basins, within Queens, Bronx and Westchester Counties and Jamaica Bay drainage basin within Kings and Queens Counties including a certain portion of Rockaway Inlet. (a) This section applies to the waters within the following areas, which constitute the Interstate Sanitation District:

(1) The drainage basin of the Lower Hudson River from the mouth to northern Westchester-Rockland County lines, except Saw Mill River and Sparkill Creek drainage basins.

(2) The drainage basins of Arthur Kill, Kill Van Kull, and Harlem River, and Raritan Bay.

(3) The drainage basin of Lower East River from the mouth to a line across East River north of Wards Island between Stony Point in Bronx County and Lawrence Point in Queens County.

(4) New York Bay including Gravesend Bay, Coney Island Creek, Atlantic Basin, Erie Basin, Gowanus Bay, Gowanus Canal. The Narrows and Atlantic Ocean waters off Coney Island lying westerly of a north-south line from Light Inlet at the southeasterly tip of Coney Island Peninsula to the south tip of Rockaway Point, thence along the jetty to Rockaway jetty light, thence due south to the New York-New Jersey boundary line.

(5) Nassau County including the waters of Long Island Sound between Nassau-Queens and Nassau-Suffolk County lines and the waters of Atlantic Ocean to the three mile limit between said county lines.

(6) The area within Suffolk County lying west of a north-south topographical limit line and its extensions to a point in Long Island Sound at the New York-Connecticut State boundary line due north of Miller Place Beach and to Blue Point on the south mainland thence southward across Great South Bay to Water Island, thence three miles due south to a point in the Atlantic Ocean at the south State boundary line.

(7) Certain tidal waters which are within the Upper East River and Long Island Sound drainage basins within Queens, Bronx, and Westchester Counties.

(8) Jamaica Bay drainage basin within Kings and Queens Counties and including Rockaway Inlet east of a north-south line drawn from Light Inlet at the southeasterly tip of Coney Island peninsula near Manhattan Beach to the westerly shoreline west of Lookout Tower on Rockaway Point.

(b) Said classes and standards of quality and purity applicable thereto are set forth hereinafter and designated Class I and Class II.

CLASS "I"

Best usage of waters. The waters shall be suitable for secondary contact recreation and any other usage except for primary contact recreation and shellfishing for market purposes.

Quality Standards for Class "I" Waters

<i>Items</i>	<i>Specifications</i>
1. Garbage, cinders, ashes, oils, sludge or other refuse.	None in any waters of the marine district as defined by Environmental Conservation Law (§ 17-0105).
2. Coliform	The monthly geometric mean total coliform value for one hundred ml of sample shall not exceed ten thousand and the monthly geometric mean fecal coliform value for one hundred ml of sample shall not exceed two thousand from a minimum of five examinations. This standard shall be met during all periods when disinfection is practiced.
3. Dissolved Oxygen	Shall not be less than 4.0 mg/l at any time.
4. pH	The normal range shall not be extended by more than one-tenth (0.1) pH unit.
5. Turbidity	No increase except from natural sources that will cause a substantial visible contrast to natural conditions. In cases of naturally turbid waters, the contrast will be due to increased turbidity.
6. Color	None from man-made sources that will be detrimental to anticipated best usage of waters.
7. Taste and odor-producing substances, toxic wastes and deleterious substances.	None in amounts that will interfere with use for secondary contact recreation or that will be injurious to edible fish or shellfish or the culture or propagation thereof, or which in any manner shall adversely affect the flavor, color, odor or sanitary conditions thereof, or impair the waters for any other

<i>Items</i>	<i>Specifications</i>
8. Suspended, colloidal or settleable solids.	best usage as determined for the specific waters which are assigned to this class. None from sewage, industrial wastes or other wastes which will cause deposition or be deleterious for any best usage determined for the specific waters which are assigned to this class.
9. Oil and floating substances.	No residue attributable to sewage, industrial wastes or other wastes, nor visible oil film nor globules of grease.
10. Thermal Discharges	(See Part 704 of this Title.)

CLASS "II"

Best usage of waters. All waters not primarily for recreational purposes, shellfish culture or the development of fishlife.

Quality Standards for Class "II" Waters

<i>Items</i>	<i>Specifications</i>
1. Floating solids, settleable solids, sludge deposits	None which are readily visible and attributable to sewage, industrial wastes or other wastes or which deleteriously increase the amounts of these constituents in receiving waters after opportunity for reasonable dilution and mixture with the wastes discharged thereto.
2. Garbage, cinders, ashes, oils, sludge or other refuse	None in any waters of the marine district as defined by Environmental Conservation Law (§ 17-0105).
3. Dissolved Oxygen	An average of not less than 30 percent saturation during any week of the year, provided such saturation levels insure adequate oxygen to support fish and shellfish life at all times.
4. Toxic wastes, oil, deleterious substances, colored or other wastes, or thermal discharges	None alone or in combination with other substances or wastes in sufficient amounts to be injurious to edible fish and shellfish, or the culture or propagation thereof, or which shall in any manner affect the flavor, color, odor or sanitary condition of such fish or shellfish so as to injuriously affect the sale thereof, or which shall cause any injury to the public and private shellfisheries of this State. (See Part 704 of this Title for thermal discharges.)

Historical Note

Sec. amd. filed Mar. 27, 1972; repealed, new filed: Apr. 28, 1972; Feb. 25, 1974 amd. filed Sept. 20, 1974 eff. 30 days after being filed with the Secretary of State.

702.4 Class AA—Special (Upper Hudson River drainage basin).**CLASS AA—SPECIAL**

Best usage of waters. Any usage except for disposal of sewage, industrial waste or other waste.

Quality Standards for Class AA—Special Waters**(Upper Hudson River Drainage Basin)**

<i>Items</i>	<i>Specifications</i>
1. Floating solids, settleable solids, oil, sludge deposits, toxic wastes, deleterious substances, colored or other wastes or heated liquids	None attributable to sewage, industrial wastes or other wastes.
2. Sewage or waste effluents	None into waters of this class.

Historical Note

Sec. amd. filed Mar. 27, 1972; repealed new filed: Apr. 28, 1972; repealed, filed Feb. 25, 1974 eff. 30 days after being filed with the Secretary of State provided, however, if the application, pursuant to Parts 800 to 941 inclusive of Title 6, of any provision of Parts 701 or 702 shall be found to be invalid,

the corresponding provision of Parts 701 or 702 in effect immediately prior to such effective date shall be deemed not to have been repealed and shall remain in effect until such time as the provision, the application of which was found to be invalid, can lawfully be made applicable.

702.5**Historical Note**

Sec. repealed, new filed Apr. 28, 1972; repealed, filed Feb. 25, 1974 eff. 30 days after being filed with the Secretary of State provided, however, if the application, pursuant to Parts 800 to 941 inclusive of Title 6, of any provision of Parts 701 or 702 shall be found to be invalid, the corresponding provision of

Parts 701 or 702 in effect immediately prior to such effective date shall be deemed not to have been repealed and shall remain in effect until such time as the provision, the application of which was found to be invalid, can lawfully be made applicable.

702.6-702.7**Historical Note**

Secs. repealed, filed Mar. 22, 1968 eff. Mar. 22, 1968.

702.8**Historical Note**

Sec. added, filed May 24, 1967; repealed, new filed Apr. 28, 1972; repealed, filed Feb. 25, 1974 eff. 30 days after being filed with the Secretary of State provided, however, if the application, pursuant to Parts 800 to 941 inclusive of Title 6, of any provision of Parts 701 or 702 shall be found to

be invalid, the corresponding provision of Parts 701 or 702 in effect immediately prior to such effective date shall be deemed not to have been repealed and shall remain in effect until such time as the provision, the application of which was found to be invalid, can lawfully be made applicable.

PART 703**GROUND WATER CLASSIFICATIONS, QUALITY STANDARDS AND
EFFLUENT STANDARDS AND/OR LIMITATIONS**

(Statutory authority: Environmental Conservation Law, §§ 17-0301, 17-0809)

Sec.		Sec.	
703.1	Definitions	703.7	Additional effluent standards and/or limitations
703.2	Purposes of classifications, quality standards, and effluent standards and/or limitations	703.8	Modifications of effluent standards and/or limitations
703.3	Collection of samples	703.9	Studies and monitoring
703.4	Tests or analytical determinations	703.10	Exceptions
703.5	Classes and quality standards for ground waters	703.11	Assignment of ground water classifications and quality standards
703.6	Effluent standards and/or limitations for discharges to class GA waters		

Historical Note

Part (§§ 703.1-703.4) filed Mar. 20, 1967; new (§§ 703.1-703.11) filed Aug. 2, 1978 eff. repealed, new filed Apr. 28, 1972; repealed, 30 days after filing.

Section 703.1 Definitions. The terms, words or phrases used in this Part shall have the following meaning:

- (a) *Administrator* shall mean the administrator of the United States Environmental Protection Agency.
- (b) *Best usage of waters* as specified for each class shall be those uses as determined by the commissioner in accordance with the considerations prescribed by the Environmental Conservation Law.
- (c) *Commissioner* shall mean the Commissioner of Environmental Conservation.
- (d) *Consolidated rock or bed rock* is the compact or solid hard rock exposed at the surface of the earth or overlain by the unconsolidated deposits.
- (e) *Department* shall mean the New York State Department of Environmental Conservation.
- (f) *Disposal system* means a system for disposing of sewage, industrial waste or other wastes and including sewer systems and treatment works.
- (g) *Effluent standard and/or limitation* shall mean any restriction on quantities, quality, rates and concentrations of chemical, physical, biological, and other constituents of effluents which are discharged or allowed to run from an outlet, point source or any other discharge within the meaning of Environmental Conservation Law, section 17-0501, into the unsaturated or saturated zones.
- (h) *Fresh water* is that water having a chloride concentration equal to or less than 250 mg/l, or a total dissolved solids concentration equal to or less than 1000 mg/l.
- (i) *Ground waters* are those waters in the saturated zone, including perched water areas.
- (j) *Industrial waste* means any liquid, gaseous, solid or waste substance or a combination thereof resulting from any process of industry, manufacturing, trade, or business or from the development or recovery of any natural resources, which may cause or might reasonably be expected to cause pollution of the waters of the State in contravention of the standards adopted as provided in Environmental Conservation Law, article 17.
- (k) *Land application techniques* include the following three basic methods of waste discharge application: irrigation; infiltration-percolation; and overland flow.
- (l) *Land utilization practices* entails the use of plants, the soil surface, and soil matrix for removal of certain wastewater constituents.

(m) *Micrograms per liter, ug/l*, is the weight in micrograms of any specific substance or substances contained in one liter of solution.

(n) *Milligrams per liter, mg/l*, is the weight in milligrams of any specific substance or substances contained in one liter of solution.

(o) *Other wastes* means garbage, refuse, decayed wood, sawdust, shavings, bark, sand, lime, cinders, ashes, offal, oil, tar, dyestuffs, acids, chemicals, leachate, sludge, salt and all other discarded matter not sewage or industrial waste which may cause or might reasonably be expected to cause pollution of the waters of the State in contravention of the standards adopted as provided in Environmental Conservation Law, article 17.

(p) *Outlet* means the terminus of a sewer system, or the point of emergence of any water-borne sewage, industrial waste or other wastes or the effluent therefrom, into the saturated or unsaturated zones.

(q) *Pathogenic organism* shall mean any disease-producing organism.

(r) *Perched ground water* shall mean unconfined ground water separated from an underlying body of ground water by an unsaturated zone.

(s) *Person or persons* shall mean any individual, public or private corporation, political subdivision, government agency, municipality, industry, co-partnership, association, firm, trust, estate or any other legal entity whatsoever.

(t) *Point source* means any discernible, confined and discrete conveyance, including but not limited to any pipe, ditch, channel, tunnel, conduit, well, discrete fissure, container, rolling stock, concentrated animal feeding operation or vessel or other floating stock from which pollutants are or may be discharged.

(u) *Pollutant* means dredged spoil, solid waste, incinerator residue, sewage, garbage, sewage sludge, munitions, chemical wastes, biological materials, radioactive materials, heat, wrecked or discarded equipment, rock, sand, and industrial, municipal, and agricultural waste discharged into water.

(v) *Pollution* shall mean the presence in the environment of conditions and/or contaminants in quantities of characteristics which are or may be injurious to human, plant or animal life or to property or which unreasonably interfere with the comfortable enjoyment of life and property throughout such areas of the State as shall be affected thereby.

(w) *Potable waters* are those fresh waters usable for drinking, culinary or food processing purposes.

(x) *Quality standard* shall mean such measure of purity or quality for any ground waters in relation to their best usage.

(y) *Saline water* is that water having a chloride concentration of more than 250 mg/l or a total dissolved solids concentration of more than 1000 mg/l.

(z) The *saturated zone* is that extensive portion of the earth's crust which is saturated with water. (Includes perched water areas.)

(aa) *Sewage* means the water-carried human or animal wastes from residences, buildings, industrial establishments or other places, together with such ground water infiltration and surface water as may be present.

(bb) *Subsurface sewage disposal system* shall mean a disposal system which discharges sewage beneath the surface of the ground.

(cc) *Toxic pollutant* means those pollutants, or combination of pollutants, including disease-causing agents, which after discharge and upon exposure, ingestion, inhalation or assimilation into any organism, either directly from the environment or indirectly through food chains, will, on the basis of information available to the department, cause death, disease, behavioral abnormalities, cancer, genetic muta-

tions, physiological malfunctions, including malfunctions in reproduction, or physical deformations, in such organisms or their offspring.

(dd) *Treatment works* means any plant, disposal field, lagoon, pumping station, constructed drainage ditch or surface water intercepting ditch, incinerator, area devoted to sanitary land fills or other works not specifically mentioned herein, installed for the purpose of treating, neutralizing, stabilizing or disposing of sewage, industrial waste or other wastes.

(ee) *Unconsolidated deposits* are all non- or poorly indurated soil materials above the bed rock.

(ff) The *unsaturated zone* is that portion of the earth's crust which does not contain sufficient water to fill all interconnected voids or pore spaces. Perched water bodies may exist within the unsaturated zone.

(gg) *Waste management system* includes the management of mechanical equipment, crops, irrigation and monitors as an operational unit.

Historical Note

Sec. filed Mar. 20, 1967; repealed, new after filing.
filed: Apr. 28, 1972; Aug. 2, 1978 eff. 30 days

703.2 Purposes of classifications, quality standards, and effluent standards and/or limitations. The purpose of these classes, quality standards, and effluent standards and/or limitations is to prevent pollution of ground waters and to protect the ground waters for use as a potable water.

Historical Note

Sec. filed Mar. 20, 1967; repealed, new after filing.
filed: Apr. 28, 1972; Aug. 2, 1978 eff. 30 days

703.3 Collection of samples. (a) The determination of compliance or non-compliance of sewage, industrial waste or other waste discharges with the requirements of this Part shall be made through tests or analytical determinations of ground water or effluent samples collected in such manner as are approved by the department.

(b) The location at which ground water samples are collected shall be determined by the department. In selecting or approving such locations, the department shall consider all relevant facts, including but not limited to:

(1) the mobility of pollutants in the unsaturated zone is governed by the rate of movement of percolating water and the active pollutant attenuation mechanisms in this zone;

(2) attenuation mechanisms may remove potential pollutants in passage through topsoil and adequate thicknesses of the unsaturated zone; and

(3) attenuation of pollutant concentrations with distance may occur in the saturated zone, similar to that in the unsaturated zone, as a result of attenuation processes occurring below the water table.

(c) The location at which effluent samples are collected shall be at a point where the effluent emerges from a treatment works, disposal system, outlet or point source and prior to being discharged to the ground.

Historical Note

Sec. filed Mar. 20, 1967; repealed, new after filing.
filed: Apr. 28, 1972; Aug. 2, 1978 eff. 30 days

703.4 Tests or analytical determinations. Tests or analytical determinations to determine compliance or noncompliance with standards shall be made in accordance with the latest edition of:

(a) *Standard Methods for the Examination of Water and Wastewater* prepared by American Public Health Association (APHA), American Water Works Association (AWWA), and Water Pollution Control Federation (WPCF);

(b) *Methods for Chemical Analysis of Water and Wastes* prepared by Environmental Protection Agency (EPA);

(c) *Water standards of the American Society for Testing and Materials (ASTM)*; or

(d) by other methods approved by the commissioner as giving results equal to or superior to methods listed above.

Historical Note

Sec. filed Mar. 20, 1967; repealed, new after filing.
filed: Apr. 28, 1972; Aug. 2, 1978 eff. 30 days

703.5 Classes and quality standards for ground waters.

(a) *Class GA.* (1) The best usage of class GA waters is as a source of potable water supply. Class GA waters are fresh ground waters found in the saturated zone of unconsolidated deposits and consolidated rock or bed rock.

(2) Quality standards for class GA waters shall be the most stringent of:

(i) the items and specifications applicable to such waters found in this section;

(ii) the maximum contaminant levels for drinking water promulgated by the Commissioner of Health as found in 10 NYCRR Subpart 5-1, *Public Water Supplies* or any subsequent revision thereto or replacement thereof;

(iii) the maximum contaminant levels for drinking water promulgated by the administrator under the Safe Drinking Water Act (P.L. 93-523); and

(iv) the standards for raw water quality promulgated by the Commissioner of Health as found in 10 NYCRR Part 170, *Sources of Water Supply* or any subsequent revision thereto or replacement thereof.

(3) The following quality standards shall be applicable to class GA waters:

<i>Items</i>	<i>Specifications</i>
(a) Sewage, industrial waste or other wastes, taste or odor producing substances, toxic pollutants, thermal discharges, radioactive substances or other deleterious matter.	None which may impair the quality of the ground waters to render them unsafe or unsuitable for a potable water supply or which may cause or contribute to a condition in contravention of standards for other classified waters of the State.
(b) The concentration of the following substances or chemicals:	Shall not be greater than the limit specified, except where exceeded due to natural conditions:
(1) Arsenic (As)	0.025 mg/l
(2) Barium (Ba)	1.0 mg/l
(3) Cadmium (Cd)	0.01 mg/l
(4) Chloride (Cl)	250 mg/l
(5) Chromium (Cr) Hexavalent	0.05 mg/l
(6) Copper (Cu)	1.0 mg/l
(7) Cyanide (CN)	0.2 mg/l
(8) Fluoride (F)	1.5 mg/l
(9) Foaming Agents ¹	0.5 mg/l
(10) Iron (Fe) ²	0.3 mg/l

<i>Items</i>	<i>Specifications</i>
(11) Lead (Pb)	0.025 mg/l
(12) Manganese (Mn) ²	0.3 mg/l
(13) Mercury (Hg)	0.002 mg/l
(14) Nitrate (as N)	10.0 mg/l
(15) Phenols	0.001 mg/l
(16) Selenium (Se)	0.02 mg/l
(17) Silver (Ag)	0.05 mg/l
(18) Sulfate (SO ₄)	250 mg/l
(19) Zinc (Zn)	5 mg/l
(20) pH Range	6.5-8.5
(21) Aldrin, or 1, 2, 3, 4, 10, 10-hexachloro-1, 4, 4a, 5, 8, 8a-hexahydro- <i>endo</i> -1, 4- <i>exo</i> -5, 8-dimethanonaphthalene.	not detectables
(22) Chlordane, or 1, 2, 4, 5, 6, 7, 8, 8-octachloro-2, 3, 3a, 4, 7, 7a-hexahydro-4, 7-methanoindene.	0.1 ug/l
(23) DDT, or 2, 2-bis- (p-chlorophenyl)-1, 1, 1-trichloroethane and metabolites.	not detectables
(24) Dieldrin, or 6, 7-epoxy aldrin.	not detectables
(25) Endrin, or 1, 2, 3, 4, 10, 10-hexachloro-6, 7-epoxy-1, 4, 4a, 5, 6, 7, 8, 8a-octahydro- <i>endo</i> -1, 4- <i>endo</i> -5, 8-dimethanonaphthalene.	not detectables
(26) Heptachlor, or 1, 4, 5, 6, 7, 8, 8-heptachloro-3a, 4, 7, 7a-tetrahydro-4, 7-methanoindene and metabolites.	not detectables
(27) Lindane and other Hexachlorocyclohexanes or mixed isomers of 1, 2, 3, 4, 5, 6-hexachlorocyclohexane.	not detectables
(28) Methoxychlor, or 2, 2-bis-(p-methoxyphenyl)-1, 1, 1-trichloroethane.	35.0 ug/l
(29) Toxaphene (a mixture of at least 175 chlorinated camphene derivatives).	not detectables
(30) 2, 4-Dichlorophenoxyacetic acid (2, 4-D)	4.4 ug/l
(31) 2, 4, 5-Trichlorophenoxypropionic acid (2, 4, 5-TP) (Silvex)	0.26 ug/l
(32) Vinyl chloride (chloroethene)	5.0 ug/l
(33) Benzene	not detectables
(34) Benzo (a) pyrene	not detectables
(35) Kepone or decachlorooctahydro-1, 3, 4-metheno-2H-cyclobuta (cd) pentalen-2-one (chlordeone).	not detectables

Items	Specifications
(36) Polychlorinated biphenyls (PCB) (Aroclor)	0.1 ug/l
(37) Ethylene thiourca (ETU)	not detectables
(38) Chloroform	100 ug/l
(39) Carbon tetrachloride (tetrachloromethane)	5 ug/l
(40) Pentachloronitrobenzene (PCNB)	not detectables
(41) Trichloroethylene	10 ug/l
(42) Diphenylhydrazine	not detectables
(43) bis (2-chloroethyl) ether	1.0 ug/l
(44) 2, 4, 5-Trichlorophenoxyacetic acid (2, 4, 5-T)	35 ug/l
(45) 2, 3, 7, 8-Tetrachlorodibenzo-p-dioxin (TCDD)	3.5 x 10 ⁻⁵ ug/l
(46) 2 - Methyl- 4 -chlorophenoxyacetic acid (MCPA)	0.44 ug/l
(47) Amiben, or 3-amino-2, 5-dichlorobenzoic acid (chloramben)	87.5 ug/l
(48) Dicamba, or 2-methoxy-3, 6-dichlorobenzoic acid	0.44 ug/l
(49) Alachlor, or 2-chloro-2', 6'-diethyl-N- (meth oxymethyl)-acetanilide (Lasso)	35.0 ug/l
(50) Butachlor, or 2-chloro-2', 6'-diethyl-N- (butoxymethyl)-acetanilide (Machete)	3.5 ug/l
(51) Propachlor, or 2-chlor-N-isopropyl-N-acetanilide (Ramrod)	35.0 ug/l
(52) Propanil, or 3', 4'-dichloropropionanilide	7.0 ug/l
(53) Aldicarb, [2-methyl-2-(methylthio) propionaldehyde 0-(methyl carbamoyl) oxime] and methomyl [1-methylthioacetaldhyde 0-(methyl-carbamoyl) oxime]	0.35 ug/l
(54) Bromacil, or 5-broma-3-sec-butyl-6-methyluracil	4.4 ug/l
(55) Paraquat, or 1, 1'-dimethyl-4, 4'-dipyridylum	2.98 ug/l
(56) Trifluralin, or α, α, α -trifluoro-2, 6-dinitro-, N-dipropyl-p- toluidine (Treflan)	35.0 ug/l
(57) Nitralin, or 4-(methylsulfonyl)-2, 6-dinitro-N, N-dipropylaniline (Planavin)	35.0 ug/l
(58) Benefin, or N-butyl-N-ethyl- α, α, α -trifluoro-2, 6- dinitro-p-toluidine (Balan)	35.0 ug/l

	<i>Items</i>	<i>Specifications</i>
(59)	Azinphosmethyl, or <i>O</i> , <i>O</i> -dimethyl- <i>S</i> -4 oxo-1, 2, 3-benzotriazin-3 (4H)-ylmethylphosphorodithioate (Guthion)	4.4 ug/l
(60)	Diazinon, or <i>O</i> , <i>O</i> -diethyl <i>O</i> -(2)-isopropyl-4-methyl-6-pyrimidinyl)-phosphorothioate.	0.7 ug/l
(61)	Phorate (also for Disulfoton), or <i>O</i> , <i>O</i> -diethyl- <i>S</i> -[(ethylthio) methyl]-phosphorodithioate (Thimet R), and disulfoton, or <i>O</i> , <i>O</i> -diethyl- <i>S</i> -[(2-ethylthio) ethyl] phosphorodithioate (Di-System R)	not detectable ³
(62)	Carbaryl, or 1-naphthyl- <i>N</i> -methylcarbamate	28.7 ug/l
(63)	Ziram, or zinc salts of dimethyldithiocarbamic acid.	4.18 ug/l
(64)	Ferbam, or iron salts of dimethyldithiocarbamic acid.	4.18 ug/l
(65)	Captan, or <i>N</i> -trichloromethylthio-4-cyclohexene-1, 2-dicarboximide.	17.5 ug/l
(66)	Folpet, or <i>N</i> -trichloromethylthiophthalimide.	56.0 ug/l
(67)	Hexachlorobenzene (HCB)	0.35 ug/l
(68)	Paradichlorobenzene (PDB) (also orthodichlorobenzene)	4.7 ug/l
(69)	Parathion (and Methyl parathion), or (<i>O</i> , - <i>O</i> -diethyl- <i>O</i> - <i>p</i> -nitrophenylphosphorothioate, and methyl parathion, or <i>O</i> , <i>O</i> -dimethyl- <i>O</i> - <i>p</i> -nitrophenylphosphorothioate.	1.5 ug/l
(70)	Malathion, or <i>S</i> -1, 2- <i>bis</i> (ethoxycarbonyl) ethyl- <i>O</i> , <i>O</i> -dimethylphosphorodithioate.	7.0 ug/l
(71)	Maneb, or- manganese salt of ethylene- bis- dithiocarbamic acid.	1.75 ug/l
(72)	Zineb, or zinc salt of ethylene-bis-dithiocarbamic acid.	1.75 ug/l
(73)	Dithane, or zincate of manganese ethylene-bis-dithiocarbamate.	1.75 ug/l
(74)	Thiram, or tetramethylthiuramdisulfide	1.75 ug/l
(75)	Atrazine, or 2-chloro-4-ethylamino-6-isopropylamino- <i>S</i> -triazine	7.5 ug/l
(76)	Propazine, or 2-chloro-4, 6-diisopropylamino- <i>S</i> -triazine.	16.0 ug/l
(77)	Simazine, or 2-chloro-4, 6-diethylamino- <i>S</i> -triazine.	75.25 ug/l

	<i>Items</i>	<i>Specifications</i>
(78)	di-n-butylphthalate	770 ug/l
(79)	Di (2-ethylhexyl) phthalate (DEHP)	4.2 mg/l
(80)	Hexachlorophene, or 2, 2'-methylene-bis (3, 4, 6-trichlorophenol)	7 ug/l
(81)	Methyl methacrylate	0.7 mg/l
(82)	Pentachlorophenol (PCP)	21 ug/l
(83)	Styrene	931 ug/l

- Notes:* ¹ Foaming agents determined as methylene blue active substances (MBAS) or other tests as specified by the commissioner.
- ² Combined concentration of iron and manganese shall not exceed 0.5 mg/L.
- ³ *Not detectable* means by tests or analytical determinations referenced in section 703.4.

(b) *Class GSA.* (1) The best usage of class GSA waters is as a source of potable mineral waters, for conversion to fresh potable waters, or as raw material for the manufacture of sodium chloride or its derivatives or similar products. Such waters are saline waters found in the saturated zone.

(2) The following quality standards shall be applicable to class GSA waters:

<i>Items</i>	<i>Specifications</i>
Sewage, industrial wastes or other wastes, color, taste or odor producing substances, toxic pollutants, thermal discharges, radioactive substances or other deleterious matter.	None which may impair the waters for use as sources of saline waters for the best usage outlined above or as to cause or contribute to a condition in contravention of standards for other classified waters of the State.

(c) *Class GSB.* (1) The best usage of class GSB waters is as a receiving water for disposal of wastes. Such waters are those saline waters found in the saturated zone which have a chloride concentration in excess of 1000 milligrams per liter or a total dissolved solids concentration in excess of 2000 milligrams per liter.

(2) The following quality standards shall be applicable to class GSB waters:

<i>Items</i>	<i>Specifications</i>
Sewage, industrial wastes or other wastes, color, taste or odor producing substances, toxic pollutants, thermal discharges, radioactive substances or other deleterious matter.	None which may be deleterious, harmful, detrimental or injurious to the public health, safety or welfare or which may cause or contribute to a condition in contravention of standards for other classified waters of the State.

(3) Class GSB shall not be assigned to any ground waters of the State unless the commissioner finds that adjacent and tributary ground waters and the best usage thereof will not be impaired by such classification.

Historical Note

Sec. filed Mar. 20, 1967; repealed, new after filing.
filed: Apr. 23, 1972; Aug. 2, 1978 eff. 30 days

703.6 Effluent standards and/or limitations for discharges to class GA waters.

(a) The effluent standards and/or limitations in schedules I and II of this section apply to a discharge from a point source or outlet or any other discharge within the meaning of Environmental Conservation Law, section 17-0501 which discharge will or may enter the unsaturated or saturated zones.

(b) The department may establish additional effluent standards and/or limitations as set forth in section 703.7 of this Part.

(c) The effluent standards and/or limitations shall be incorporated in SPDES permits (under Part 750 *et seq.* of this Title) for discharges to ground waters, where applicable.

Schedule I

Applicability. The following effluent standards and/or limitations shall apply to all class GA waters in New York State.

Biological organisms. Coliform and/or pathogenic organisms shall not be discharged in amounts sufficient to render fresh ground waters detrimental to public health, safety or welfare.

Chemical characteristics.

Substance	Maximum allowable concentration in mg/l (unless otherwise noted)
(1) Aluminum	2.0
(2) Arsenic	0.05
(3) Barium	2.0
(4) Cadmium	0.02
(5) Chloride	500
(6) Chromium (Cr) (Hexavalent)	0.10
(7) Copper	1.0
(8) Cyanide	0.40
(9) Fluoride	3.0
(10) Foaming Agents ¹	1.0
(11) Iron ²	0.6
(12) Lead	0.05
(13) Manganese ³	0.6
(14) Mercury	0.004
(15) Nickel	2.0
(16) Nitrate (as N)	20
(17) Oil and Grease	15
(18) Phenols	0.002
(19) Selenium	0.04
(20) Silver	0.1
(21) Sulfate	500
(22) Sulfide	1.0
(23) Zinc	5.0
(24) pH Ranges ⁴	6.5-8.5
(25) Aldrin, or 1, 2, 3, 4, 10, 10-hexachloro-1, 4, 4a, 5, 8, 8a-hexahydro- <i>endo</i> -1, 4- <i>exo</i> -5, 8-dimethanonaphthalene	not detectable ⁴
(26) Chlordane, or 1, 2, 4, 5, 6, 7, 8, 8-octachloro-2, 3, 3a, 4, 7, 7a-hexahydro-4, 7-methanoindene	0.1 ug/l

<i>Substance</i>	<i>Maximum allowable concentration in mg/l (unless otherwise noted)</i>
(27) DDT, or 2, 2-bis-(p-chlorophenyl)-1, 1, 1-trichloroethane and metabolites	not detectable*
(28) Dieldrin, or 6, 7-epoxy aldrin	not detectable*
(29) Endrin, or 1, 2, 3, 4, 10, 10-hexachloro-6, 7-epoxy-1, 4, 4a, 5, 6, 7, 8, 8a-octahydro-endo-1, 4-endo-5, 8-dimethanonaphthalene	not detectable*
(30) Heptachlor, or 1, 4, 5, 6, 7, 8, 8-heptachloro-3a, 4, 7, 7a-tetrahydro-4, 7-methanoindene and metabolites	not detectable*
(31) Lindane and other Hexachlorocyclohexanes or mixed isomers of 1, 2, 3, 3, 5, 6-hexachlorocyclohexane	not detectable*
(32) Methoxychlor, or 2, 2-bis-(p-methoxyphenyl)-1, 1, 1-trichloroethane	35 ug/l
(33) Toxaphene (a mixture of at least 175 chlorinated camphene derivatives)	not detectable*
(34) 2, 4-Dichlorophenoxyacetic acid (2, 4-D)	4.4 ug/l
(35) 2, 4, 5-Trichlorophenoxypropionic acid (2, 4, 5-TP) (Silvex)	0.26 ug/l
(36) Vinyl chloride (chloroethene)	5.0 ug/l
(37) Benzene	not detectable*
(38) Benzo (a) pyrene	not detectable*
(39) Kepone or decachlorooctahydro-1, 3, 4-metheno-2H-cyclobuta (cd) pentalen-2-one (chlordeone)	not detectable*
(40) Polychlorinated biphenyls (PCB) (Aroclor)	0.1 ug/l
(41) Ethylene thiourea (ETU)	not detectable*
(42) Chloroform	100 ug/l
(43) Carbon tetrachloride (tetrachloromethane)	5 ug/l
(44) Pentachloronitrobenzene (PCNB)	not detectable*
(45) Trichloroethylene	10 ug/l
(46) Diphenylhydrazine	not detectable*
(47) bis (2-chloroethyl) ether	1.0 ug/l
(48) 2, 4, 5-Trichlorophenoxyacetic acid (2, 4, 5-T)	35 ug/l
(49) 2, 3, 7, 8-Tetrachlorodibenzo-p-dioxin (TCDD)	3.5×10^{-5} ug/l
(50) 2-Methyl-4-chlorophenoxyacetic acid (MCPA)	0.44 ug/l

Substance	Maximum allowable concentration in mg/l (unless otherwise noted)
(51) Amiben, or 3-amino-2, 5-dichlorobenzoic acid (chloramben)	87.5 ug/l
(52) Dicamba, or 2-methoxy-3, 6-dichlorobenzoic acid	0.44 ug/l
(53) Alachlor, or 2-chloro-2', 6'-diethyl-N- (methoxymethyl)-acetanilide (Lasso)	35.0 ug/l
(54) Butachlor, or 2-chlor-2', 6'-diethyl-N- (butoxymethyl)-acetanilide (Machete)	3.5 ug/l
(55) Propachlor, or 2-chlor-N-isopropyl-N-acetanilide (Ramrod)	35.0 ug/l
(56) Propanil, or 3', 4'-dichloropropionanilide	7.0 ug/l
(57) Aldicarb, [2-methyl-2-(methylthio) propionaldehyde O- (methyl carbamoyl) oxime] and methomyl [1-methylthioacetaldehyde O- (methyl-carbamoyl) oxime]	0.35 ug/l
(58) Bromacil, or 5-bromo-3-sec-butyl-6-methyluracil	4.4 ug/l
(59) Paraquat, or 1, 1'-dimethyl-4, 4'-dipyridylium	2.98 ug/l
(60) Trifluralin, or α , α , α -trifluoro-2, 6-dinitro-N-dipropyl-p-toluidine (Treflan)	35.0 ug/l
(61) Nitralin, or 4-(methylsulfonyl) -2, 6-dinitro-N, N-dipropylaniline (Planavin)	35.0 ug/l
(62) Benefin, or N-butyl-N-ethyl- α , α , α -trifluoro-2, 6-dinitro-p-toluidine (Balan)	35.0 ug/l
(63) Azinphosmethyl, or O, O-dimethyl-S-4-oxo-1, 2, 3-benzotriazin-3 (4H)-ylmethylphosphorodithioate (Guthion)	4.4 ug/l
(64) Diazinon, or O, O-diethyl O-(2-isopropyl-4-methyl-6-pyrimidinyl)-phosphorothioate	0.7 ug/l
(65) Phorate (also for Disulfoton), or O, O-diethyl-S-[(ethylthio)methyl]-phosphorodithioate (Thimet R), and disulfoton, or O, O-diethyl-S-[(2-ethylthio)ethyl]-phosphorodithioate (Di-System R)	not detectable
(66) Carbaryl, or 1-naphthyl-N-methylcarbamate	28.7 ug/l

<i>Substance</i>	<i>Maximum allowable concentration in mg/l (unless otherwise noted)</i>
(67) Ziram, or zinc salts of dimethyldithiocarbamic acid	4.18 ug/l
(68) Ferbam, or iron salts of dimethyl-dithiocarbamic acid	4.18 ug/l
(69) Captan, or <i>N</i> -trichloromethylthio-4-cyclohexene- 1, 2-dicarboximide	17.5 ug/l
(70) Folpet, or <i>N</i> -trichloromethylthiophthalimide	56.0 ug/l
(71) Hexachlorobenzene (HCB)	0.35 ug/l
(72) Paradichlorobenzene (PDB) (also orthodichlorobenzene)	4.7 ug/l
(73) Parathion (and Methyl parathion), or (<i>O</i> , <i>O</i> -diethyl- <i>O</i> - <i>p</i> -nitrophenylphosphorothioate, and methyl parathion, or <i>O</i> , <i>O</i> -dimethyl- <i>O</i> - <i>p</i> - nitrophenylphosphorothioate.	1.5 ug/l
(74) Malathion, or <i>S</i> -1, 2- bis (ethoxycarbonyl) ethyl- <i>O</i> , <i>O</i> -dimethylphosphorodithioate	7.0 ug/l
(75) Maneb, or-manganese salt of ethylene- bis- dithiocarbamic acid	1.75 ug/l
(76) Zineb, or zinc salt of ethylene-bis-dithiocarbamic acid	1.75 ug/l
(77) Dithane, or zincate of manganese ethylene- bis- dithiocarbamate	1.75 ug/l
(78) Thiram, or tetramethylthiuramdisulfide	1.75 ug/l
(79) Atrazine, or 2- chlor- 4- ethylamino- 6- isopropylamino- <i>S</i> -triazine	7.5 ug/l
(80) Propazine, or 2-chloro-4, 6-diisopropylamino- <i>S</i> -triazine	16.0 ug/l
(81) Simazine, or 2- chloro-4, 6-diethylamino- <i>S</i> -triazine	75.25 ug/l
(82) di- <i>n</i> -butylphthalate	770 ug/l
(83) Di (2-ethylhexyl) phthalate (DEHP)	4.2 mg/l
(84) Hexachlorophene, or 2, 2'-methylene-bis (3, 4, 6-trichlorophenol)	7 ug/l
(85) Methyl methacrylate	0.7 mg/l
(86) Pentachlorophenol (PCP)	21 ug/l

<i>Substance</i>	<i>Maximum allowable concentration in mg/l (unless otherwise noted)</i>
(87) Styrene	931 ug/l

Notes:

- 1 Foaming agents determined as methylene blue active substances (MBAS) or other tests as specified by the commissioner.
- 2 Combined concentration of iron and manganese shall not exceed 1.0 mg/l.
- 3 When natural ground waters have a pH outside the range indicated above, that natural pH may be one extreme of the allowable range.
- 4 *Not detectable* means by tests or analytical determinations referenced in section 703.4 of this Part.

Schedule II

Applicability. In addition to the effluent standards and/or limitations in Schedule I, the following also apply in the counties of Nassau and Suffolk:

Chemical Characteristics.

<i>Substance</i>	<i>Maximum allowable concentration in mg/l</i>
(1) Dissolved Solids, Total	1000
(2) Nitrogen, Total (as N)	10

Historical Note

Sec. filed Aug. 2, 1978 eff. 30 days after filing.

703.7 Additional effluent standards and/or limitations. (a) The department, after consultation with the State Department of Health, may establish on a case by case basis more stringent effluent standards and/or limitations than those set forth in schedule I or II of section 703.6 of this Part and may impose effluent standards and/or limitations for a toxic pollutant or any substance not included in schedule I or II, when necessary, to prevent pollution and protect the ground waters for their best usage. The department shall consider rules and regulations promulgated by the administrator or the New York State Department of Health in establishing such standards and/or limitations. Additionally, the department shall consider action levels for compounds determined to exhibit toxic effects which are established by the New York State Commissioner of Health.

(b) Circumstances under which the department may consider more stringent effluent standards and/or limitations include, but are not limited to:

- (1) a discharge to an aquifer which is the sole or principal source of a potable water supply;
- (2) an existing or proposed discharge is directly on or into consolidated rock or bed rock;
- (3) a discharge containing one or more substances which in combination with precipitation and/or natural soil constituents is likely to produce a toxic pollutant; or
- (4) where adverse accumulative or synergistic effects can be established for constituents in a discharge.

(c) Where a discharge is proposed or exists which would or does contain a pollutant for which there is a quality standard under this Part but there is no applicable effluent standard and/or limitation under this Part for such a pollutant, the department, after consultation with the New York State Department of Health,

shall establish effluent standards and/or limitations for such pollutant on a case by case basis.

Historical Note

Sec. filed Aug. 2, 1978 eff. 30 days after filing.

703.8 Modifications of effluent standards and/or limitations.

(a) (1) A person responsible for a discharge subject to this Part may petition in writing for a modification of the effluent standards and/or limitations found in section 703.6 or established pursuant to section 703.7 of this Part.

(2) Such person shall have the burden of establishing to the satisfaction of the commissioner, after his consultation with the New York State Commissioner of Health, that one or more of the effluent standards and/or limitations are unnecessarily restrictive as to a particular discharge in that such modification of certain standards and/or limitations would, notwithstanding noncompliance with such standards and/or limitations, prevent pollution and protect the ground waters for their best usage.

(b) The regulations contained in Part 753 of this title prescribing procedures for notice and public participation shall apply whenever a person petitions for a modification of effluent standards and/or limitations established pursuant to section 703.6 of this Part.

Historical Note

Sec. filed Aug. 2, 1978 eff. 30 days after filing.

703.9 Studies and monitoring. (a) The department may require the submission of information by any person responsible for a discharge in order that the department may evaluate the short- and/or long-term effect the discharge may have on ground waters of the State or for the purpose of determining additional effluent standards and/or limitations or modifications thereto, as set forth in sections 703.7 and 703.8 of this Part, respectively. Such information may include, but is not limited to:

(1) a statement of the property to be affected by a discharge and the extent to which such property is under the control of the person responsible for such discharge;

(2) a geohydrologic analysis of the aquifer(s) which may be affected;

(3) a determination of the direction and rate of movement of the discharge and the natural ground water;

(4) an evaluation of adverse effects a discharge may have on any aquifer, source of potable water supply, or other surface and ground waters of the State; and

(5) an evaluation of the ability of unconsolidated deposits, consolidated rock or bed rock and the ground waters to attenuate potential pollutants such that the best usage of the ground waters is maintained.

(b) The department may require the installation and operation of monitoring facilities in order to assure compliance with effluent standards and/or limitations or to evaluate the effect of the discharge on the quality of the ground water. Specific monitoring requirements shall be established by the department on a case-by-case basis and as may be required by Part 756 of this Title.

Historical Note

Sec. filed Aug. 2, 1978 eff. 30 days after filing.

703.10 Exceptions. (a) *Activities and conditions.* The effluent standards and/or limitations for discharges to class GA waters set forth in section 703.6 of this Part are not applicable to the following activities:

(1) the discharge of sewage without the admixture of industrial waste or other wastes when:

(i) a disposal system, point source or outlet consists of a subsurface sewage disposal system designed, constructed and maintained in accordance with guidelines and standards satisfactory to the department;

(ii) monitoring facilities are utilized in accordance with requirements as may be specified by the department; and

(iii) the disposal system is designed to discharge, and discharges, less than 30,000 gallons per day;

(2) normally accepted agricultural practice of utilizing chemicals and fertilizers for growing of crops for human and animal consumption; and

(3) the potential renovative capabilities of a waste management system employing land application techniques and land utilization practices may be permitted for a discharge, provided it has been demonstrated to the satisfaction of the commissioner, after his consultation with the New York State Commissioner of Health, that:

(i) there shall be no actual or potential public health hazard;

(ii) applicable water quality standards shall be met in the saturated zone; and

(iii) applicable water quality standards shall not be contravened in any adjacent waters of the State.

(b) Nothing contained in this section shall be construed to allow any discharge which would preclude the best usage of class GA waters specified in section 703.5 of this Part.

Historical Note

Sec. filed Aug. 2, 1978 eff. 30 days after filing.

703.11 Assignment of ground water classifications and quality standards. The ground water classifications and quality standards enumerated in subdivisions (a) and (b) of section 703.5 of this Part are assigned to all the ground waters of the State of New York.

Historical Note

Sec. filed Aug. 2, 1978 eff. 30 days after filing.

PART 704**CRITERIA GOVERNING THERMAL DISCHARGES**

(Statutory authority: Environmental Conservation Law, §§ 15-0313, 17-0301)

Sec.	Sec.
704.1 Water quality standard for thermal discharges	704.4 Additional limitations or modifications
704.2 Criteria governing thermal discharges	704.5 Intake structures
704.3 Mixing zone criteria	704.6 Applicability of criteria

Historical Note

Part (§§ 704.1—704.4) added, filed Aug. 12, 1969; repealed, new filed: Apr. 23, 1972; Sept. 20, 1974 eff. 30 days after filing with the Secretary of State, provided, however, if the application, pursuant to Parts 800 to 941 inclusive of Title 6, of any provision of Part 704 shall be found to be invalid,

the corresponding provision of Part 704 in effect immediately prior to such effective date shall be deemed not to have been repealed and shall remain in effect until such time as the provision, the application of which was found to be invalid, can lawfully be made applicable.

Section 704.1 Water quality standard for thermal discharges. (a) All thermal discharges to the waters of the State shall assure the protection and propagation of a balanced, indigenous population of shellfish, fish, and wildlife in and on the body of water.

(b) The criteria contained in this Part shall apply to all thermal discharges and shall be complied with, except as provided in this Part.

Historical Note

Sec. added, filed Aug. 12, 1969; repealed, new filed: Apr. 23, 1972; Sept. 20, 1974 eff. 30 days after filing with the Secretary of State, provided, however, if the application, pursuant to Parts 800 to 941 inclusive of Title 6, of any provision of Part 704 shall be found to be invalid, the corresponding

provision of Part 704 in effect immediately prior to such effective date shall be deemed not to have been repealed and shall remain in effect until such time as the provision, the application of which was found to be invalid, can lawfully be made applicable.

704.2 Criteria governing thermal discharges. (a) *General criteria.* The following criteria shall apply to all waters of the State receiving thermal discharges, except as provided in section 704.6 of this Part:

- (1) The natural seasonal cycle shall be retained.
- (2) Annual spring and fall temperature changes shall be gradual.
- (3) Large day-to-day temperature fluctuations due to heat of artificial origin shall be avoided.
- (4) Development or growth of nuisance organisms shall not occur in contravention of water quality standards.
- (5) Discharges which would lower receiving water temperature shall not cause a violation of water quality standards and section 704.3 of this Part.
- (6) For the protection of the aquatic biota from severe temperature changes, routine shut down of an entire thermal discharge at any site shall not be scheduled during the period from December through March.

(b) *Special criteria.* The following criteria shall apply to all waters of the State receiving thermal discharges, except as provided in section 704.6 of this Part:

- (1) *Non-trout waters.* (i) The water temperature at the surface of a stream shall not be raised to more than 90 degrees Fahrenheit at any point.
- (ii) At least 50 percent of the cross sectional area and/or volume of flow of the stream including a minimum of one-third of the surface as measured from shore to shore shall not be raised to more than five Fahrenheit degrees over the temperature that existed before the addition of heat of artificial origin or to a maximum of 86 degrees Fahrenheit whichever is less.

(iii) At least 50 percent of the cross sectional area and/or volume of flow of the stream including a minimum of one-third of the surface as measured from shore to shore shall not be lowered more than five Fahrenheit degrees from the temperature that existed immediately prior to such lowering.

(2) *Trout waters.* (i) No discharge at a temperature over 70 degrees Fahrenheit shall be permitted at any time to streams classified for trout.

(ii) From June through September no discharge shall be permitted that will raise the temperature of the stream more than two Fahrenheit degrees over that which existed before the addition of heat of artificial origin.

(iii) From October through May, no discharge shall be permitted that will raise the temperature of the stream more than five Fahrenheit degrees over that which existed before the addition of heat of artificial origin or to a maximum of 50 degrees Fahrenheit whichever is less.

(iv) From June through September no discharge shall be permitted that will lower the temperature of the stream more than two Fahrenheit degrees from that which existed immediately prior to such lowering.

(3) *Lakes.* (i) The water temperature at the surface of a lake shall not be raised more than three Fahrenheit degrees over the temperature that existed before the addition of heat of artificial origin.

(ii) In lakes subject to stratification as defined in Part 652 of this Title, thermal discharges that will raise the temperature of the receiving waters shall be confined to the epilimnion.

(iii) In lakes subject to stratification as defined in Part 652 of this Title, thermal discharges which will lower the temperature of the receiving waters shall be discharged to the hypolimnion, and shall meet the water quality standards contained in Parts 701 and 702 of this Title in all respects.

(4) *Coastal waters.* (i) The water temperature at the surface of coastal waters shall not be raised more than four Fahrenheit degrees from October through June nor more than 1.5 Fahrenheit degrees from July through September over that which existed before the addition of heat of artificial origin.

(ii) The water temperature at the surface of coastal waters shall not be lowered more than four Fahrenheit degrees from October through June nor more than 1.5 Fahrenheit degrees from July through September from that which existed immediately prior to such lowering.

(5) *Estuaries or portions of estuaries.* (i) The water temperature at the surface of an estuary shall not be raised to more than 90 degrees Fahrenheit at any point.

(ii) At least 50 percent of the cross sectional area and/or volume of the flow of the estuary including a minimum of one-third of the surface as measured from water edge to water edge at any stage of tide, shall not be raised to more than four Fahrenheit degrees over the temperature that existed before the addition of heat of artificial origin or a maximum of 83 degrees Fahrenheit whichever is less.

(iii) From July through September, if the water temperature at the surface of an estuary before the addition of heat of artificial origin is more than 83 degrees Fahrenheit an increase in temperature not to exceed 1.5 Fahrenheit degrees at any point of the estuarine passageway as delineated above, may be permitted.

(iv) At least 50 percent of the cross sectional area and/or volume of the flow of the estuary including a minimum of one-third of the surface as measured from water edge to water edge at any stage of tide, shall not be lowered

more than four Fahrenheit degrees from the temperature that existed immediately prior to such lowering.

(6) *Enclosed bays.* No additional temperature change except that which occurs naturally shall be permitted in enclosed bays.

Historical Note

Sec. added, filed Aug. 12, 1969; repealed, new filed: Apr. 28, 1972; Sept. 20, 1974 eff. 30 days after filing with the Secretary of State, provided, however, if the application, pursuant to Parts 800 to 941 inclusive of Title 6, of any provision of Part 704 shall be found to be invalid, the corre-

sponding provision of Part 704 in effect immediately prior to such effective date shall be deemed not to have been repealed and shall remain in effect until such time as the provision, the application of which was found to be invalid, can lawfully be made applicable.

704.3 Mixing zone criteria. The following criteria shall apply to all waters of the State receiving thermal discharges, except as provided in section 704.6 of this Part.

(a) The department shall specify definable, numerical limits for all mixing zones (e.g., linear distances from the point of discharge, surface area involvement, or volume of receiving water entrained in the thermal plume).

(b) Conditions in the mixing zone shall not be lethal in contravention of water quality standards to aquatic biota which may enter the zone.

(c) The location of mixing zones for thermal discharges shall not interfere with spawning areas, nursery areas and fish migration routes.

Historical Note

Sec. added, filed Aug. 12, 1969; repealed, new filed: Apr. 28, 1972; Sept. 20, 1974 eff. 30 days after filing with the Secretary of State, provided, however, if the application, pursuant to Parts 800 to 941 inclusive of Title 6, of any provision of Part 704 shall be found to be invalid, the corresponding

provision of Part 704 in effect immediately prior to such effective date shall be deemed not to have been repealed and shall remain in effect until such time as the provision, the application of which was found to be invalid, can lawfully be made applicable.

704.4 Additional limitations or modifications. (a) An applicant may apply for a modification of the criteria set forth in sections 704.2 and 704.3 of this Part.

(b) Upon receipt of such application, the commissioner shall confer with the U.S. Environmental Protection Agency and shall transmit to that agency information to enable the administrator to fulfill responsibilities under Federal Law.

(c) The applicant shall have the burden of establishing to the satisfaction of the commissioner that one or more of the criteria are unnecessarily restrictive as to a particular project in that a modification of such criterion, or criteria, as the case may be, would assure the protection and propagation of a balanced indigenous population of shellfish, fish, and wildlife in and on the body of water into which the discharge is to be made.

(d) The applicant shall consult with the Department of Environmental Conservation to determine appropriate studies which shall be conducted by the applicant. Prior approval shall be obtained by the applicant for a program of studies that will determine the impact of any proposed modification. Such studies shall include, but shall not be limited to:

(1) A comparative analysis of environmental effects of the thermal discharge on the receiving waters when subject to the stated criteria of this Part, and when subject to the applicant's proposed modification.

(2) An analysis of the different discharge modes (e.g., surface or subsurface) and the advantages and disadvantages of each mode with regard to effects on aquatic life.

(e) A public hearing shall be held upon the application.

(f) The commissioner may authorize a modification of the stated criteria, which modifications shall be conditioned upon post-operational experience. The commissioner may require additional treatment of, or change in, a thermal discharge in the event that post-operational experience shows a trend toward impairment by the discharge of the quality of the receiving waters for the protection and propagation of a balanced indigenous population of shellfish, fish and wildlife in and on the body of water.

Historical Note

Sec. added, filed Aug. 12, 1969; repealed, new filed: Apr. 28, 1972; Sept. 20, 1974 eff. 30 days after filing with the Secretary of State, provided, however, if the application, pursuant to Parts 800 to 941 inclusive of Title 6, of any provision of Part 704 shall be found to be invalid, the corresponding

provision of Part 704 in effect immediately prior to such effective date shall be deemed not to have been repealed and shall remain in effect until such time as the provision, the application of which was found to be invalid, can lawfully be made applicable.

704.5 Intake structures. The location, design, construction, and capacity of cooling water intake structures, in connection with point source thermal discharges, shall reflect the best technology available for minimizing adverse environmental impact.

Historical Note

Sec. added, filed Sept. 20, 1974 eff. 30 days after filing with the Secretary of State, provided, however, if the application, pursuant to Parts 800 to 941 inclusive of Title 6, of any provision of Part 704 shall be found to be invalid, the corresponding

provision of Part 704 in effect immediately prior to such effective date shall be deemed not to have been repealed and shall remain in effect until such time as the provision, the application of which was found to be invalid, can lawfully be made applicable.

704.6 Applicability of criteria. (a) In determining that a discharge existing prior to July 25, 1969 has violated the standard for thermal discharges, as provided in subdivision (a) of section 704.1 of this Part, the violation of any of the criteria contained in this Part shall not constitute evidence of a violation of such standard unless it is also shown that the violation of such criteria has contributed to the violation of the standard.

(b) The provisions of subdivision (a), and subparagraph (iii) of paragraph (1), subparagraph (iv) of paragraph (2), subparagraph (iii) of paragraph (3), subparagraph (ii) of paragraph (4), subparagraph (iv) of paragraph (5), and paragraph (6) of subdivision (b) of section 704.2, and section 704.3 of this Part shall apply only to thermal discharges which have been brought into existence subsequent to July 31, 1973 or to which the criteria contained in this Part were intended to apply pursuant to any certification issued by the commissioner pursuant to section 401(d) of the Federal Water Pollution Control Act amendments of 1972.

(c) Whenever the commissioner has reason to believe that a thermal discharge, existing prior to the adoption of this Part, does not conform to subdivision (a) of section 704.1 of this Part, he may impose appropriate criteria contained in this Part upon such thermal discharge, unless, after public hearing, the owner or operator of any such thermal discharge establishes to the satisfaction of the commissioner that either such thermal discharge does conform to subdivision (a) of section 704.1 of this Part or that any such criteria are more stringent than necessary to assure conformance with subdivision (a) of section 704.1 of this Part.

Historical Note

Sec. added, filed Sept. 20, 1974 eff. 30 days after filing with the Secretary of State, provided, however, if the application, pursuant to Parts 800 to 941 inclusive of Title 6, of any provision of Part 704 shall be found to be invalid, the corresponding

provision of Part 704 in effect immediately prior to such effective date shall be deemed not to have been repealed and shall remain in effect until such time as the provision, the application of which was found to be invalid, can lawfully be made applicable.

PART 837**LAKE ERIE (EAST END)—NIAGARA RIVER DRAINAGE BASIN**

(Statutory authority: Public Health Law, art. 12)

Sec.	Sec.
837.1 Adopting order	837.4 Table I
837.2 Definitions and conditions	837.5 Map A
837.3 Assigned classifications and standards of quality and purity	837.6 Map B
	837.7 Quadrangle maps

Section 837.1 Adopting order. Pursuant to the authority contained in article 12 of the Public Health Law, the Water Pollution Control Board having made proper studies and having held public hearings on due notice with reference thereto, hereby adopts and assigns the following classifications and standards of quality and purity to the various waters as specifically designated and described below and subject to the definitions and conditions as stated.

837.2 Definitions and conditions. The several terms, words or phrases hereinafter mentioned shall be construed as follows:

(a) *Class* as appearing in table I, as the letters A, A-special (International boundary waters), B, C, D or E opposite each specifically designated waters means Class A, A-special (International boundary waters), B, C, D or E, as the case may be, as set forth in Part 701 and 702, *supra*.

(b) *Standards* as appearing in table I, as the letters A, A-special (International boundary waters), B, C, D or E opposite each specifically designated waters shall mean the standards of quality and purity established for class A, A-special (International boundary waters), B, C, D or E, as the case may be, as set forth in Part 701 and 702, *supra*. The symbol (T) after any class designation shall mean that the designated waters are trout waters and that the dissolved oxygen specification for trout waters shall apply thereto.

(c) *Waters index number* as appearing in table I shall mean that number which has been applied to any specifically designated waters as appearing on the maps set forth in section 837.7, *infra*.

(d) *Name* as appearing in table I shall mean the name, if any, by which the specifically designated waters are generally known and which name, if any, appears on the reference maps. In cases of specifically designated waters which have no name, the named tributary to which the unnamed waters are tributary is indicated so far as possible. In the table, an item number is assigned consecutively to each specifically designated waters.

(e) *Description* as appearing in table I shall mean a brief indication as to the location of the specifically designated waters so that by reference to reference maps such waters may be located without reference to their waters index numbers. Entries under column headed "Description" also include designations of sections of a stream to which a particular assignment of a class and standards shall apply.

(f) *Map ref. no.* The numbers appearing in the table under the heading designate the following maps which have been partially reproduced as maps 1 to 13, inclusive, with superimposed tracing in black of streams and other waters and waters index numbers in section 837.7, *infra*.

Map ref. no.	Name of quadrangle	Published by	Edition
1	Niagara Falls, N. Y.	U. S. Geological Survey	1901
2	Tonawanda, N. Y.	U. S. Geological Survey	1901
3	Lockport, N. Y.	U. S. Geological Survey	1902
4	Medina, N. Y.	U. S. Geological Survey	1897
5	Albion, N. Y.	U. S. Geological Survey	1897
6	Buffalo, N. Y.	U. S. Geological Survey	1901
7	Depew, N. Y.	U. S. Geological Survey	1905
8	Attica, N. Y.	U. S. Geological Survey	1905
9	Batavia, N. Y.	U. S. Geological Survey	1904
10	Eden, N. Y.	U. S. Geological Survey	1907
11	Springville, N. Y.	U. S. Geological Survey	1928
12	Arcade, N. Y.	U. S. Geological Survey	1925
13	Portage, N. Y.	U. S. Geological Survey	1905

(g) *Tributary* or *tributaries* shall mean any stream, lake, pond or other body of surface water which flows into any other stream, lake, pond or other body of surface water. In the table under column headed "Waters Index Number" where no tributaries are mentioned, the specifically designated waters shall include only the stream, pond or other body of water designated by such waters index number; where tributaries are mentioned after the waters index number, the specifically designated water shall include the stream, pond or other body of water designated by such waters index number and all tributaries and subtributaries thereof which are shown on the reference maps, unless exceptions are expressly stated.

(h) All streams or other bodies of water which appear as black lines with accompany index numbers on the maps partially reproduced in section 837.7, *infra*, or which appear on the original published maps listed in subdivision (f) as blue continuous or dotted lines to indicate natural waters and which are not specifically designated in the table shall be assigned the same classes and standards of quality and purity as the specifically designated waters to which they are directly tributary.

(i) All streams, rivulets and other collections of natural waters within the above drainage basins as below defined which are not shown on the reference maps shall be assigned to class D with the standards of quality and purity for class D assigned thereto. Provided, however, that any continuous flowing natural stream which is not shown on the reference maps shall have the same classification as the waters to which it is directly tributary.

(j) The Lake Erie (east end)—Niagara River drainage basins shall be deemed to include the following areas: All land and water areas, the natural surface water drainage from which is directly or indirectly tributary to Lake Erie (east end) and the Niagara River.

837.3 Assigned classifications and standards of quality and purity. The classifications and standards of quality and purity which are hereby assigned to all fresh surface waters within the Lake Erie (east end)—Niagara River drainage basins are set forth in table I.

837.4 Table I.

TABLE I

Classifications and Standards of Quality and Purity Which Are Assigned to All Surface Waters within the Lake Erie (East End) - Niagara River Drainage Basin; Erie, Niagara, Genesee, Orleans and Wyoming Counties, New York

Item No.	Waters Index Number	Name	Description	Map Ref. No.	Class	Standards
1	0-158	Niagara River American side	Waters from international boundary to American shore between confluence with Lake Ontario and Lake Erie. Latter point is defined as a line running due west from south end of Bird Island pier to international boundary. These waters include all bays, arms, and inlets thereof, but not trib. streams or Black Rock Canal.	1,2,6	A-Special (inter-national boundary waters)	A-Special (inter-national boundary waters)
2	Black Rock Canal	Black Rock Canal	Waters east of Squaw Island and Bird Island pier between canal locks and a line from south end of Bird Island pier to Buffalo harbor light #6.	6	C	C
3	0-158-1 and 2	Tributaries of Niagara River	Enter Niagara River from east in Town of Lewiston approximately 4.5 and 7.0 miles respectively from mouth.	1	C	C
4	0-158-3	Fish Creek	Enters Niagara River from east approximately 2.0 miles north of Niagara-Lewiston town line.	1,2	D	D
5	0-158-4 and P 1	Tributary of Niagara River	Enters Niagara River from east approximately 0.7 mile north of Niagara-Lewiston town line.	1	D	D

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TABLE I (contd.)

Item No.	Waters Index Number	Name	Description	Map Ref. No.	Class	Standards
6	0-158-5 and tribs. as shown on reference map	Bloody Run	Enters Niagara River from south approximately 0.2 mile north of Niagara-Lewiston town line.	1	D	D
7	Hydraulic Canal	Hydraulic Canal	Flows through City of Niagara Falls from Porter park to Niagara Mohawk Schoellkopf Station.	1	D	D
8	0-158-6 portion as described	Gill Creek	Enters Niagara River from north, just east of Packard Road, City of Niagara Falls. From mouth to Hyde Park Lake, P 1a, designated as item no. 9.	1	D	D
9	0-158-6-P 1a	Hyde Park Lake	That portion of Gill Creek in Gill Creek in Hyde Park between Pine Avenue and Porter Road, Niagara Falls, New York.	1	B	B
10	0-158-6 portion as described	Gill Creek	North from Porter Road, Niagara Falls, New York to source.	1,2	D	D
11	0-158-6-1,2,3,4 and trib. as shown on reference map	Tributaries of Gill Creek	Enter Gill Creek from east and west between mouth and Niagara Falls city line.	1,2	D	D
12	0-158-6-5 and 6	Tributaries of Gill Creek	Enter Gill Creek from west and southeast approximately 0.3 and 2.8 miles respectively north of Niagara Falls city line.	1,2	C	C

TABLE I (contd.)

Item No.	Waters Index Number	Name	Description	Map Ref. No.	Class	Standards
13	0-158-7	Tributary of Niagara River	Enters Niagara River (Little River) from northwest at S. 86th Street, Niagara Falls, New York.	2	C	C
14	0-158-8 portion as described	Cayuga Creek	Enters Niagara River (Little River) from north at 87th Street, Niagara Falls, New York. Mouth to trib. 2 which is approximately 500 feet north of Homestead Avenue, town of Niagara.	2	C	C
15	0-158-8 portion as described	Cayuga Creek	From trib. 2 which is approximately 500 feet north of Homestead Avenue, Town of Niagara to source.	2	D	D
16	0-158-8-1 and trib. as shown on reference map	Bergholtz Creek	Enters Cayuga Creek from east at Cayuga Drive, Niagara Falls, New York.	2	D	D
17	0-158-8-2, 3, 4 and 5	Tributaries of Cayuga Creek	Enter Cayuga Creek west, north and east at points north of Niagara Falls city line.	2	D	D
18	0-158-9, 10 and 11 and trib. as shown	Tributaries of Niagara River	Enter Niagara River from north and east within City of North Tonawanda, New York	2	D	D

TABLE I (contd.)

Item No.	Waters Index Number	Name	Description	Map Ref. No.	Class	Standards
19	0-158-12 portion as described	Tonawanda Creek	Enters Niagara River from east at Erie-Niagara county line. Mouth to Barge Canal confluence at Pendleton.	2,3	C	C
20	0-158-12 portion as described	Tonawanda Creek	From Barge Canal confluence at Pendleton to dam at East Pembroke.	3,4,8	B	B
21	0-158-12 portion as described	Tonawanda Creek	From dam at East Pembroke to water supply dam at Batavia.	4,5,8,9	C	C
22	0-158-12 portion as described	Tonawanda Creek	From water supply dam at Batavia to source.	8,9,12	A	A
23	0-158-12-1 portion as described	Ellicott Creek	Enters Tonawanda Creek from south-east approximately 0.3 mile from mouth. Mouth to Erie Railroad crossing.	2	D	D
24	0-158-12-1 portion as described	Ellicott Creek	From Erie Railroad crossing to trib. 1 which is in line with a continuation of Mill Creek Road, City of Tonawanda.	2	C	C
25	0-158-12-1 portion as described including P 4a	Ellicott Creek	From trib. 1 which is in line with a continuation of Mill Creek Road, City of Tonawanda to trib. 17 which is approximately 0.5 mile west of western boundary, Village of Alden.	2,6,7	B	B

TABLE I (contd.)

Item No.	Waters Index Number	Name	Description	Map Ref. No.	Class	Standards
26	0-158-12-1 portion as described	Ellicott Creek	From trib. 17 which is approximately 0.5 mile west of western boundary, Village of Alden to source.	7, 8	C	C
27	0-158-12-1-1, 2, 3, 4, 5, 6, 7, 8, 9, 10 and 11 and tribs. including P 2, P 3, P 4 and P 5 as shown on reference map	Tributaries of Ellicott Creek	Enter Ellicott Creek between mouth and where creek is crossed by Amherst-Cheektowaga town line.	2, 3, 6, 7	D	D
28	0-158-12-1-12, 13, 14 and 15 including P 5a as shown on reference map	Tributaries of Ellicott Creek	Enter Ellicott Creek from north and south between Lancaster-Cheektowaga town line and Lancaster-Alden town line.	7	B	B
29	0-158-12-1-16 and 17 and tribs. as shown on reference map	Tributaries of Ellicott Creek	Enter Ellicott Creek from north-east and south between Lancaster-Alden town line and western boundary, Village of Alden.	7, 8	C	C
30	0-158-12-1-18	Spring Creek-Peck Creek	Enters Ellicott Creek from south-east at a point approximately where northern boundary, Village of Alden, crosses creek.	8	C	C
31	0-158-12-1-18-1 and tribs. as shown on reference map including P 7	Durke Creek	Enters Spring Creek-Peck Creek from south between eastern boundary, Village of Alden and Erie-Genesee county line.	8	C	C

TABLE 1 (cont'd)

Item No.	Waters Index Number	Name	Description	Map Ref. No.	Class	Standards
32	0-158-12-1-18-2, 3 and 4 and trib. as shown on reference map	Tributaries of Spring Creek	Enter Spring Creek-Peck Creek from an easterly direction between Erie-Genesee county line and source.	8	C	C
33	0-158-12-1-19 and trib. as shown on reference map	Tributary of Ellicott Creek	Enters Ellicott Creek from south-east approximately 0.4 mile east of Erie-Genesee county line.	8	B	B
34	0-158-12-1-20	Tributary of Ellicott Creek	Enters Ellicott Creek from north-east approximately 1.8 miles east of Erie-Genesee county line.	8	C	C
35	0-158-12-1-21 and tribs. as shown on reference map including P 8 and P 9	Crooked Brook	Enters Ellicott Creek from east at a point due east from Fargo and approximately 2.8 miles east of Erie-Genesee county line.	8	C	C
36	0-158-12-1-22, 23 and 24 and tribs. as shown on reference map	Tributaries of Ellicott Creek	Enter Ellicott Creek from east between Crooked Brook, item 35, and Erie Railroad crossing	8	C	C
37	0-158-12-1-25 and 26 and trib. as shown on reference map	Tributaries of Ellicott Creek	Enter Ellicott Creek from east between Erie Railroad crossing and Genesee-Wyoming county line.	8	B	B
38	0-158-12-1-27	Tributary of Ellicott Creek	Enters Ellicott Creek from south at Genesee-Wyoming county line.	8	C	C

TABLE 1 (cont'd)

Item No.	Waters Index Number	Name	Description	Map Ref. No.	Class	Standards
39	0-158-12-1-28 and 29	Tributaries of Ellicott Creek	Enter Ellicott Creek from southeast between trib. 27, item no. 38, and source	8	B	B
40	0-158-12-2	Tributary of Tonawanda Creek	Enters Tonawanda Creek from north-east at a point approximately 4.2 miles above mouth.	2	D	D
41	0-158-12-3	Bull Creek	Enters Tonawanda Creek from north at Martinsville.	2	C	C
42	0-158-12-3-1	Sawyer Creek	Enters Bull Creek from north-west at a point approximately 0.7 miles above mouth.	2	D	D
43	0-158-12-3-2, 3, and 4 and trib. as shown on reference map	Tributaries of Bull Creek	Enter Bull Creek from west, north and northeast respectively between Sawyer Creek, item no. 42, and source.	2	D	D
44	0-158-12-4 and 5 and tribs. as shown on reference map	Tributaries of Tonawanda Creek	Enter Tonawanda Creek from north and south approximately 2.7 and 5.2 miles respectively above Bull Creek, item no. 41.	2	D	D
45	0-158-12-6 portion as described	Ransom Creek	Enters Tonawanda Creek from south-east at a point approximately 5.4 miles above Bull Creek, item no. 41. Mouth to Got Creek, item no. 49.	2,3	C	C

TABLE I (contd.)

Item No.	Waters Index Number	Name	Description	Map Ref. No.	Class	Standards
46	0-158-12-6 portion as described including P 11	Ransom Creek	From Got Creek, item no. 49, to source.	3, 7	C	C(T)
47	0-158-12-6-1 and tribs. and 2 as shown on reference map	Tributaries of Ransom Creek	Enter Ransom Creek from south and north approximately 2.4 and 2.6 miles respectively above mouth.	3, 7	D	D
48	0-158-12-6-3 and tribs. as shown on reference map	Black Creek	Enters Ransom Creek from east approximately 3.4 miles above mouth.	3	D	D
49	0-158-12-6-4 and tribs. including P 9a as shown on reference map	Got Creek	Enters Ransom Creek from south approximately 1.0 mile above Black Creek, item no. 48.	3, 7	C	C(T)
50	0-158-12-6-5, 6 and trib. and 7 as shown on reference map including P 10	Tributaries of Ransom Creek	Enter Ransom Creek from east and south between Got Creek, item no. 49, and source.	3, 7	D	D
51	Barge Canal portion as described	Barge Canal	From separation with Tonawanda Creek at Pendleton to watershed limit.	3	C	C
52	0-158-12-7 and trib. as shown on reference map	Tributary of Tonawanda Creek	Enters Tonawanda Creek from north of Pendleton.	3	B	B

TABLE I (contd.)

Item No.	Waters Index Number	Name	Description	Map Ref. No.	Class	Standards
53	0-158-12-8	Mud Creek	Enters Tonawanda Creek from east just west of Millers Port.	3,4	C	C
54	0-158-12-8-1 and 2	Tributaries of Mud Creek	Enter Mud Creek from north between mouth and Lockport-Royalton town line.	3	B	B
55	0-158-12-8-3,4 and 5 and tribs. as shown on reference map	Tributaries of Mud Creek	Enter Mud Creek from north and east between Lockport-Royalton town line and source.	3,4	C	C
56	0-158-12-9 and tribs. as shown on reference map	Beeman Creek	Enters Tonawanda Creek from south approximately 9.8 miles above Mud Creek, item no. 53.	3,7	C	C
57	0-158-12-10 and trib. as shown on reference map	Tributary of Tonawanda Creek	Enters Tonawanda Creek from south approximately 1.2 miles above Beeman Creek, item no. 56.	3	C	C
58	0-158-12-11	Ledge Creek	Enters Tonawanda Creek from south approximately 9.2 miles above Beeman Creek, item no. 56.	3,4	C	C(T)
59	0-158-12-11-1	Murder Creek	Enters Ledge Creek from south approximately 0.9 mile above mouth.	3,4,8	C	C
60	0-158-12-11-1-P 14	Griswold Pond	Located on Murder Creek at Griswold.	8	C	C

TABLE I (contd.)

Item No.	Waters Index Number	Name	Description	Map Ref. No.	Class	Standards
61	0-158-12-11-1-1 and tribs. as shown on reference map	Beaver Meadow Brook	Enters Murder Creek from south-west approximately 1.1 miles above mouth.	3	D	D
62	0-158-12-11-1-2	Tributary of Murder Creek	Enters Murder Creek from east just north of Swift's Mills.	3	C	C
63	0-158-12-11-1-3	Tributary of Murder Creek	Enters Murder Creek from east approximately 1.2 miles north of Akron.	3,4	B	B
64	0-158-12-11-1-4, 5 and 6 and tribs. as shown on reference map	Tributaries of Murder Creek	Enter Murder Creek from east and south between Erie-Genesee county line and a point 1.0 mile below Corfu.	4,8	C	C
65	0-158-12-11-1-7 and tribs. as shown on reference map	Tributary of Murder Creek	Enters Murder Creek from north-east approximately 0.4 mile below Corfu.	8	B	B
66	0-158-12-11-1-8 and trib. as shown on reference map	Tributary of Murder Creek	Enters Murder Creek from south approximately 1.0 mile above Corfu.	8	C	C
67	0-158-12-11-1-9 and tribs. as shown on reference map	Huron Creek	Enters Murder Creek from east just south of Pembroke-Darien town line.	8	C	C

TABLE I (contd.)

Item No.	Waters Index Number	Name	Description	Map Ref. No.	Class	Standards
68	0-158-12-11-1-10, 11 and 12 and tribs. as shown on reference map	Tributaries of Murder Creek	Enter Murder Creek between Huron Creek, item no. 67, and Darlen.	8	C	C
69	0-158-12-11-1-13 and trib. as shown on reference map	Tributary of Murder Creek	Enters Murder Creek from south at Griswold.	8	C	C
70	P 13	Akron Reservoir	Located on Wyoming-Genesee county line approximately 5.5 miles east of Erie-Genesee county line.	8	A	A
71	0-158-12-11-1-13-P 13-1, 2 and 3 and trib. as shown on reference map	Tributaries to Akron Reservoir	Enter Akron Reservoir from east and south.	8	A	A
72	0-158-12-11-1-14, 15 and trib. as shown on reference map	Tributaries of Murder Creek	Enter Murder Creek from south approximately 1.1 miles above Griswold.	8	B	B
73	0-158-12-11-1-16 and tribs. as shown on reference map	Tributary of Murder Creek	Enters Murder Creek from south approximately 1.5 miles above Griswold.	8	C	C

TABLE I (contd.)

Item No.	Waters Index Number	Name	Description	Map Ref. No.	Class	Standards
74	0-158-12-11-2	Quarry Spring Run	Enters Ledge Creek from southeast approximately 0.2 mile west of Erie-Genesee county line.	4	C	C(T)
75	0-158-12-11-3	Tributary of Ledge Creek	Enters Ledge Creek from south approximately 0.2 mile east of Erie-Genesee county line.	4	C	C(T)
76	0-158-12-12 and 13 and trib. as shown on reference map	Tributaries of Tonawanda Creek	Enter Tonawanda Creek from north-east and southeast between Ledge Creek, item no. 58 and a point 1.0 mile west of Erie-Genesee county line.	3, 4	C	C
77	0-158-12-14	Tributary of Tonawanda Creek	Enters Tonawanda Creek from south-east approximately 0.7 mile west of Erie-Genesee county line.	4	B	B
78	0-158-12-15 and tribs. as shown on reference map	Canal feeder	Enters Tonawanda Creek from north approximately 1.0 mile east of Erie-Genesee county line.	4	D	D
79	0-158-12-16, 17 and 18 and tribs. as shown on reference map	Tributaries of Tonawanda Creek	Enter Tonawanda Creek from east between Canal feeder, item no. 78, and West Shore Railroad.	4	C	C
80	0-158-12-19	Tributary of Tonawanda Creek	Enters Tonawanda Creek from south approximately 0.5 mile above West Shore Railroad.	4	B	B

TABLE I (contd.)

Item No.	Waters Index Number	Name	Description	Map Ref. No.	Class	Standards
81	0-158-12-20 and 21 including P 15 (Dead Lake) as shown on reference map	Tributaries of Tonawanda Creek	Enter Tonawanda Creek from east approximately 2.3 miles west and 0.9 mile east respectively of Indian Falls.	4	C	C
82	0-158-12-22, 23 and 24	Tributaries of Tonawanda Creek	Enter Tonawanda Creek from south between a point 1.0 mile above Indian.	4	B	B
83	0-158-12-25, 26 and 27 and tribs. as shown on reference map	Tributaries of Tonawanda Creek	Enter Tonawanda Creek from east and west between North Pembroke and East Pembroke.	4	C	C
84	0-158-12-28	Bowen Brook	Enters Tonawanda Creek from east approximately 0.5 mile east of East Pembroke.	8	C	C
85	0-158-12-28-1	Tributary of Bowen Brook	Enters Bowen Brook from north-east approximately 0.4 mile above mouth.	8	B	B
86	0-158-12-28-2, 3 and 4 and trib. as shown on reference map	Tributaries of Bowen Brook	Enter Bowen Brook from east and west between Lehigh Valley Railroad and Delaware, Lackawanna and Western Railroad.	8	C	C

TABLE I (contd.)

Item No.	Waters Index Number	Name	Description	Map Ref. No.	Class	Standards
87	0-158-12-28-5	Tributary of Bowen Brook	Enters Bowen Brook from west approximately 0.3 mile above Delaware, Lackawanna and Western Railroad.	8	B	B
88	0-158-12-28-6,7 and 8 and trib. as shown on reference map	Tributaries of Bowen Brook	Enter Bowen Brook between trib. 5, item no. 87, and source.	8	C	C
89	0-158-12-29 and 30	Tributaries of Tonawanda Creek	Enter Tonawanda Creek from north between Bowen Brook, item no. 84, and Bushville.	4	B	B
90	P 15a	Nu Lake	Lies south and west of Tonawanda Creek approximately 0.7 mile west of Bushville.	4	B	B
91	0-158-12-31 and trib. as shown on reference map	Tributary of Tonawanda Creek	Enters Tonawanda Creek from south approximately 0.4 mile above Bushville.	8,9	C	C
92	P 16	Unnamed pond	Lies 0.3 mile north of City of Batavia northern boundary.	5	D	D
93	0-158-12-32 portion as described	Little Tonawanda Creek	Enters Tonawanda Creek from south-east approximately 0.5 mile north of Batavia-Alexander town line. Mouth to P 16d at Linden.	9	A	A

TABLE I (contd.)

Item No.	Waters Index Number	Name	Description	Map Ref. No.	Class	Standards
94	0-158-12-32 portion as described including P 16d	Little Tonawanda Creek	From and including P 16d at Linden to Dale.	9	A	A(T)
95	0-158-12-32 portion as described	Little Tonawanda Creek	From Dale to source.	9	A	A
96	0-158-12-32-1,2,3, 4,5,6 and 7 and tribs. as shown on reference map	Tributaries of Little Tonawanda Creek	Enter Little Tonawanda Creek between mouth and trib. 8, item no. 97.	9	A	A
97	0-158-12-32-8 portion as described	Tributary of Little Tonawanda Creek	Enters Little Tonawanda Creek from east approximately 0.6 mile above Genesee-Wyoming county line. Mouth to easterly crossing of road from Vernal to Pearl River, a distance of approximately 1.4 miles.	9	A	A(T)
98	0-158-12-32-8 portion as described and tribs. as shown on reference map		From easterly crossing of road from Vernal to Pearl River to source.	9	A	A
99	0-158-12-32-9,10, 11,12,13 and 14 and tribs. as shown on reference map	Tributaries of Little Tonawanda Creek	Enter Little Tonawanda Creek between trib. 8, item no. 97, and source.	9	A	A

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TABLE I (contd.)

Item No.	Waters Index Number	Name	Description	Map Ref. No.	Class	Standards
100	0-158-12-33, 34, 35, 36, 37, 38, 39 and 40 and tribs. including P 16f as shown on reference map	Tributaries of Tonawanda Creek	Enter Tonawanda Creek between Batavia-Alexander town line and a point 0.2 mile south of Genesee-Wyoming county line.	9, 8	A	A
101	0-158-12-41 and tribs. as shown on reference map	Tannery Brook	Enters Tonawanda Creek from north-west approximately 0.4 mile south of Genesee-Wyoming county line.	8	A	A
102	0-158-12-42, 43, 44 and 45 and trib. as shown on reference map	Tributaries of Tonawanda Creek	Enter Tonawanda Creek between Tannery Brook, item no. 101, and Crow Creek, item no. 103.	8	A	A
103	0-158-12-46 and tribs. as shown on reference map including P 20 (New Attica Reservoir) and P 20a (Attica Water Supply Lake)	Crow Creek	Enters Tonawanda Creek from east approximately 0.9 mile south of Village of Attica southern boundary.	8, 9	A	A
104	0-158-12-47, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 62, 63, 64 and 65 and tribs. as shown on reference map	Tributaries of Tonawanda Creek	Enter Tonawanda Creek between Crow Creek, item no. 103, and Stony Brook, item no. 105.	8	A	A

TABLE I (cont'd)

Item No.	Waters Index Number	Name	Description	Map Ref. No.	Class	Standards
105	0-158-12-66 and tribs. as shown on reference map.	Stony Brook	Enters Tonawanda Creek from east at Varysburg.	8,9,13	A	A
106	0-158-12-67,68,69, 70,71,72,73,74,75, and 76 and tribs. as shown on reference map	Trib. of Tonawanda Creek	Enter Tonawanda Creek between Stony Brook, item no. 105, and East Fork, item no. 107.	8,12	A	A
107	0-158-12-77 portion as described	East Fork	Enters Tonawanda Creek from south approximately 2.2 miles southwest of Johnsonburg. Mouth to Engine Creek, item no. 110.	12	A	A
108	0-158-12-77 portion as described	East Fork	From Engine Creek, item no. 110, to source.	12	A	A(TS)
109	0-158-12-77-1 and tribs. as shown on reference map	Trib. of East Fork	Enters East Fork from east approximately 0.9 mile above mouth	12	A	A
110	0-158-12-77-2 and trib. as shown on reference map	Engine Creek	Enters East Fork from southeast approximately 2.2 miles above mouth.	12	A	A(T)

TABLE I (contd.)

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

TABLE I (contd.)

Item No.	Waters Index Number	Name	Description	Map Ref. No.	Class	Standards
117	0-158-15 portion as described	Scajaquada Creek	From crossing of Main Street, City of Buffalo to trib. 4 which is in line with continuation of Frederick Drive, Town of Cheektowaga.	6	D	D
118	0-158-15 portion as described	Scajaquada Creek	From trib. 4 which is in line with continuation of Frederick Drive, Town of Cheektowaga to source.	6, 7	B	B
119	0-158-15-1, 2, 3, 4, 5, 6, and 7 and tribs. as shown on reference map	Trib. of Scajaquada Creek	Enter Scajaquada Creek from north and northeast between mouth and source.	6, 7	D	D
120	Big Burnt Ship Creek	Big Burnt Ship Creek	Separates Grand Island from Buckhorn Island.	2	B	B
121	G.I. 1	Trib. of Big Burnt Ship Creek	Enters Big Burnt Ship Creek from east opposite eastern end of Buckhorn Island.	2	B	B
122	G.I. 2 and trib. as shown on reference map	Gun Creek	Enters Niagara (East Channel) from Grand Island at Edgewater.	2	B	B
123	G.I. 3 and trib. as shown on reference map	Spicer Creek	Enters Niagara (East Channel) from Grand Island opposite North Tonawanda water intake light.	2	B	B

TABLE I (contd.)

Item No.	Waters Index Number	Name	Description	Map Ref. No.	Class	Standards
124	G.I. 4	Trib. of Niagara River	Enters Niagara River (West Channel) approximately opposite intersection of Fix Road and Bush Road, Grand Island.	6	B	B
125	G.I. 5	Trib. of Niagara River	Enters Niagara River (West Channel) at foot of Parkway West, Grand Island.	1	B	B
126	G.I. 6	Trib. of Niagara River	Enters Niagara River (West Channel) at foot of Third Avenue, Grand Island.	1	B	B
127	E portion as described	Lake Erie including Erie Basin	Waters southerly of line from Buffalo harbor light #6 to south end of Bird Island Pier; easterly of line from south end Bird Island pier to north end of north breakwater; easterly of line from south water; easterly of line from south end of north breakwater to north end of old or middle breakwater and northerly end of line from north end of old or middle breakwater to south pier light at United States Coast Guard station.	6	C	C

TABLE I (contd.)

Item No.	Water's Index Number	Name	Description	Map Ref. No.	Class	Standards
128	E portion as described	Lake Erie or outer harbor	Waters easterly of old or middle breakwater and south northern end of old or middle breakwater to south pier light at United States Coast Guard station and line represented by extension of Tift Street to south end of south breakwater.	6	B	B
129	E portion as described	Lake Erie	Waters southerly of line represented by extension of Tift Street to south end of south breakwater; southerly of line from south end of south breakwater to south pierhead light and easterly of south entrance arm breakwater and Stony Point breakwater excluding Union Canal and Lackawanna Canal.	6	C	C
130	Union Canal	Union Canal	Enters Lake Erie in section designated as item no. 129.	6	D	D
131	Lackawanna Canal	Lackawanna Canal	Enters Lake Erie in section designated as item no. 129.	6	D	D

TABLE I (contd.)

Item No.	Water's Index Number	Name	Description	Map Ref. No.	Class	Standards
132	E portion as described	Lake Erie	Waters southerly and westerly of and within one thousand (1000) feet of south entrance arm breakwater and Stony Point breakwater and westerly of and within one thousand (1000) feet of east shore of Lake Erie between south pierhead light and line represented by extension of First Street in Woodlawn (town of Hamburg) to Lake Erie.	6	C	C
133	E portion as described	Lake Erie	Waters westerly of and within one thousand (1000) feet of shore of Lake Erie between line represented by extension of First Street in Woodlawn (town of Hamburg) and line constructed perpendicular to international boundary line and connecting such boundary line with westerly bank of Eighteenmile Creek, item 237, at its mouth.	6, 10	B	B

TABLE I (cont'd)

Item No.	Waters Index Number	Name	Description	Map Ref. No.	Class	Standards
134	E-1 portion as described	Lake Erie	All other portions of easterly end of Lake Erie not included in above descriptions southerly and easterly of international boundary line and a line constructed perpendicular to international boundary line and connecting such boundary line with westerly bank of Eighteen Mile Creek, Item No. 237, at its mouth.	6,10		A-Special*
135	E-1 portion as described	Buffalo River	Enters Lake Erie from east at United States Coast Guard station. Mouth to City of Buffalo-West Seneca town line and including Buffalo Ship Canal.	6	D	D
136	E-1 portion as described	Buffalo River	From City of Buffalo-West Seneca town line to Cayuga Creek, Item No. 173.	6	D	D
137	E-1 portion as described	Buffalo River	From Cayuga Creek, Item No. 173, to trib. 18, Item No. 203.	6,7	B	B
138	E-1 portion as described	Buffalo River	From trib. 18, Item No. 203, to source.	7,11,12	A	A

* (International boundary waters)

TABLE I (cont'd)

Item No.	Waters Index Number	Name	Description	Map Ref. No.	Class	Standards
139	E-1-4 portion as Described	Cazenovia Creek	Enters Buffalo River from southeast approximately 6.14 miles above mouth. Mouth to Cazenovia Street Bridge, City of Buffalo.	6	D	D
140	E-1-4 portion as described	Cazenovia Creek	From Cazenovia Street Bridge, City of Buffalo, to junction of East Branch Cazenovia Creek, Item No. 144, and West Branch Cazenovia Creek, Item No. 159.	6,7	B	B
141	E-1-4-1,2,3,4, 5 and 6 and tribs. as shown on reference map	Tributaries of Cazenovia Creek	Enter Cazenovia Creek from east and south between mouth and Spring Brook, Item No. 142.	6,7	D	D
142	E-1-4-7 and trib. as shown on reference map	Spring Brook	Enters Cazenovia Creek from east at Spring Brook.	7	C	C(T)
143	E-1-4-8,9,10,11, 12 and 13	Tributaries of Cazenovia Creek	Enter Cazenovia Creek from east and south between Spring Brook, Item No. 142, and junction of East Branch Cazenovia Creek, Item No. 144, and West Branch Cazenovia Creek, Item No. 159.	7	D	D

TABLE I (contd.)

Item No.	Waters Index Number	Name	Description	Map Ref. No.	Class	Standards
144	E-1-4-14 portion as described	East Branch Cazenovia Creek	Enters Cazenovia Creek from south approximately 0.5 mile west of East Aurora village line. Mouth to hamlet of Holland.	7,11	B	B
145	E-1-4-14 portion as described	East Branch Cazenovia Creek (Protection Creek above) trib. 26	From hamlet of Holland to source.	11,12	C	C(T)
146	E-1-4-14-1,2,3 and trib. as shown on reference map	Tributaries of East Branch Cazenovia Creek	Enter East Branch Cazenovia Creek from north and south at approximately 0.4, 0.6 and 1.2 miles respectively above mouth.	7,11	D	D
147	E-1-4-14-4 and trib. as shown on reference map	Tannery Brook	Enters East Branch Cazenovia Creek from northeast approximately 1.8 miles above mouth.	7	D	D
148	E-1-4-14-5,6,7,8,9,10,11,12,13,14,15,16,17,18,19,20 and 21 and trib. as shown on reference map	Tributaries of East Branch Cazenovia Creek	Enter East Branch Cazenovia Creek from east and west between Tannery Brook, item no. 147 and hamlet of Holland.	7,11	B	B
149	E-1-4-14-22 and 23 and trib. as shown on reference map	Tributaries of East Branch Cazenovia Creek	Enter East Branch Cazenovia Creek from south at hamlet of Holland and approximately 0.5 mile above hamlet of Holland respectively.	11	B	B

TABLE I (contd.)

Item No.	Water's Index Number	Name	Description	Map Ref. No.	Class	Standards
150	E-1-4-14-24 and trib. as shown on reference map	Tributary of East Branch Cazenovia Creek	Enters East Branch Cazenovia Creek from east approximately 1.5 miles above hamlet of Holland.	11	C	C(T)
151	E-1-4-14-25	Tributary of East Branch Cazenovia Creek	Enters East Branch Cazenovia Creek from west approximately 1.6 miles above hamlet of Holland.	11	D	D
152	E-1-4-14-26	Tributary of East Branch Cazenovia Creek	Enters East Branch Cazenovia Creek from south approximately 2.1 miles above hamlet of Holland.	11	C	C(T)
153	E-1-4-14-26-1,2,3,4 and 5 and trib. as shown on reference map	Tributaries of a tributary of East Branch Cazenovia Creek	Enter stream between mouth and source.	11	D	D
154	E-1-4-14-27	Tributary of East Branch Cazenovia Creek	Enters East Branch Cazenovia Creek from east approximately 2.5 miles above hamlet of Holland.	11	B	B
155	E-1-4-14-28	Tributary of East Branch Cazenovia Creek	Enters East Branch Cazenovia Creek from southeast approximately 3.0 miles above hamlet of Holland.	11	D	D
156	E-1-4-14-29 excluding P 50 and P 51	Tributary of East Branch Cazenovia Creek	Enters East Branch Cazenovia Creek from north approximately 3.7 miles above hamlet of Holland.	12	C	C(T)

TABLE 1 (cont'd)

Item No.	Waters Index Number	Name	Description	Map Ref. No.	Class	Standards
157	E-1-4-14-29-P 50 and P 51	Ponds on Tributary of a tributary of East Branch Cazenovia Creek	Ponds lie approximately 0.5 mile above mouth of stream.	12	B	B(T)
158	E-1-4-14-30 and 31	Tributaries of East Branch Cazenovia Creek	Enter East Branch Cazenovia Creek from southwest and southeast respectively between trib. 29, item no. 156, and source.	11,12	C	C(T)
158.1	E-1-4-14-30-P 52a	Erie County Conservation Society Pond	Pond is at headwaters of tributary 30, Item No. 158	11	C	C
159	E-1-4-15 portion as described	West Branch Cazenovia Creek	Enters Cazenovia Creek from southwest approximately 0.5 mile west of East Aurora village line. Mouth to trib. 4, item no. 163.	7,11	B	B
160	E-1-4-15 portion as described	West Branch Cazenovia Creek	From trib. 4, item no. 163, to trib. 5, item no. 164.	11	A	A
161	E-1-4-15 portion as described	West Branch Cazenovia Creek	From trib. 5, item no. 164, to source.	11	B	B
162	E-1-4-15-1,2 and 3	Tributaries of West Branch Cazenovia Creek	Enter West Branch Cazenovia Creek from east and west at points approximately 0.4, 0.7 and 1.5 miles from mouth respectively.	7,11	B	B
163	E-1-4-15-4	Tributary of West Branch Cazenovia Creek	Enters West Branch Cazenovia Creek from east approximately 1.7 miles from mouth	11	B	B

TABLE I (contd.)

Item No.	Water-Index Number	Name	Description	Map Ref. No.	Class	Standards
164	E-1-4-15-5 and trib. as shown on reference map	Tributary of West Branch Cazenovia Creek	Enters West Branch Cazenovia Creek from east approximately 2.9 miles from mouth.	11	B	B
165	E-1-4-15-6, 7, 8 and trib. as shown on reference map	Tributaries of West Branch Cazenovia Creek	Enter West Branch Cazenovia Creek from east and west between trib. 5, item 164, and Pipe Creek, item no. 166.	11	B	B
166	E-1-4-15-10 and trib. as shown on reference map	Pipe Creek	Enters West Branch Cazenovia Creek from east approximately at Aurora-Colden town line.	11	A	A
167	E-1-4-15-11, 12, 13, 14, 15, 16, 17 and 18 and tribs. as shown on reference map	Tributaries of West Branch Cazenovia Creek	Enter West Branch Cazenovia Creek between Pipe Creek, item no. 166, and Crump Brook, item no. 168.	11	B	B
168	E-1-4-15-19 and trib. as shown on reference map	Crump Brook	Enters West Branch Cazenovia Creek from southeast approximately 0.2 mile below Colden-Concord town line.	11	B	B
169	E-1-4-15-20	Tributary of West Branch Cazenovia Creek	Enters West Branch Cazenovia Creek from west approximately 0.3 mile above Colden-Concord town line.	11	B	B
170	E-1-4-15-21 and tribs. as shown on reference map	Sprague Brook	Enters West Branch Cazenovia Creek from east approximately 0.9 mile above Colden-Concord town line.	11	B	B

TABLE I (contd.)

Item No.	Waters Index Number	Name	Description	Map Ref. No.	Class	Standards
171	E-1-4-15-22 and tribs. as shown on reference map	Spencer Brook	Enters West Branch Cazenovia Creek from east approximately 2.5 miles above Colden-Concord town line.	11	B	B
172	E-1-4-15-23	Graff Brook	Enters West Branch Cazenovia Creek from east approximately 4.0 miles above Colden-Concord town line.	11	B	B
173	E-1-6 portion as described	Cayuga Creek	Enters Buffalo River from east approximately 1.0 mile east of City of Buffalo-Cheektowaga town line. Mouth to Plumb Bottom Creek, item no. 178.	6,7	C	C
174	E-1-6 portion as described including P 65 (Como Lake)	Cayuga Creek	From Plumb Bottom Creek, item no. 178, to source.	7,8,12	B	B
175	E-1-6-1	Tributary of Cayuga Creek	Enters Cayuga Creek from west approximately 0.5 mile above mouth.	6	D	D
176	E-1-6-2 and tribs. as shown on reference map	Slate Bottom Creek	Enters Cayuga Creek from east approximately 2.0 miles above mouth.	6,7	D	D
177	E-1-6-3,4 and 5	Tributaries of Cayuga Creek	Enter Cayuga Creek between Slate Bottom Creek, item no. 176, and western boundary of Village of Lancaster.	7	D	D

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TABLE I (contd.)

Item No.	Waters Index Number	Name	Description	Map Ref. No.	Class	Standards
178	E-1-6-6 and tribs. as shown on reference map	Plumb Bottom Creek	Enters Cayuga Creek from east near intersection of St. Mary's Street, Village of Lancaster.	7	D	D
179	E-1-6-7 portion as described	Little Buffalo Creek	Enters Cayuga Creek from south-east approximately 1.4 miles east of Lancaster village line. Mouth to trib. 4, item no. 184.	7	C	C
180	E-1-6-7 portion as described	Little Buffalo Creek	From trib. 4, item no. 184, to trib. 6, item no. 186.	7	B	B
181	E-1-6-7 portion as described	Little Buffalo Creek	From trib. 6, item no. 186, to trib. 16, item no. 188.	7	C	C(T)
182	E-1-6-7 portion as described	Little Buffalo Creek	From trib. 16, item no. 188, to source.	7,8	C	C
183	E-1-6-7-1,2 and 3	Tributaries of Little Buffalo Creek	Enter Little Buffalo Creek at points approximately 0.5, 1.6 and 2.6 miles respectively above mouth.	7	D	D
184	E-1-6-7-4 and trib. as shown on reference map	Tributary of Little Buffalo Creek	Enters Little Buffalo Creek from east approximately 4.2 miles above mouth.	7	D	D
185	E-1-6-7-5	Tributary of Little Buffalo Creek	Enters Little Buffalo Creek from east approximately 0.5 mile above trib. 4, item no. 184.	7	D	D

TABLE I (contd.)

Item No.	Waters Index Number	Name	Description	Map Ref. No.	Class	Standards
186	E-1-6-7-6	Tributary of Little Buffalo Creek	Enters Little Buffalo Creek from northeast approximately 1.2 miles above trib. 4, item no. 184.	7	D	D
187	E-1-6-7-7,8,9,10,11,12,13,14 and 15 and tribs. as shown on reference map	Tributaries of Little Buffalo Creek	Enter Little Buffalo Creek between trib. 6, item no. 186, and trib. 16, item no. 188.	7,8	D	D
188	E-1-6-7-16 and trib. as shown on reference map	Tributary of Little Buffalo Creek	Enters Little Buffalo Creek from southeast approximately 1.4 miles west of Erie-Wyoming county line.	7,8	D	D
189	E-1-6-8,9,10,11,12,13,14,15,16,17,18,19,20,21,22 and 23 and tribs. as shown on reference map	Tributaries of Cayuga Creek	Enter Cayuga Creek between Little Buffalo Creek, item no. 179, and Cowlesville.	7,8	D	D
190	E-1-6-24 and tribs. as shown on reference map	Red Brook	Enters Cayuga Creek from east approximately 0.6 mile east of Cowlesville.	8	D	D
191	E-1-6-25,26,27,28 and 29 and tribs. as shown on reference map	Tributaries of Cayuga Creek	Enter Cayuga Creek between Red Brook, item no. 190, and Right or Gillett Creek, item no. 192.	8	D	D

TABLE I (contd.)

Item No.	Waters Index Number	Name	Description	Map Ref. No.	Class	Standards
192	E-1-6-30	Right Branch or Gillett Creek	Enters Cayuga Creek from north approximately 3.5 miles above Red Brook, item no. 190.	8	D	D
193	E-1-6-30-1, 2 and 3	Tributaries of Right Branch or Gillett Creek	Enter Right Branch or Gillett Creek between mouth and Bennington.	8	D	D
194	E-1-6-30-4	Fenton Creek	Enters Right Branch or Gillett Creek approximately 0.7 mile east of Bennington.	8	D	D
195	E-1-6-30-4-1 and tribs. as shown on reference map	French Brook	Enters Fenton Creek approximately 0.5 mile above mouth.	8	D	D
196	E-1-6-30-5, 6, 7, 8, 9, 10, 11, 12 and tribs. as shown on reference map	Tributaries of Right Branch or Gillett Creek	Enter Right Branch or Gillett Creek between Fenton Creek, item no. 194, and source.	8	D	D
197	E-1-6-31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51 and 52 and tribs. as shown on reference map	Tributaries of Cayuga Creek	Enter Cayuga Creek between Right Branch or Gillett Creek, item no. 192, and source.	8, 12	D	D

TABLE I (contd.)

Item No.	Waters Index Number	Name	Description	Map Ref. No.	Class	Standards
198	E-1-7,8,9,10,11,12 13 and tribs. as shown on reference map	Tributaries of Buffalo River	Enter Buffalo River between Union Road, West Seneca and trib. 14, item no. 199.	7	B	B
199	E-1-14	Tributary of Buffalo River	Enters Buffalo River from north- east approximately 0.4 mile west of Elma.	7	D	D
200	E-1-15 and tribs. as shown on reference map	Pond Brook	Enters Buffalo River from south at Elma.	7	B	B
201	P 71, P 72, P 73 and P 74	Unnamed-ponds	Ponds located near source of Pond Brook, item no. 200, and approx- imately 0.5 to 1.0 mile north of East Aurora.	7	A	A
202	E-1-16, 17	Tributaries of Buffalo River	Enter Buffalo River from south- east approximately 0.2 and 0.4 mile east of Elma.	7	D	D
203	E-1-18	Tributary of Buffalo River	Enters Buffalo River from east approximately 5.2 miles above Elma.	7	D	D
204	E-1-19 and 20 and trib.	Tributaries of Buffalo River	Enter Buffalo River from east approximately 1.4 and 0.6 miles below East Elma.	7	D	D

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TABLE I (contd.)

Item No.	Water's Index Number	Name	Description	Map Ref. No.	Class	Standards
205	E-1-21 and trib. as shown on reference map	Tributary of Buffalo River	Enters Buffalo River from south approximately 0.4 mile above East Elma.	7	B	B(T)
206	E-1-22 and trib. as shown on reference map	Belowe Creek	Enters Buffalo River from south approximately 1.0 mile above East Elma.	7	D	D
207	E-1-23	Ellis Brook	Enters Buffalo River from east approximately 1.3 miles above East Elma.	7	C	C(T)
208	E-1-24, 25, 26, 27, 28 and 29 and trib. as shown on reference map	Tributaries of Buffalo River	Enter Buffalo River between Ellis Brook, item no. 207, and Hunter Creek, item no. 209.	7	D	D
209	E-1-30 and trib. as shown on reference map	Hunter Creek	Enters Buffalo River from west approximately 0.5 mile above Wales Center.	7, 11, 12	B	B
210	E-1-31, 32, 33 and 34 and trib. as shown on reference map	Tributaries of Buffalo River	Enter Buffalo River between Hunter Creek, item no. 209, and trib.	7, 8, 11	D	D
211	E-1-35 and trib. as shown on reference map	Tributary of Buffalo River	Enters Buffalo River from south approximately 0.8 mile below Wales Hollow.	11, 12	D	D

TABLE I (contd.)

Item No.	Water Index Number	Name	Description	Map Ref. No.	Class	Standards
212	E-1-36, 37, 38 and 39	Tributaries of Buffalo River	Enter Buffalo River between trib. 35, item no. 211, and Hollow Creek, item no. 213.	8, 12	D	D
213	E-1-40 and tribs. as shown on reference map	Hollow Creek	Enters Buffalo River from north-east approximately 0.5 mile below Erie-Wyoming county line.	8, 12	D	D
214	E-1-41, 42, 43 and 44 and tribs. as shown on reference map	Tributaries of Buffalo River	Enter Buffalo River between Hollow Creek, item no. 213, and Glade Creek, item no. 215.	12	D	D
215	E-1-45 and tribs. as shown on reference map	Glade Creek	Enters Buffalo River from east approximately 0.6 mile above Erie-Wyoming county line.	12	D	D
216	E-1-46, 47, 48, 49, 50, 51, 52, 53 and 54 and tribs. as shown on reference map	Tributaries of Buffalo River	Enter Buffalo River from east and west between Glade Creek, item no. 215, and Java Village.	12	D	D
217	E-1-55	Beaver Meadow Creek	Enters Buffalo River from east at Java Village.	12	C	C(T)
218	E-1-55-1	Tributary of Beaver Meadow Creek	Enters Beaver Meadow Creek from northeast approximately 1.7 miles above mouth.	12	D	D

TABLE I (contd.)

Item No.	Waters Index Number	Name	Description	Map Ref. No.	Class	Standards
219	E-1-55-2	Tributary of Beaver Meadow Creek	Enters Beaver Meadow Creek from south approximately 4.6 miles above mouth.	12	C	C(T)
220	E-1-56, 57 and 58 and tribs. as shown on reference map	Tributaries of Buffalo River	Enter Buffalo River from east and west between Beaver Meadow Creek, item no. 219, and Plato Creek, item no. 221.	12	D	D
221	E-1-59 and tribs. as shown on reference map	Plato Creek	Enters Buffalo River from south approximately 0.9 mile above Java Village.	12	D	D
222	E-1-60, 61, 62, 63, 64, 65, 66, 67 and 68 and tribs. as shown on reference map	Tributaries of Buffalo River	Enter Buffalo River from east and west between Plato Creek, item no. 221, and trib. 69, item no. 223.	12	D	D
223	E-1-69 and tribs. as shown on reference map	Tributary of Buffalo River	Enters Buffalo River from east approximately 0.2 mile below Sardinia-Holland town line.	12	C	C(T)
224	E-1-70	Tributary of Buffalo River	Enters Buffalo River from east approximately 1.0 mile above Erie-Wyoming county line.	12	D	D
225	E-2	Smoke Creek	Enters Lake Erie from east approximately 0.6 mile north of City of Lakawanna-Hamburg town line.	6, 7, 11	D	D

TABLE 1 (cont'd)

Item No.	Waters Index Number	Name	Description	Map Ref. No.	Class	Standards
226	E-2-1 portion as described	South Branch	Enters Smoke Creek from south-east 1.5 miles above mouth. Mouth to Green Lake, item no. 227.	6,7	C	C
227		Green Lake	Located on South Branch just west of S. Buffalo Street, Orchard Park.	7	B	B
228	E-2-1 portion as described	South Branch	From Green Lake, item no. 227, to source.	7,11	B	B
229	E-2-1-1,2,4	Tributaries of South Branch	Enter South Branch between mouth and Green Lake, item No. 227	6,10	D	D
229.1	E-2-1-3	Trib. of South Branch	Mouth to source	6,10, 11	C	C
229.2	E-2-1-3-1,2,3	Subtribs. of South Branch		6,10	D	D
230	E-2-1-5	Tributary of South Branch	Enters South Branch from south approximately 0.5 mile above Ellicott.	11	B	B
231	E-2-2 portion as described	Tributary of Smoke Creek	Enters Smoke Creek from south approximately 0.7 mile due north of Webster Corner. Mouth to outlet of P 80 easterly of Freeman Ponds. Near junction of S. Freeman Road and E. Quaker Street, Orchard Park.	7	D	D

TABLE 1 (cont'd)

Item No.	Waters Index Number	Name	Description	Map Ref. No.	Class	Standards
232	E-2-2 portion as described Tributary of including P 80 and P 81 Smoke Creek (Freeman Ponds) and tribs. as shown on reference map	Smoke Creek	From outlet of P 80, easterly of Freeman Ponds to source.	7,11	C	C
233	E-2-3, 4, 5, 6, 7 and 8 and trib. as shown on reference map	Tributaries of Smoke Creek	Enter Smoke Creek above Orchard Park, East Aurora Road (Big Tree Road).	7,11	D	D
234	E-3 portion as described	Rush Creek	Enters Lake Erie from each approximately 1.1 miles south of City of Lackawanna-Hamburg town line. Mouth to a point 1/8 mile above mouth	6	B	B
235	E-3 portion as described and tribs. as shown on reference map	Rush Creek	From 1/8 mile above mouth to 1.6 miles above mouth	6	D	D
235.1	E-3 portion as described	Rush Creek	From 1.6 miles above mouth to 6.5 miles above mouth	6,10	C	C
235.2	E-3 portion as described	Rush Creek	From 6.5 miles above mouth to source	10	D	D
236	E-4, 5, 6, 7, 8, 9, 10, 11, and 12 and trib. as shown on reference map	Tributaries of Lake Erie	Enter Lake Erie from east and southeast between Rush Creek, item no. 234, and Eighteen Mile Creek, item no. 237.	6,10	D	D

TABLE 1 (cont'd)

Item No.	Waters Index Number	Name	Description	Map Ref. No.	Class	Standards
237	E-13 portion as described	Eighteen Mile Creek	Enters Lake Erie from southeast at Evans-Hamburg town line. Mouth to Village of Hamburg water supply dam.	10	B	B
238	E-13 portion as described	Eighteen Mile Creek	From Village of Hamburg water supply dam to trib. 41, item no. 253.	10, 11	A	A
239	E-13 portion as described	Eighteen Mile Creek	From trib. 41, item no. 253, to source.	11	A	A(T)
240	E-13-1, 2 and 3 and trib. as shown on reference map	Tributaries of Eighteen Mile Creek	Enter Eighteen Mile Creek between mouth and Eden-Hamburg town line.	10	D	D
241	E-13-4 portion as described including P 82	South Branch Eighteen Mile Creek	Enters Eighteen Mile Creek from east approximately 0.3 mile above Eden-Hamburg town line. Mouth to trib. 23, item no. 246.	10	B	B
242	E-13-4 portion as described including P 83	South Branch Eighteen Mile Creek	From trib. 23, item no. 246, to source.	10	C	C(TS)

TABLE I (contd.)

Item No.	Waters Index Number	Name	Description	Map Ref. No.	Class	Standards
243	E-13-4-1,2,3,4,5, 6,7,8,9,10,11, and 12 and tribs. as shown on reference map	Tributaries of South Branch Eighteen Mile Creek	Enter South Branch Eighteen Mile Creek between mouth and a point approximately 0.2 mile above North Collins-Eden town line.	10	B	B
244	E-13-4-13 and tribs. as shown on reference map	Jennings Creek	Enters South Branch Eighteen Mile Creek from south approximately 0.3 mile above North Collins-Eden town line.	10	B	B
245	E-13-4-14,15,16, 17,18,19,20,21, and 22 and tribs. as shown on reference map	Tributaries of South Branch Eighteen Mile Creek	Enter South Branch Eighteen Mile Creek between a point approximately 0.5 mile above North Collins-Eden town line and New Oregon.	10	B	B
246	E-13-4-23 and tribs. as shown on reference map	Tributary of South Branch Eighteen Mile Creek	Enters South Branch Eighteen Mile Creek from east at Langford Road, New Oregon.	10	B	B
247	E-13-4-24,25,26, 27,28,29,30,31,32, 33,34 and 35 and tribs. as shown on reference map	Tributaries of South Branch Eighteen Mile Creek	Enter South Branch Eighteen Mile Creek between New Oregon and source.	10,11	D	D
248	E-13-5	Tributary of Eighteen Mile Creek	Enters Eighteen Mile Creek from north approximately 2.4 miles above Evans-Hamburg town line.	10	B	B

TABLE I (contd.)

Item No.	Waters Index Number	Name	Description	Map Ref. No.	Class	Standards
249	E-13-6 and tribs. as shown on reference map	Hampton Brook	Enters Eighteen Mile Creek from south approximately 0.5 mile above Water Valley.	10	B	B
250	E-13-7 and tribs. as shown on reference map	Tributary of Eighteen Mile Creek	Enters Eighteen Mile Creek from southeast approximately 0.6 mile above Water Valley.	10	B	B
251	E-13-8 and tribs. as shown on reference map including P 83a, Chestnut Ridge Park Res.	Neuman Creek	Enters Eighteen Mile Creek from east approximately 0.5 mile east of Hamburg village line.	10,11	A	A
252	E-13-9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39 and 40 and tribs. as shown on reference map	Tributaries of Eighteen Mile Creek	Enter Eighteen Mile Creek between a point approximately 0.3 mile below Hamburg-Boston town line and north of Boston Cross Road, Boston.	10,11	A	A
253	E-13-41	Tributary of Eighteen Mile Creek	Enters Eighteen Mile Creek from west approximately 0.1 mile south of Boston Cross Road, Boston.	10,11	A	A

TABLE I (contd.)

Item No.	Waters Index Number	Name	Description	Map Ref. No.	Class	Standards
254	E-13-42,43, 45 and tribs. as shown on reference map	Tributaries of Eighteen Mile Creek	Enter Eighteen Mile Creek between trib. 41, item no. 253, and Landon Brook, item no. 255.	10,11	A	A
255	E-13-46 and tribs. as shown on reference map	Landon Brook	Enters Eighteen Mile Creek from east approximately 0.2 mile below Boston-Concord town line.	11	A	A
256	E-13-47,48,49,50, 51,52,53,54,55,56, 57,58,59,60,61,62, 63,74, and 65 and tribs. as shown on reference map	Tributaries of Eighteen Mile Creek	Enter Eighteen Mile Creek between a point 0.2 mile below Boston-Concord town line and source.	10,11	A	A
257	Any other streams, ponds or lakes				D	D

Historical Notes

Item No. 37: amd. filed Jan. 31, 1977 eff.
Jan. 31, 1977

Item No. 38: amd. filed Jan. 31, 1977 eff.
Jan. 31, 1977

Item No. 39: amd. filed Jan. 31, 1977 eff.
Jan. 31, 1977.

Item No. 108: amd. filed Jan. 31, 1977 eff.
Jan. 31, 1977

Item No. 134: amd. filed June 26, 1978
eff. June 26, 1978.

Item No. 158.1: filed Jan. 31, 1977 eff.
Jan. 31, 1977.

Item No. 229: amd. filed Jan. 31, 1977 eff.
Jan. 31, 1977

Item No. 229.1: filed Jan. 31, 1977 eff.
Jan. 31, 1977.

Item No. 229.2: filed Jan. 31, 1977 eff.
Jan. 31, 1977.

Item No. 235: amd. filed Jan. 31, 1977 eff.
Jan. 31, 1977

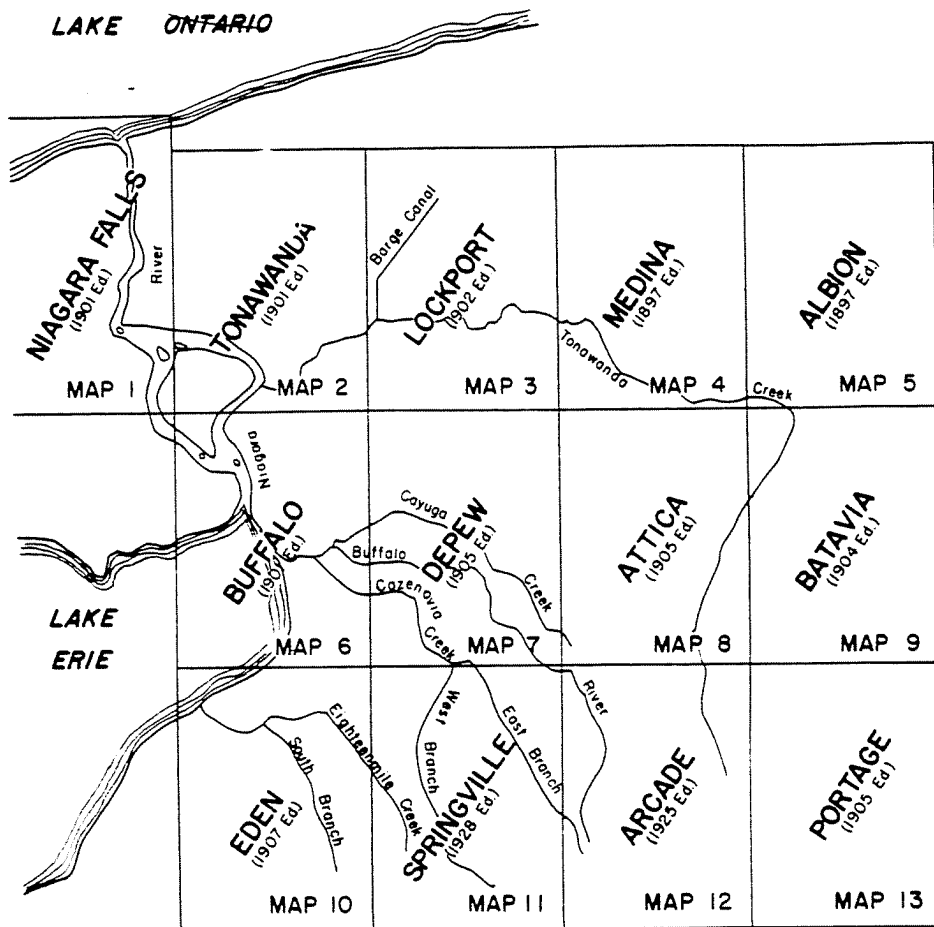
Item No. 235.1: filed Jan. 31, 1977 eff.
Jan. 31, 1977.

Item No. 235.2: filed Jan. 31, 1977 eff.
Jan. 31, 1977.

Item No. 242: amd. filed Jan. 31, 1977 eff.
Jan. 31, 1977

VICINITY MAP
LAKE ERIE (EAST END) AND
NIAGARA RIVER DRAINAGE BASINS
1952 SURVEY

SCALE IN MILES

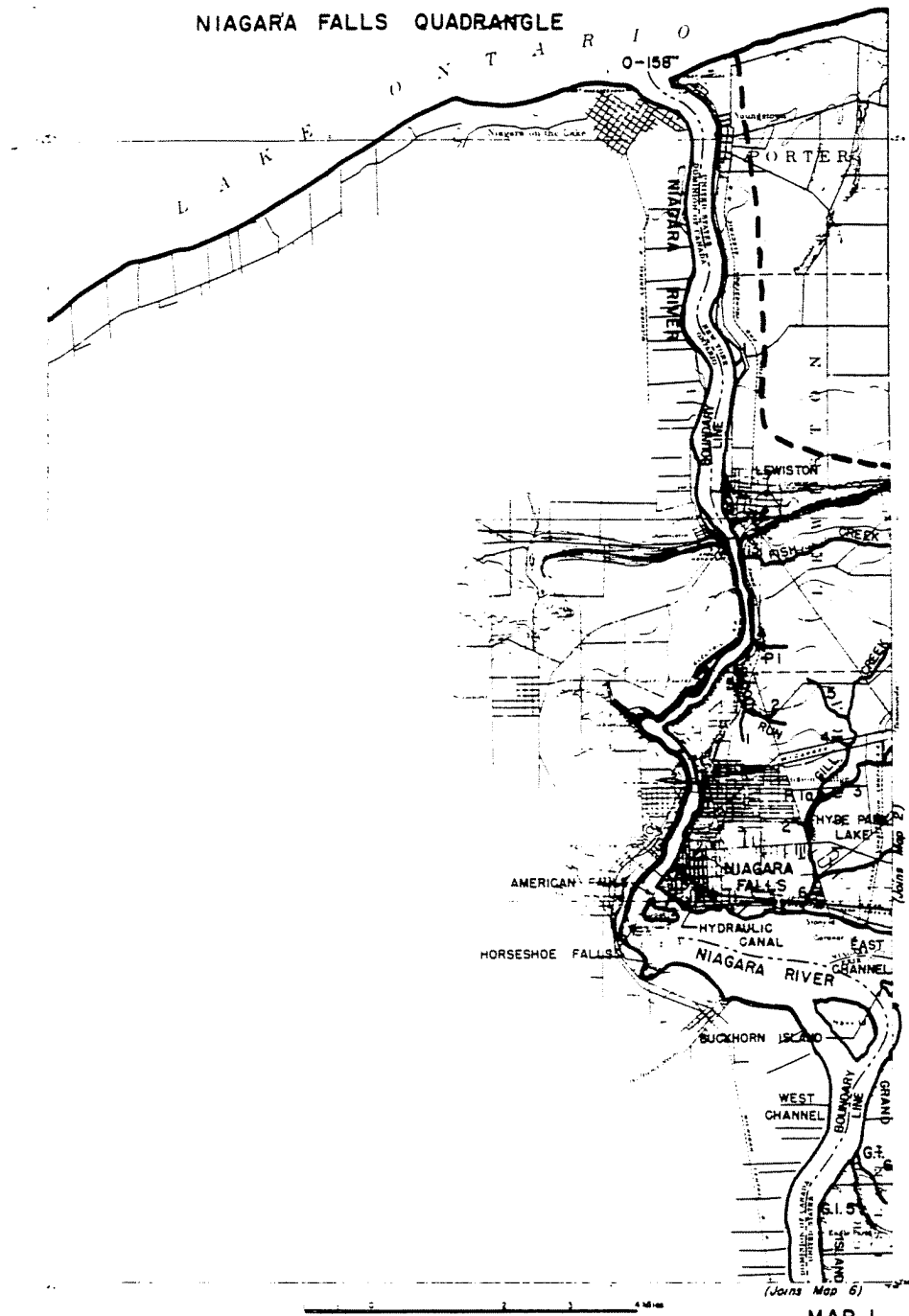


Note:

Scale of all Quadrangles - 1:62,500
 Published by U.S. Geological Survey
 Editions as shown.

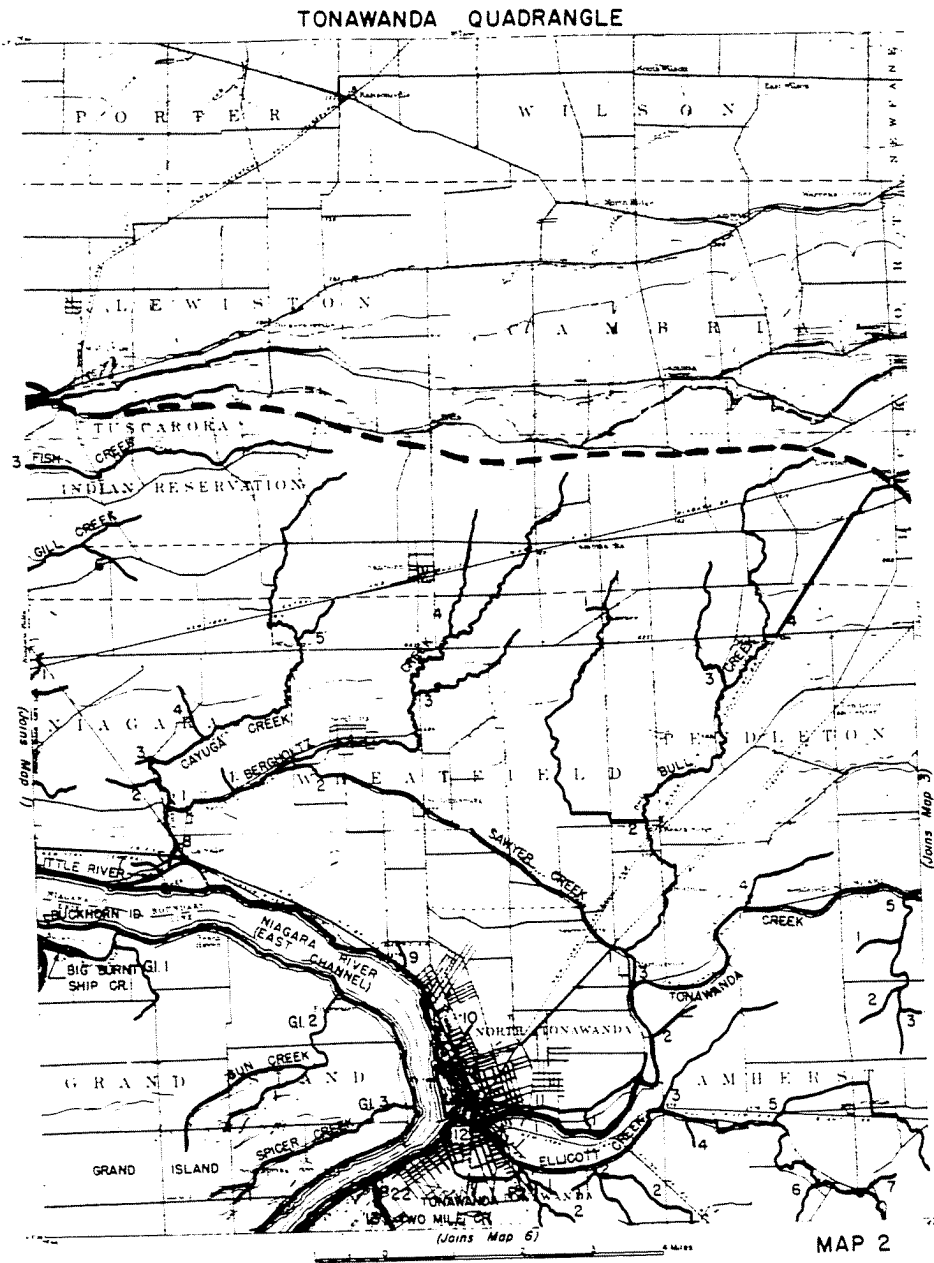
KEY TO STREAM
 IDENTIFICATION MAPS

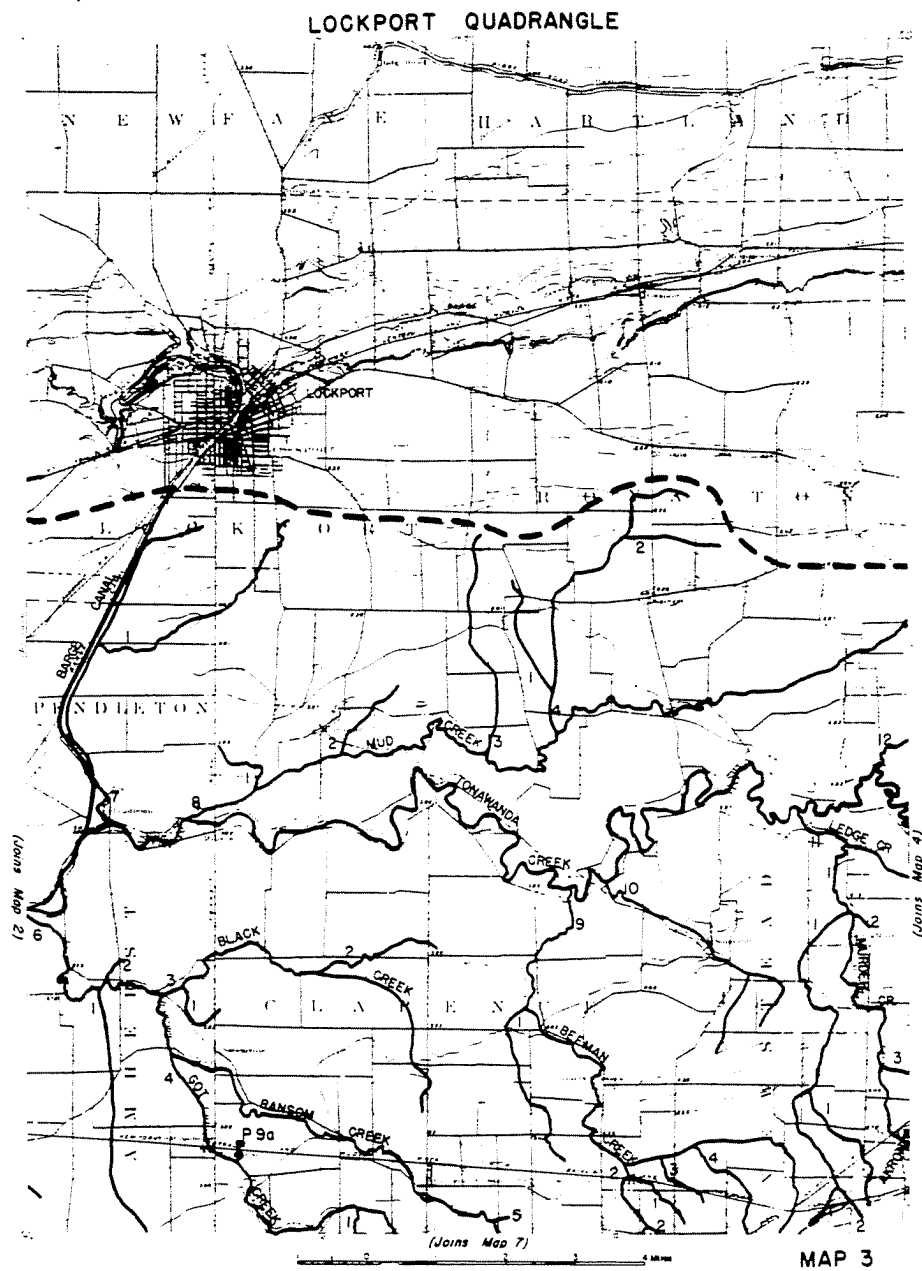
837.7 Quadrangle maps.

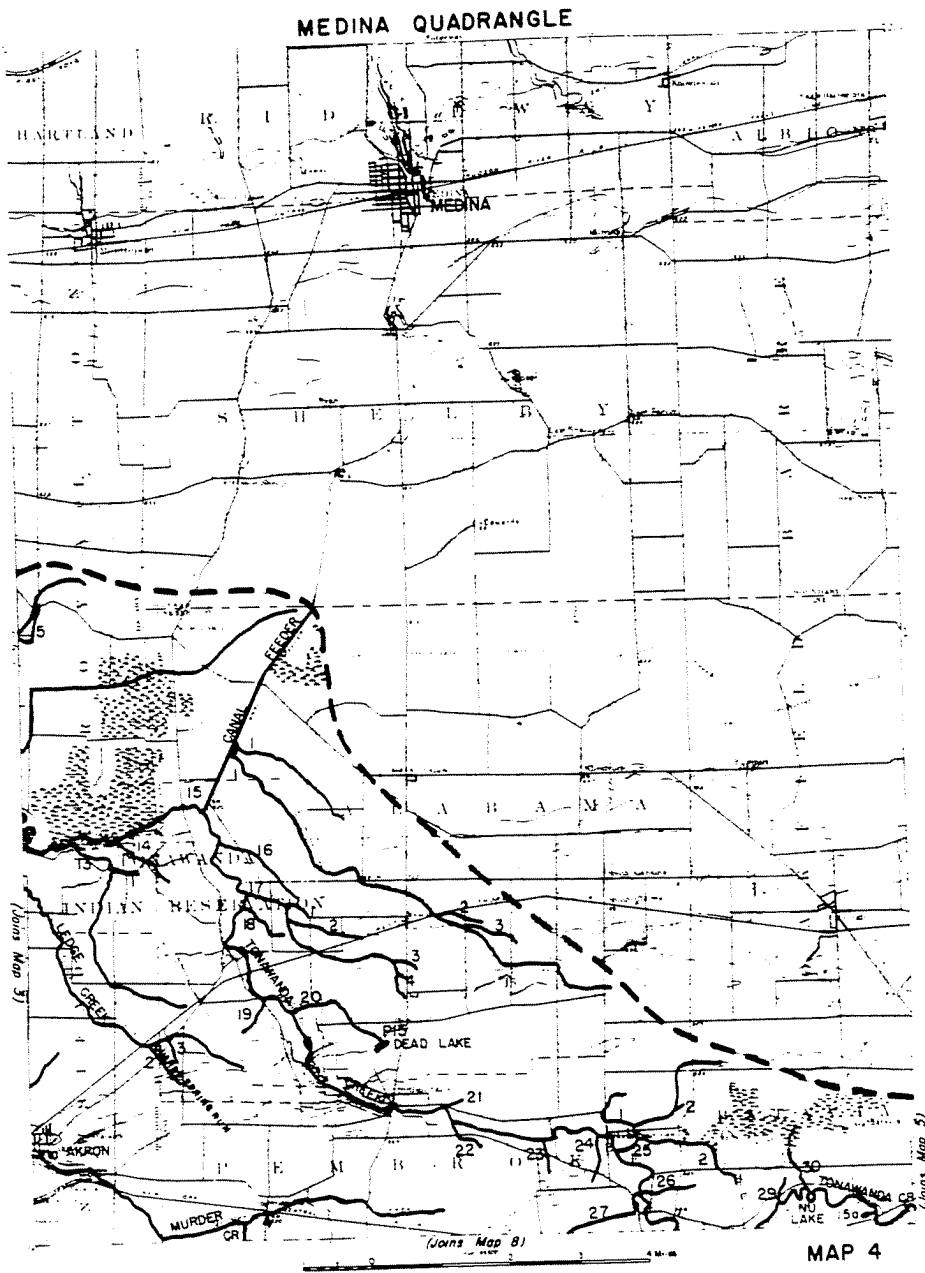


MAP I

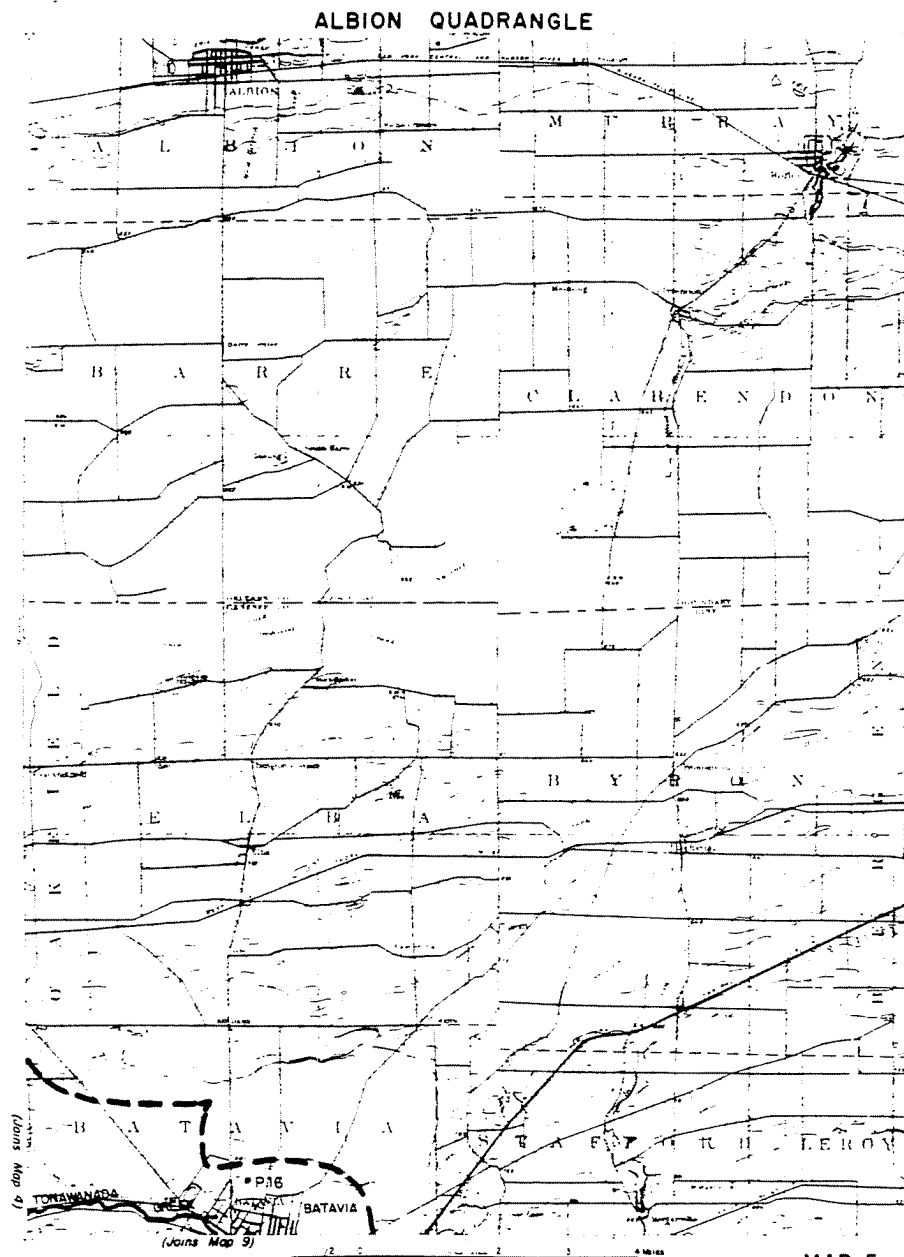
1649 CN 10-15-66

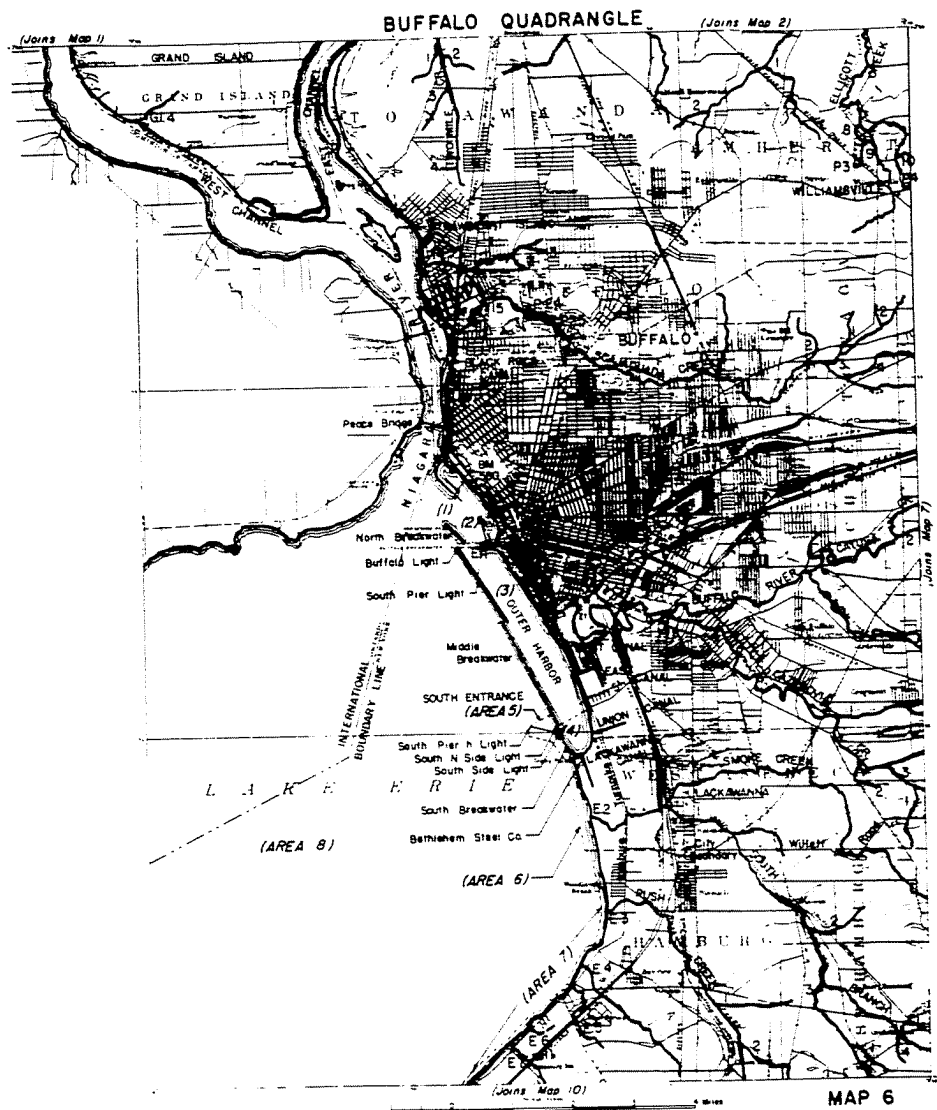


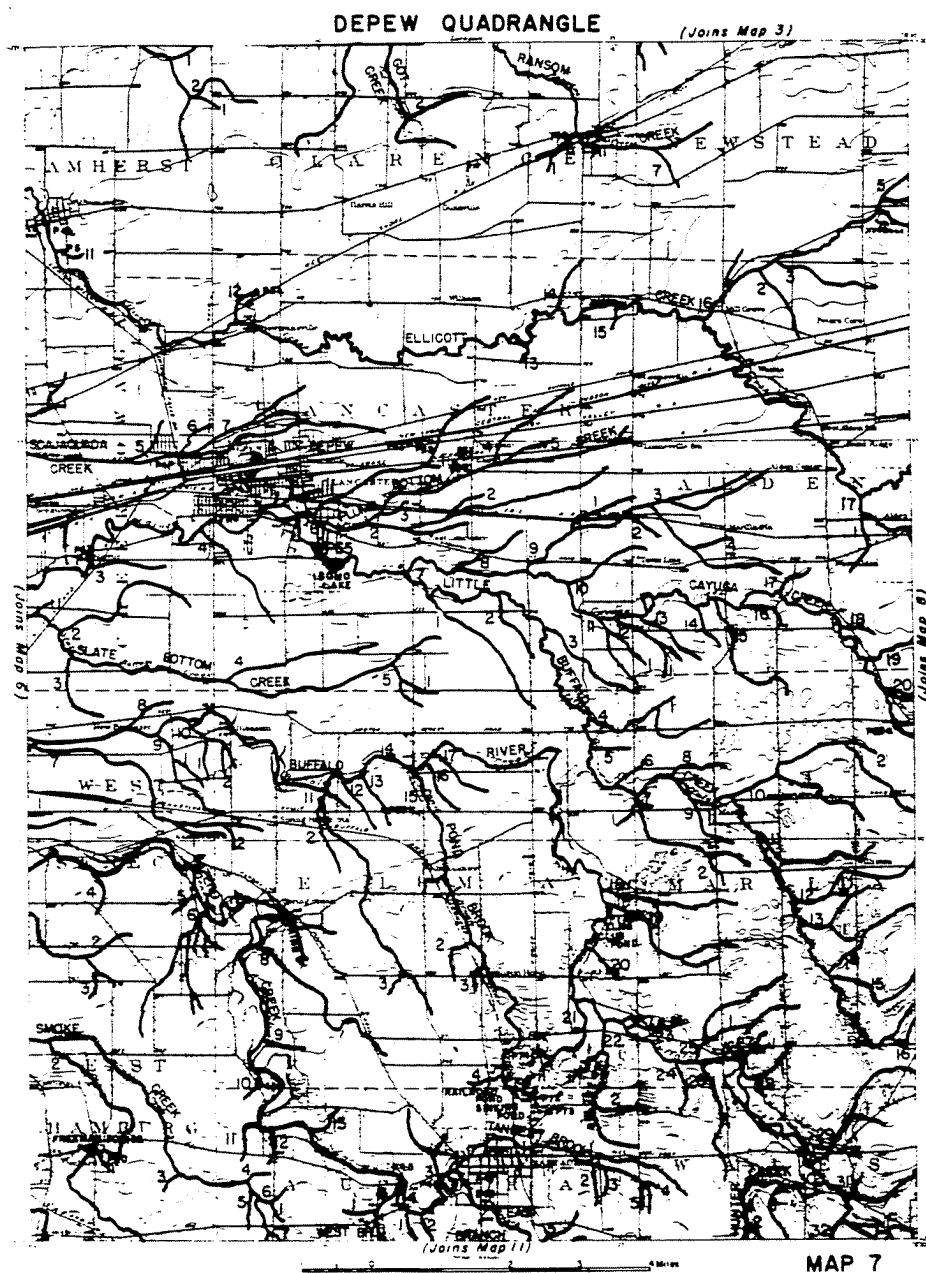


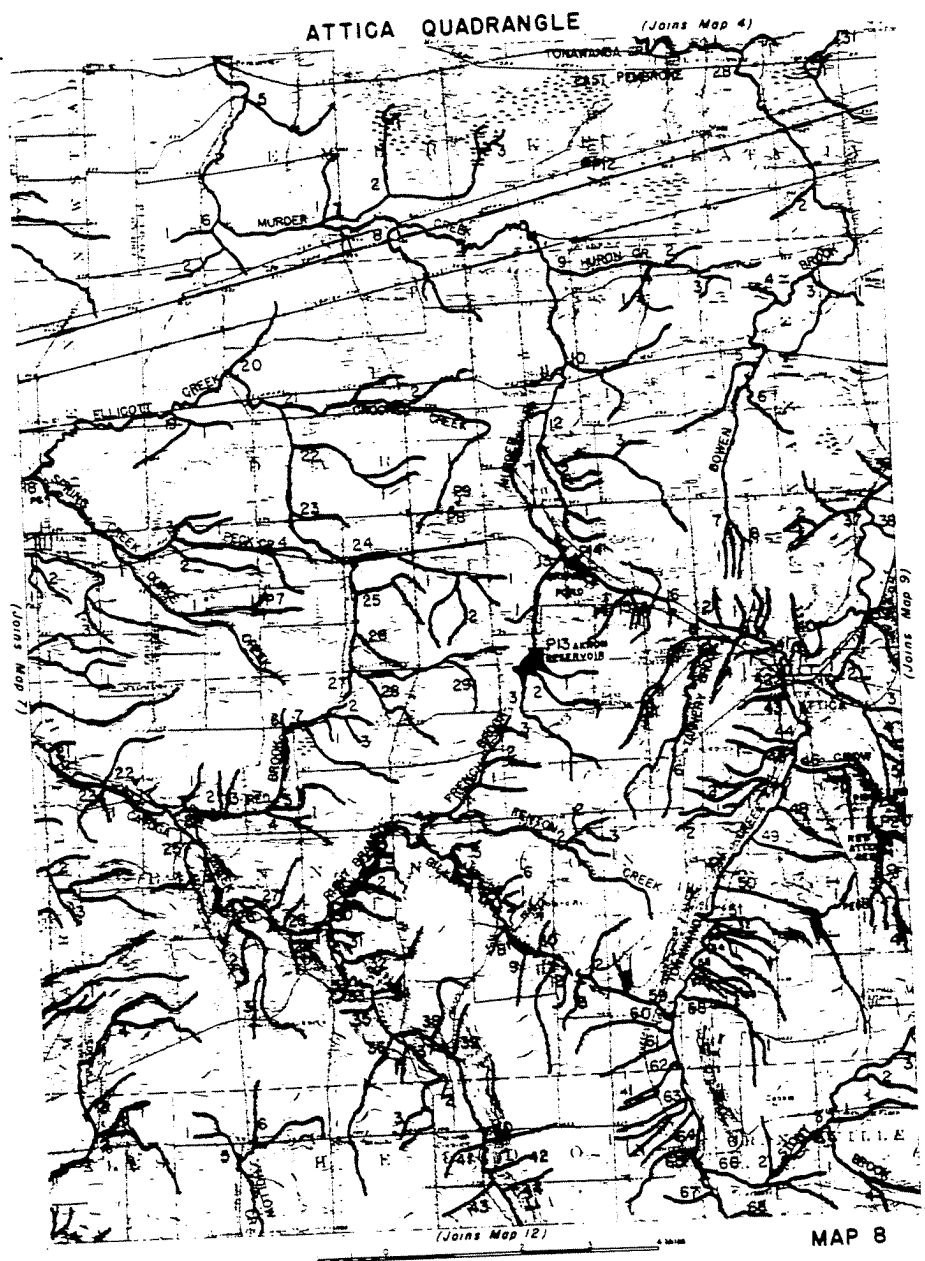


1652 CN 10-15-66

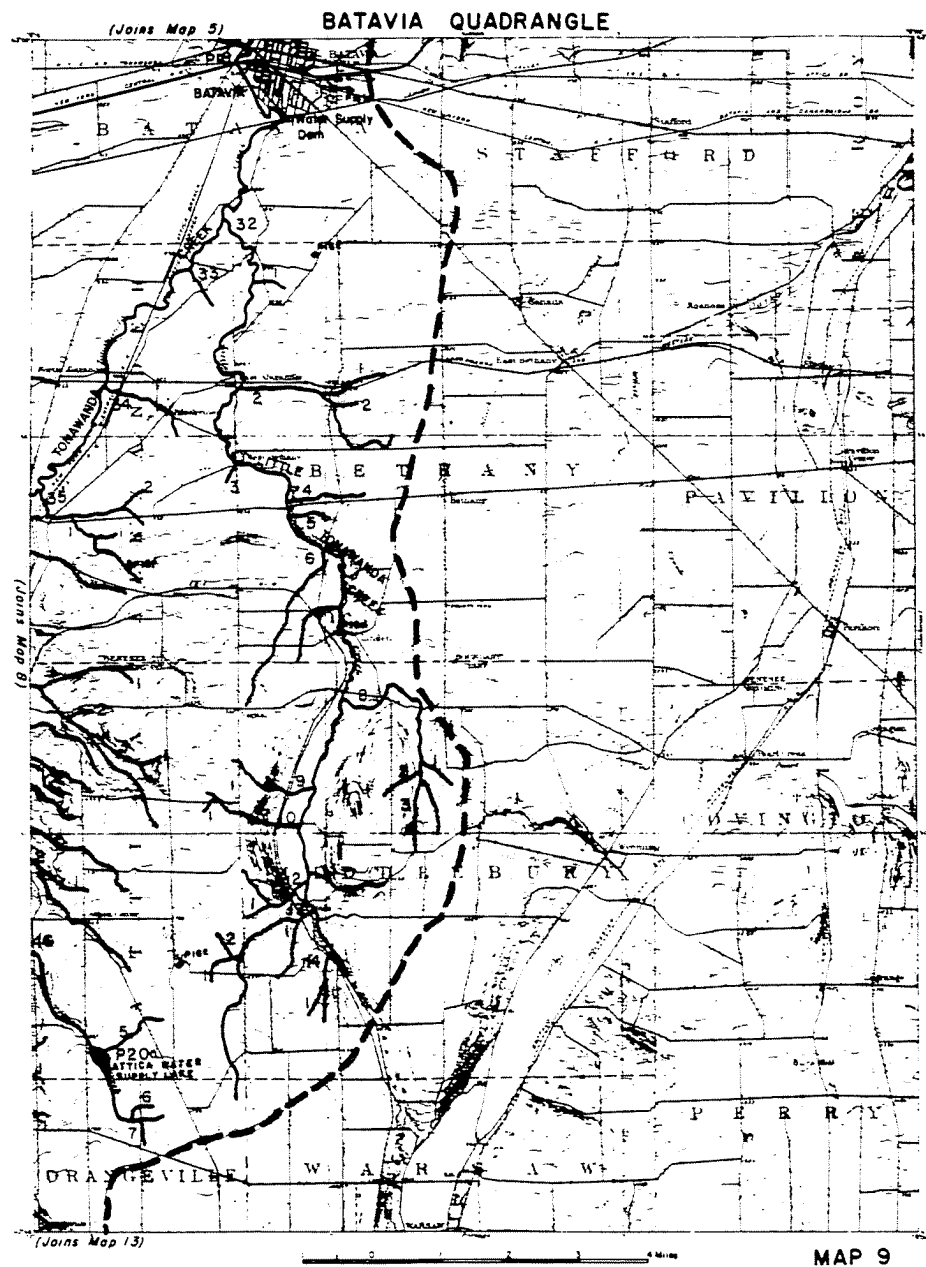


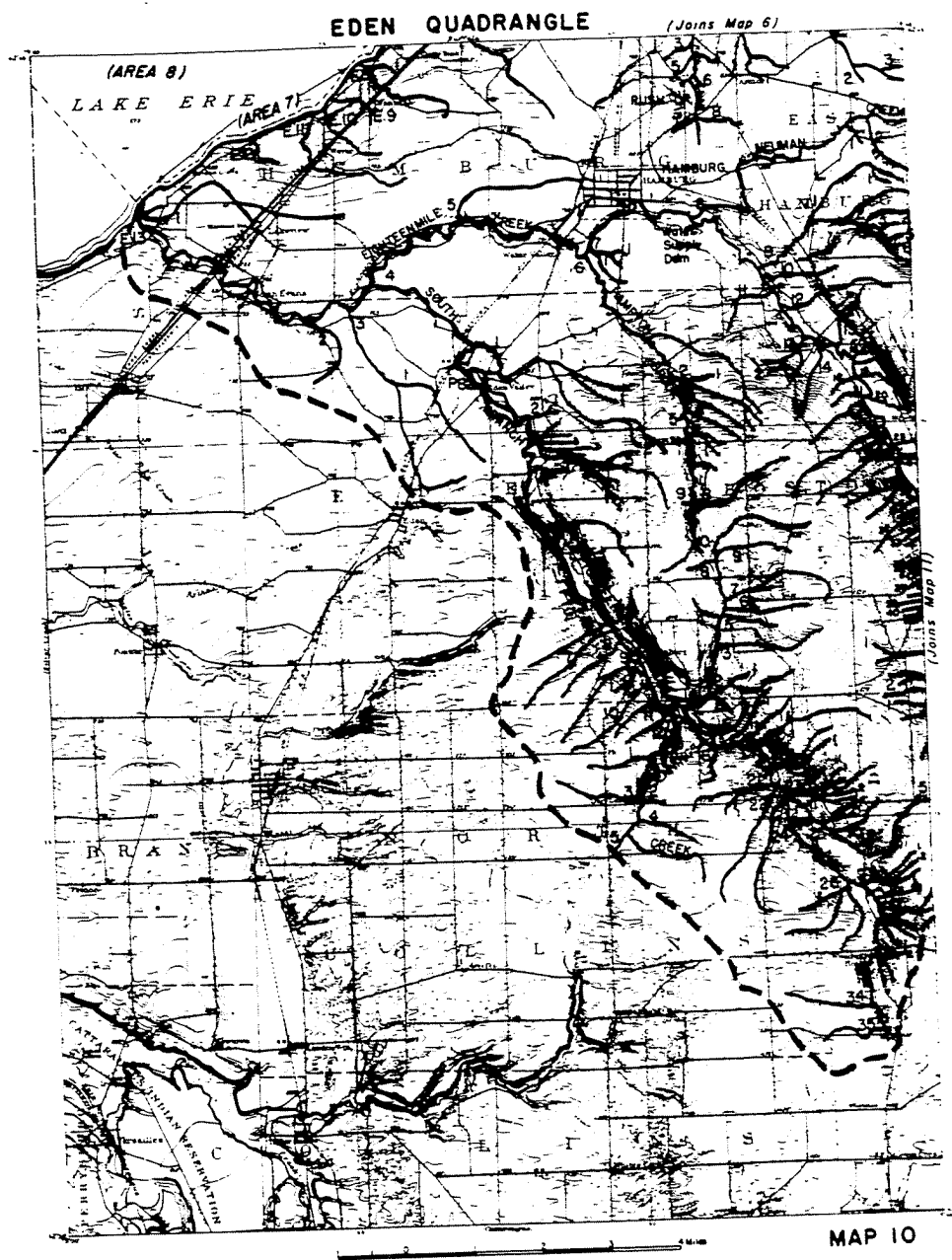


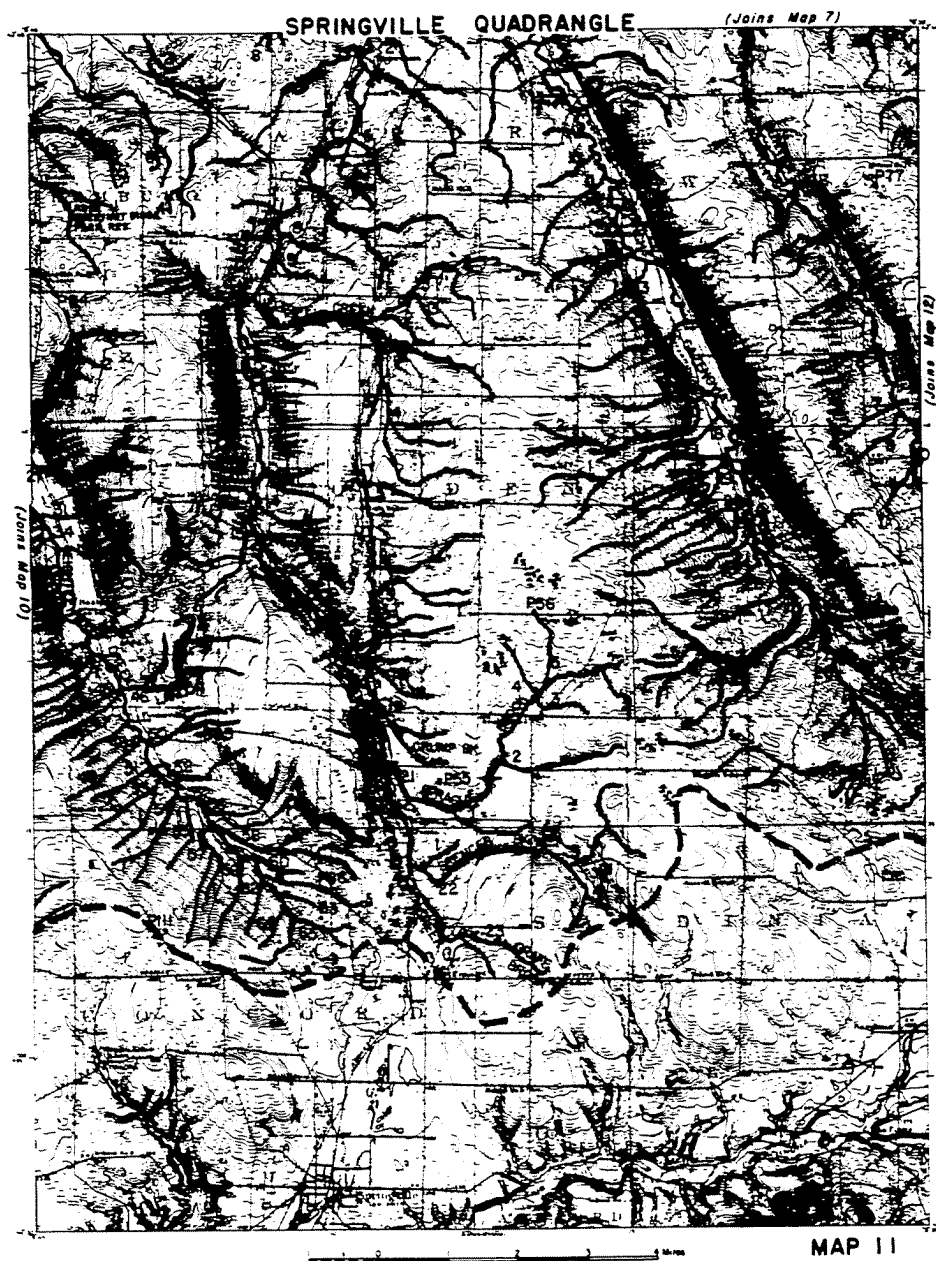


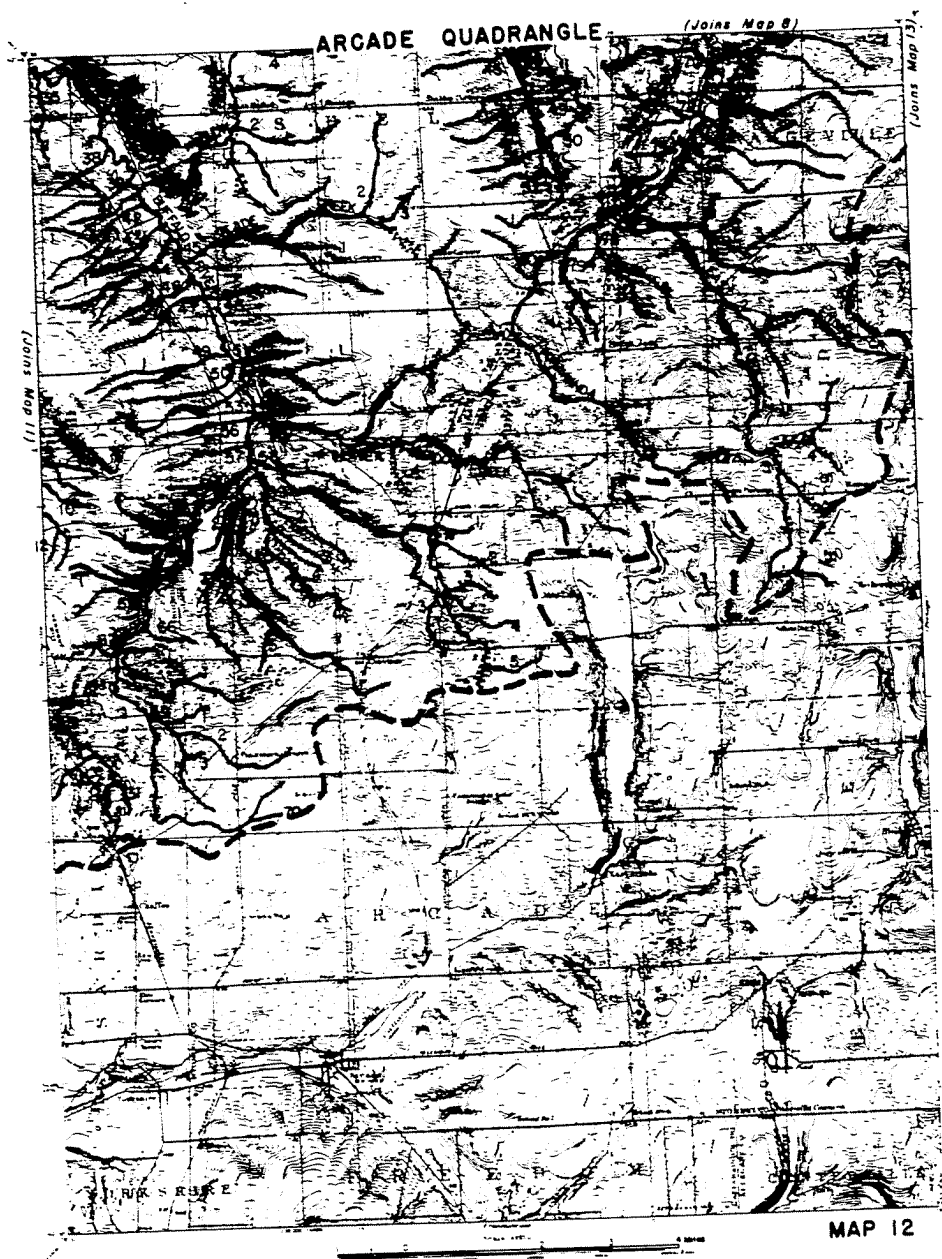


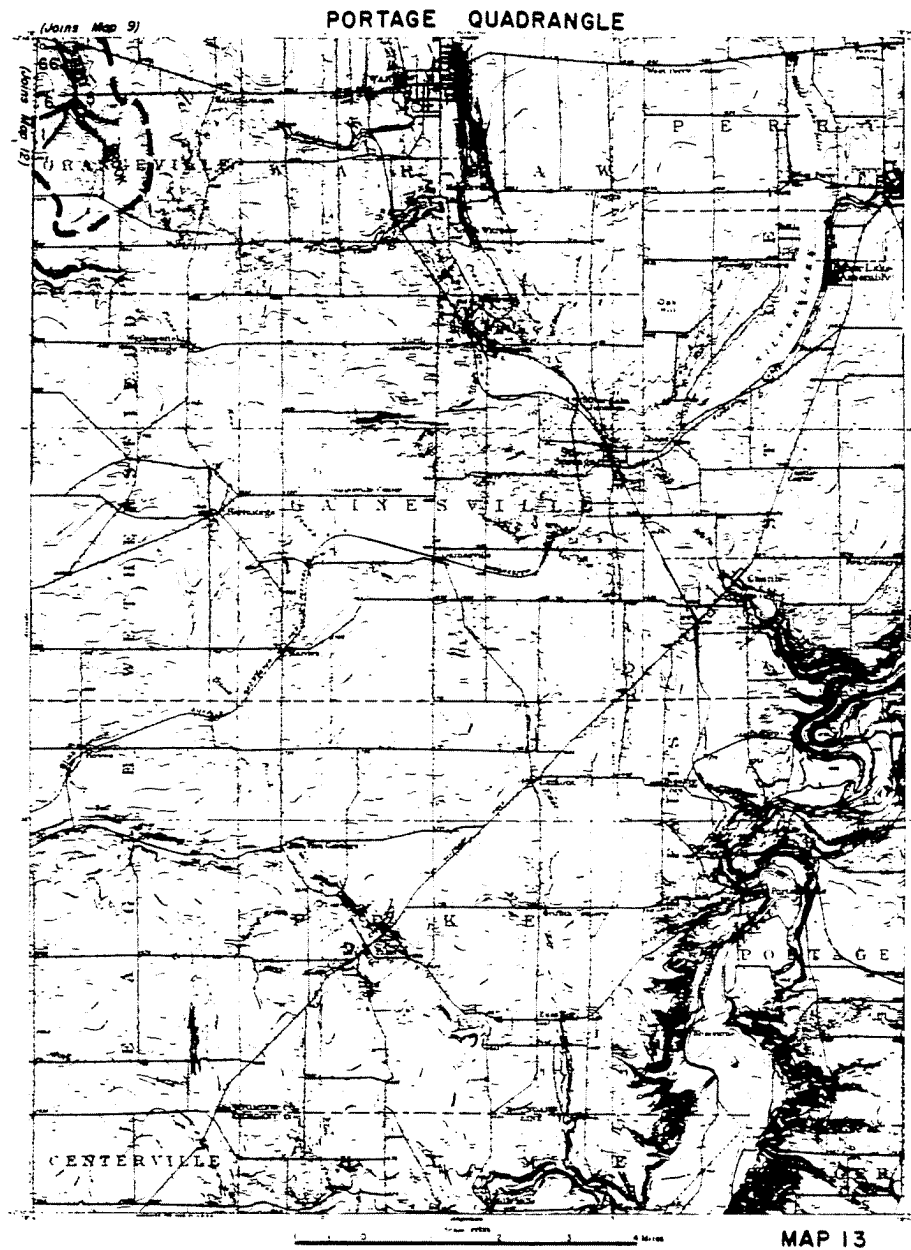
1656 CN 10-15-66



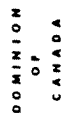








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WAGNER PATS. 11-20

MAP AND ORDINANCE REVISED. CODIFIED AND ADOPTED FEBRUARY 2 1970

REFERENCE 11

Gordon Batcheller DEC Wetlands information 847-4550

Wetlands		
93rd Street School	½ mile SE TW-6 Class II	
	1 mile WNW TW-3	TW-2

Class III		
Lockport	LP-25 Jackson Street North	
	TW3 & LP-25 tentatively id. from aerials, not classified in field	

Soil Types	Me, RoF	Made Land,
		Rock Land, Steep
	FaA	Farmington Silt Loom

6/3/83

11:00

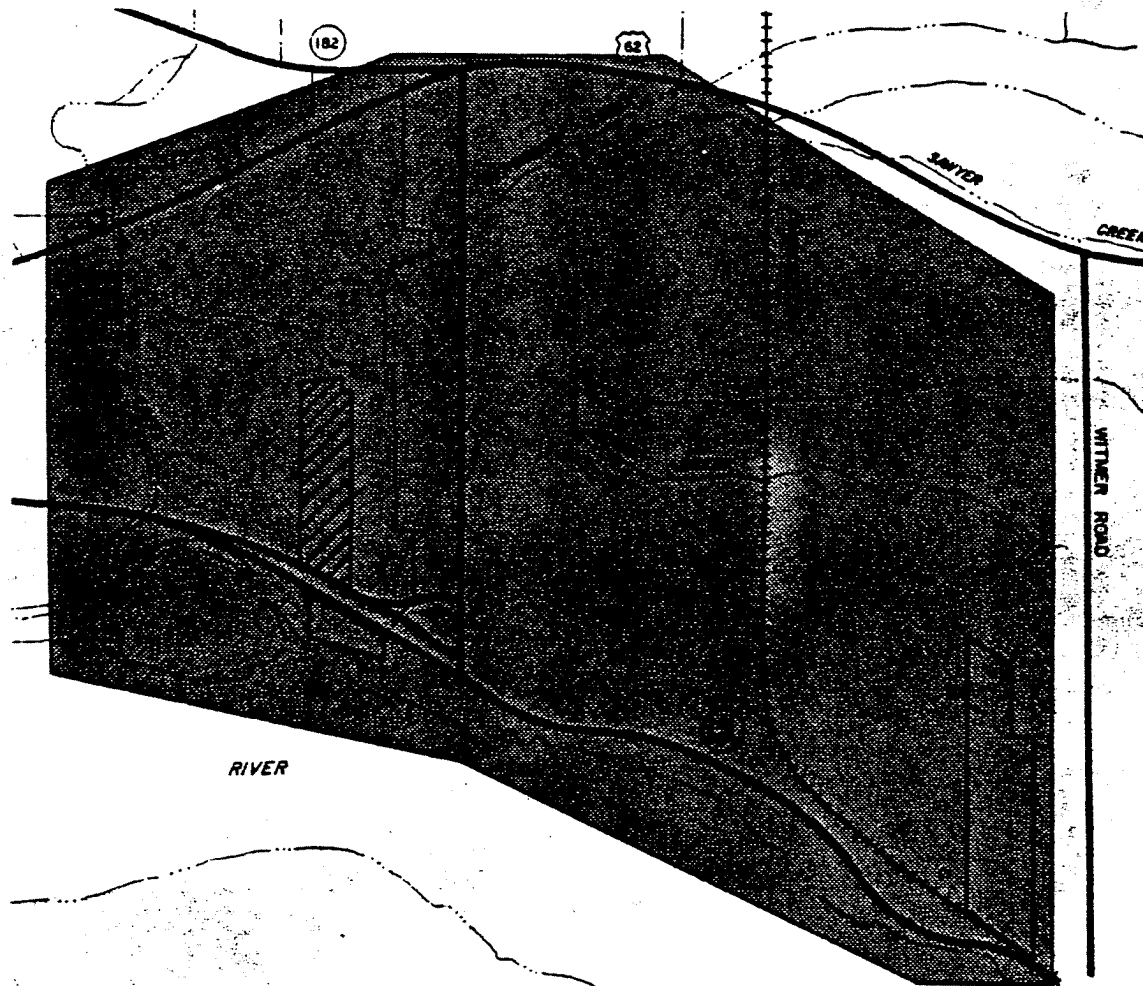
REFERENCE 12

Site Visit

School vacant, closed 1980
grounds from creek to Colvin Blvd and back to houses on next street,
grounds being maintained, i.e., mowed

TASK V: THREE-YEAR GROUNDWATER AND SURFACE WATER MONITORING PROGRAM

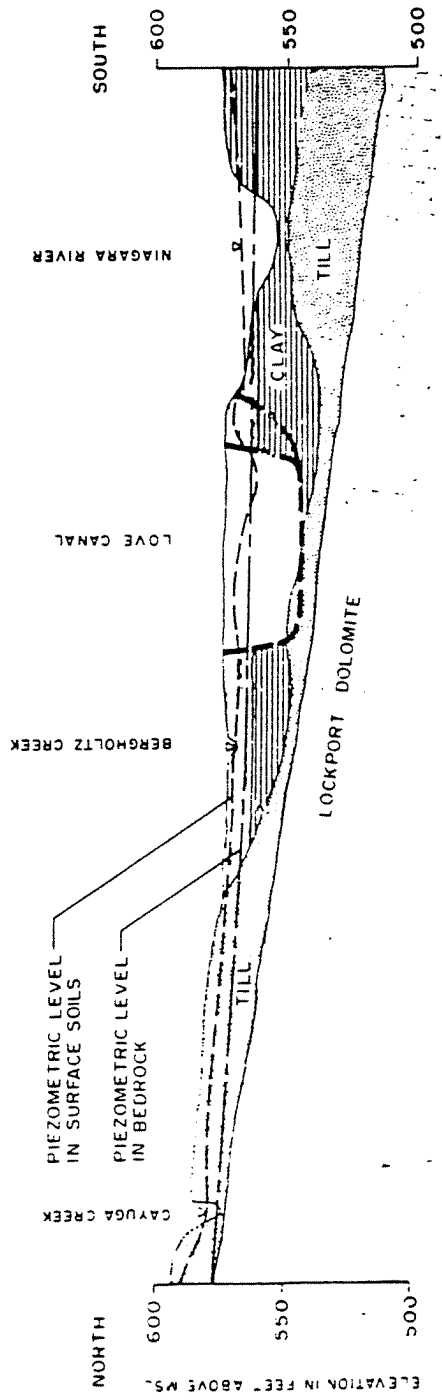
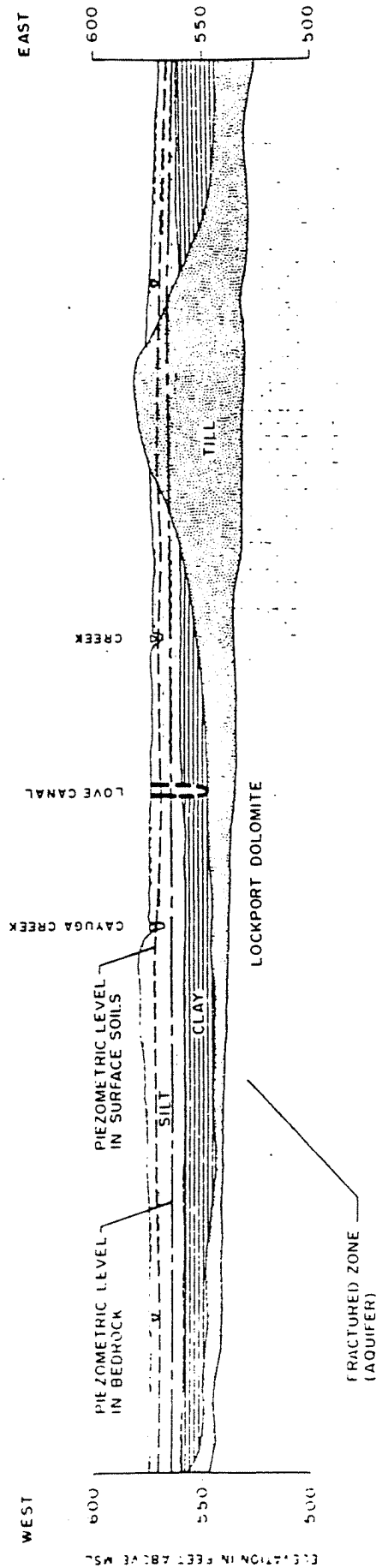
LOVE CANAL AREA AND VICINITY NIAGARA FALLS, NEW YORK



**PREPARED FOR:
DIVISION OF SOLID WASTE
NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION
JANUARY 3, 1983**

**PREPARED BY:
E.C. JORDAN CO.**

93rd. Street School, Niagara Falls, N. Y.



NOTE
 SUBSURFACE CONDITIONS DEPICTED ON THIS DIAGRAM REPRESENT AN INTERPRETATION OF INFORMATION PRESENTED IN EPA REPORT "ENVIRONMENTAL MONITORING AT LOVE CANAL AND OTHER DOCUMENTS MADE AVAILABLE BY NYSDEC."

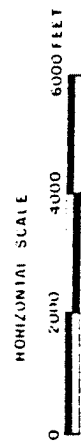


Figure 3
 (REF. 13)

EAST-WEST AND NORTH-SOUTH GEOLOGIC PROFILES
OF THE LOVE CANAL AREA AND VICINITY
LOVE CANAL REMEDIAL PROJECT (TASK V)

ECJORDANCO

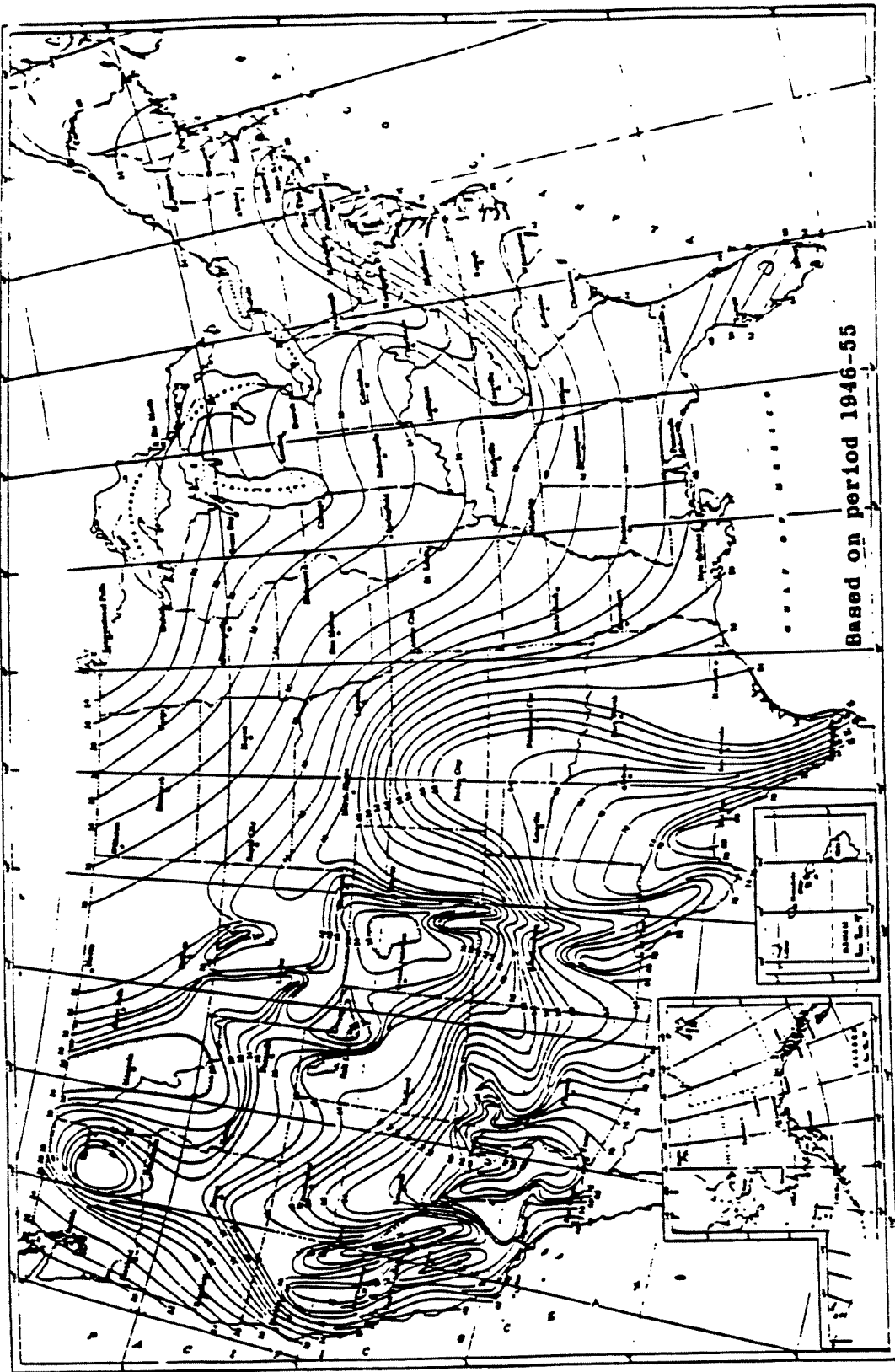


Figure 4

Mean Annual Lake Evaporation (In Inches)

Source: Climatic Atlas of the United States, U.S. Department of Commerce, National Climatic Center, Asheville, N.C., 1979.

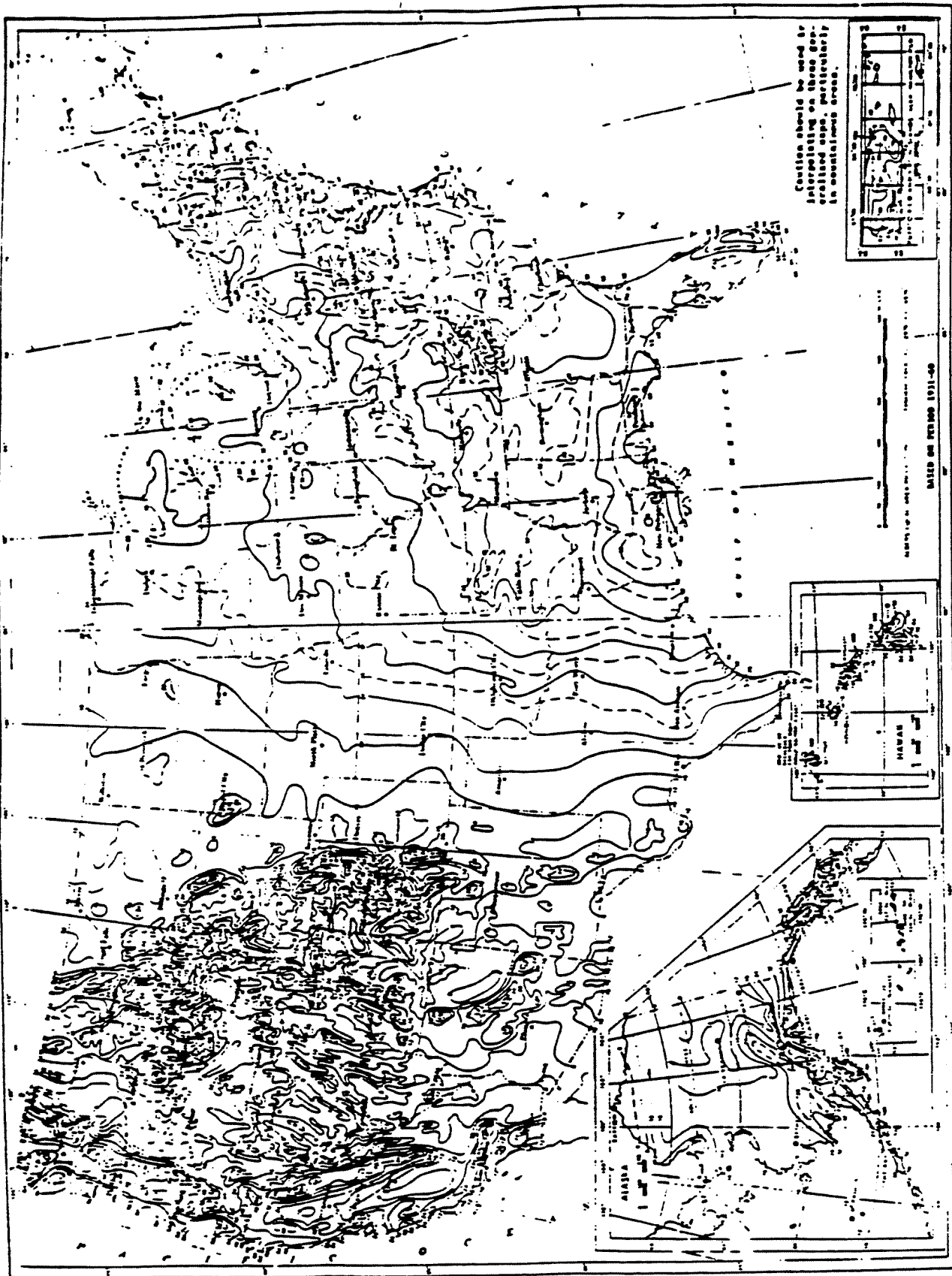


Figure 5

Normal Annual Total Precipitation (inches)

Source: Climatic Atlas of the United States, U.S. Department of Commerce, National Climatic Center, Asheville, N.C. 1970

1980

Census of Population and Housing

~~SECRET~~
200

PHC80-V-34

NEW YORK

— INCLUDE ERIE & NIAGARA COUNTIES
COUNTY SUBDIVISIONS & INCORPORATED PLACES.

Final Population and Housing Unit Counts

The figures in this report are final counts and supersede the preliminary counts published in the reports entitled Preliminary Population and Housing Unit Counts, PHC80-P. The present series consists of 56 reports—number 1 for the United States; numbers 2 through 52 for the States and the District of Columbia in alphabetical order; and numbers 53 through 56 for Puerto Rico, Guam, Virgin Islands, and American Samoa. Counts for the Northern Mariana Islands and the remainder of the Trust Territory of the Pacific Islands are not part of this series of reports but will be made available in a separate press release issued for each area.

The final population count of the State as of April 1, 1980, was 17,557,288. This figure represents a decrease of 684,103, or 3.8 percent, from the 18,241,391 inhabitants enumerated in the 1970 census.

The final count of housing units in the State as of April 1, 1980, was 6,866,851. This figure, which includes both occupied and vacant housing units, represents an increase of 567,167, or 9.0 percent, from the 6,299,684 units enumerated in the 1970 census.

An increase in the housing unit count is not inconsistent with a decrease in population as the average number of persons per occupied housing unit (or household) has declined since 1970.

This report presents final 1980 census population counts, classified by race and Spanish origin, and final 1980 housing unit counts for the State, counties, county subdivisions, incorporated places, and congressional districts. Total population and housing unit counts are also shown for 1970 for the same geographic areas.

Most of the statistics presented here are being issued in advance of their separate publication in the final

reports, *Characteristics of the Population, Number of Inhabitants*, PC80-1-A; *Characteristics of the Population, General Population Characteristics*, PC80-1-B; and *Characteristics of Housing Units, General Housing Characteristics*, HC80-1-A. Data shown in this report for congressional districts of the 96th Congress will not be included in any other 1980 census reports.

An outline of the publication and computer tape program for the 1980 Census of Population and Housing can be obtained free of charge from the Data User Services Division, Bureau of the Census, Washington, D.C. 20233.

Symbols used in tables. A dash "--" represents zero or a percent which rounds to less than 0.1. The symbol "(NA)" means not available, and three dots "..." means not applicable. For areas established since 1970, three dots "..." is shown in place of the 1970 population and housing unit figures and the 1970-80 percent change. A minus sign preceding a figure denotes decrease. The prefix "r" indicates that the count has been revised since publication of 1970 census reports.

A dagger "†" next to a geographic area indicates that the characteristics for 20 percent or more of the persons included in the 1980 census count for the area were substituted. Substitutions occurred during the computer processing of the census data when there was evidence of the existence of persons but no data for these persons. In these instances, characteristics of other enumerated persons were substituted. A more detailed discussion of substitution will be found in *Characteristics of the Population, General Population Characteristics*, PC80-1-B reports.

Issued March 1981

Table 1. Persons by Race and Spanish Origin and Housing Unit Counts: 1980—Con.

(Counts relate to areas as delineated at each census. For meaning of symbols, see text)

by State
County
County Subdivisions

Persons												Housing units		
1980	1970	Percent change, 1970 to 1980	Race					Spanish origin	1980	1970	Percent change, 1970 to 1980			
			White	Black	Am. Indian, Eskimo, and Aleut	Asian and Pacific Islander	Other							
499	581	-4.2	499	7	4	7	11	24	148	148	5.1			
1 250	1 250		1 250	8	4				171	171	55.7			
1 250	1 250		1 250	8	4				379	379	34.3			
									392	392	46.2			
									2 424	1 909	27.0			
									241	319	-24.5			
									377	341	10.6			
2 291	2 291		2 291	3	4	6	6	8	1 384	1 015	36.4			
6 856	6 984	-1.8	6 765	44	14	18	15	25	2 797	2 485	12.6			
4 861	4 789	1.5	4 783	33	13	17	15	24	2 000	1 779	12.4			
2 145	2 072	3.5	2 129	3	2	7	4	11	992	765	29.7			
473	531	-10.9	465	-	-	5	3	1	202	194	4.1			
741	765	-3.1	736	2	-	2	1	8	369	330	11.8			
968	905	7.0	954	7	3	4	-	-	519	349	48.7			
5 839	5 882	-0.7	5 797	9	6	21	6	32	2 441	2 176	12.2			
3 329	3 744	-11.1	3 294	2	6	21	6	24	1 394	1 414	-1.4			
245 055	222 295	-10.2	221 833	17 131	393	2 850	2 848	5 853	86 852	69 126	25.6			
6 299	7 842	-19.7	5 872	361	8	46	12	227	1 709	1 218	40.3			
12 937	13 255	-2.4	10 093	1 908	10	25	901	1 426	4 638	4 179	11.0			
7 139	5 701	25.2	5 536	1 130	14	31	428	541	2 099	1 368	53.4			
3 394	2 604	30.3	3 347	27	3	10	7	35	1 255	1 025	22.4			
7 261	8 475	-14.3	6 618	522	39	44	38	126	2 540	1 631	55.7			
18 091	11 092	63.1	17 418	314	25	251	83	321	5 700	3 877	47.0			
15 506	11 935	29.9	13 834	1 141	27	199	305	582	5 581	3 713	50.3			
1 555	913	70.3	1 490	52	-	11	2	30	757	328	130.8			
20 768	16 910	22.8	19 792	610	35	227	104	283	6 782	4 996	35.7			
12 375	10 902	13.5	11 959	178	20	176	42	146	3 944	3 056	29.1			
1 668	1 322	26.2	1 635	8	12	2	11	17	837	714	17.2			
2 877	2 730	5.4	2 794	70	7	2	4	10	1 159	1 018	13.9			
1 013	1 042	-2.8	1 005	6	1	1	1	4	387	372	4.0			
5 795	4 764	21.6	5 613	109	4	30	39	130	2 405	1 959	22.8			
1 996	1 914	4.3	1 941	37	3	7	8	44	793	667	18.9			
2 199	1 792	22.7	2 143	25	7	7	17	24	987	725	36.1			
6 892	6 021	14.5	6 780	72	2	29	9	71	2 584	1 995	29.5			
29 757	32 029	-7.1	21 669	7 606	68	172	242	518	13 170	12 265	7.4			
39 549	41 087	-3.7	37 069	1 415	46	790	229	498	12 799	10 932	17.1			
955	1 126	-15.2	931	16	5	1	2	9	417	382	9.2			
8 351	7 548	10.6	8 147	90	8	51	55	97	2 887	2 343	23.2			
1 692	1 680	0.7	1 678	3	-	11	-	6	678	590	14.9			
711	739	-3.8	704	3	1	2	1	3	301	263	14.4			
7 062	5 658	24.8	6 817	172	6	18	49	112	2 581	2 050	25.9			
2 542	2 336	8.8	2 451	54	-	12	25	36	1 084	866	25.2			
3 319	2 479	33.9	3 253	44	6	3	13	48	1 314	1 058	24.2			
2 658	1 702	56.2	2 482	158	1	10	7	40	892	614	45.3			
26 776	22 040	21.5	24 841	965	35	723	212	538	9 331	6 948	34.3			
4 155	4 481	-7.3	3 959	79	-	97	20	52	1 645	1 612	2.0			
4 382	4 407	-0.6	4 121	206	10	4	41	63	1 658	1 442	15.0			
1 343	1 735	-22.6	1 235	85	7	-	16	25	527	524	0.6			
1 015 472	1 113 491	-8.8	893 195	102 947	5 064	5 424	8 842	14 390	389 038	360 893	7.8			
10 093	9 787	3.1	9 781	267	22	7	16	39	2 966	2 387	24.3			
2 488	2 651	-6.1	2 476	1	5	3	4	14	931	791	17.7			
108 706	93 929	15.7	102 780	2 667	110	2 679	470	935	38 028	28 437	33.7			
6 017	6 878	-12.5	5 950	39	2	17	9	9	2 675	2 446	9.4			
13 872	14 426	-3.8	13 797	28	11	11	25	34	4 770	4 443	7.4			
6 803	7 033	-3.3	6 758	18	7	3	17	14	2 434	2 325	4.7			
7 587	7 158	7.4	7 660	3	13	9	2	24	2 559	2 128	20.3			
2 437	2 672	-8.8	2 247	83	55	-	52	63	921	1 020	-9.7			
404	546	-26.0	382	14	8	-	-	5	150	170	-11.8			
357 870	462 768	-22.7	252 365	95 116	2 383	1 322	6 684	9 499	156 470	166 142	-5.8			
1 628	1 107	47.1	1 24	2	1 498	-	4	22	798	359	116.3			
109 442	113 844	-3.9	108 049	802	119	283	189	398	39 524	34 170	15.7			
12 768	14 392	-11.3	12 636	80	12	17	23	50	4 145	3 967	4.5			
4 529	5 216	-13.2	4 517	1	2	2	7	11	1 772	1 687	5.0			
18 146	18 168	-0.1	17 984	58	18	60	26	52	6 011	5 101	17.8			
3 128	3 020	3.6	3 112	3	4	5	4	17	1 066	987	12.1			
5 037	6 400	-21.3	4 879	51	75	20	12	28	1 654	1 477	12.0			
849	1 012	-16.1	801	1	40	5	3	6	392	379	3.4			
8 171	7 573	7.9	8 121	22	13	7	8	16	2 929	2 383	22.9			
4 285	4 350	-1.5	4 243	19	9	6	8	11	1 559	1 434	8.7			
7 327	7 544	-4.1	7 266	22	11	4	24	60	2 407	2 147	12.1			
10 574	10 011	5.6	10 530	9	11	17	7	18	3 450	2 828	22.0			
17 961	14 570	23.3	17 743	77	73	23	45	179	6 771	5 447	24.3			
2 292	2 676	-14.3	2 276	-	10	3	3	28	854	813	5.0			
16 770	13 977	20.0	16 205	294	48	184	39	137	5 629	3 967	41.9			
53 270	47 644	11.8	52 729	222	68	77	174	599	18 674	13 981	33.6			
3 288	3 910	-15.9	3 265	-	9	3	11	50	1 264	1 225	3.2			
10 582	10 215	3.6	10 515	24	6	10	27	65	3 877	3 250	19.3			
3 446	3 140	9.7	3 416	6	5	9	10	23	1 231	977	26.0			
22 701	28 657	-20.8	19 773	2 178	45	25	580	1 011	9 168	9 147	0.2			
30 144	30 634	-1.6	29 871	156	45	41	31	143	10 801	9 261	16.6			
7 051	7 766	-9.2	6 792	32	14	11	2	30	2 610	2 459	6.1			
13 056	13 365	-2.3	12 977	38	14	16	11	66	4 804	4 068	18.1			
4 861	3 250	49.6	4 840	1	7	10	3	18	1 514	952	59.0			
7 231	6 322	14.4	7 156	21	40	10	4	13	2 634	2 006	31.3			
2 971	2 863	3.8	2 941	1	21	7	1	6	1 170	959	22.0			
3 791	4 090	-7.3	3 692	1	62	1	36	81	1 283	1 158	10.8			
1 496	1 675	-10.7	1 413	1	57	-	25	74	521	514	1.4			
24 359	19 978	21.9	24 073	95	19	113	59	183	8 210	5 655	45.2			
3 671	3 732	-1.6	3 632	3	4	17	15	37	1 412	1 175	20.2			

Table 1. Persons by Race and Spanish Origin and Housing Unit Counts: 1980—Con.

(Counts relate to areas as delineated at each census. For meaning of symbols, see text)

10 State
Counties
County Subdivisions

Persons										Housing units		
Race										Percent change, 1970 to 1980		
1980	1970	Percent change, 1970 to 1980	White	Black	Am. Indian, Eskimo, and Aleut	Asian and Pacific Islander	Other	Spanish origin	1980	1970	Percent change, 1970 to 1980	
2 792	2 505	11.5	2 784	3	1	1	3	8	962	803	19.8	
18 693	21 898	-14.6	18 538	9	81	36	29	76	6 894	6 831	0.9	
12	16	-25.0	12	-	-	-	-	-	4	5	-20.0	
91 269	107 282	-14.9	90 114	525	155	344	131	478	34 018	32 332	5.2	
18 474	20 980	-11.9	18 283	61	42	52	36	118	7 272	7 103	2.4	
2 844	2 617	8.7	2 832	-	10	1	1	16	989	817	21.1	
51 210	48 404	5.8	50 722	226	62	126	74	220	16 663	13 535	23.1	
36 176	34 631	4.5	35 857	137	64	45	73	233	19 124	14 474	32.1	
2 398	2 010	19.3	2 389	1	4	4	-	11	1 140	888	28.4	
970	912	6.4	967	-	1	2	-	7	384	317	21.1	
1 837	1 857	-1.1	1 827	6	3	1	-	7	842	676	24.6	
1 267	1 284	-1.3	1 259	1	-	2	5	7	663	646	2.6	
659	607	8.6	656	-	-	-	3	3	265	238	11.3	
880	837	5.1	876	-	2	-	2	1	449	366	22.7	
2 221	2 132	4.2	2 219	-	2	-	-	16	1 204	870	38.4	
919	763	20.4	916	-	-	2	1	5	718	523	37.3	
922	763	20.8	922	-	-	-	-	1	436	273	59.7	
781	733	6.5	780	-	-	1	-	-	540	304	77.6	
5 139	5 244	-2.0	5 115	11	7	5	1	93	1 999	1 685	18.6	
1 450	1 532	-5.4	1 434	10	3	2	1	17	594	550	8.0	
681	957	-28.8	679	-	1	-	-	1	595	451	31.9	
6 597	5 776	14.2	6 400	107	25	12	53	67	3 321	2 271	46.2	
2 490	2 731	-8.8	2 474	9	2	2	3	3	1 525	1 165	30.9	
1 288	1 496	-13.9	1 270	9	4	4	1	4	596	496	20.2	
179	212	-15.6	179	-	-	-	-	-	214	149	43.6	
1 064	903	17.8	1 050	3	2	1	8	2	448	343	30.6	
608	536	13.4	600	2	-	-	6	1	246	182	35.2	
174	169	3.0	170	-	1	1	2	1	83	60	38.3	
1 606	1 403	14.5	1 596	3	3	4	-	1	1 711	1 024	67.1	
5 436	5 839	-6.9	5 408	3	10	13	2	6	2 272	1 964	15.7	
2 938	3 268	-10.1	2 920	3	9	6	-	4	1 107	1 051	5.3	
1 439	1 453	-1.0	1 438	1	-	-	-	12	747	674	10.8	
613	673	-8.9	613	-	-	-	-	9	315	291	8.2	
1 759	1 688	4.2	1 757	1	1	-	-	8	1 232	971	26.9	
1 051	777	35.3	1 047	-	4	-	-	1	593	396	49.7	
44 929	43 931	2.3	42 640	88	2 083	71	47	178	20 331	16 221	25.3	
5 318	6 698	-5.7	5 276	19	13	3	7	13	2 692	2 271	13.5	
4 478	4 854	-7.7	4 454	2	12	3	7	11	1 763	1 647	7.0	
1 960	1 909	2.7	1 943	1	7	9	-	2	639	558	14.5	
1 045	1 055	-0.9	1 043	-	2	-	-	5	1 113	533	108.8	
1 247	1 117	11.6	1 132	-	109	-	6	4	417	336	24.1	
499	333	49.8	497	-	-	2	-	-	244	168	45.2	
1 625	1 473	10.3	1 604	3	6	7	5	5	545	433	25.9	
1 237	1 257	-1.6	1 231	-	-	-	6	11	405	364	11.3	
226	237	-4.6	225	-	-	-	1	5	87	81	7.4	
1 863	1 948	-4.4	1 852	-	9	1	1	19	749	646	15.9	
869	976	-11.0	869	-	-	-	-	14	375	378	-0.8	
1 218	1 149	6.0	1 202	6	10	-	-	3	400	310	29.0	
786	832	-5.5	783	-	-	1	2	3	340	252	34.9	
1 84	111	65.8	184	-	-	-	-	-	222	172	29.1	
1 804	1 963	-8.1	1 722	5	70	1	5	6	643	587	9.5	
926	550	68.4	900	1	21	4	-	4	826	289	185.8	
5 604	5 643	-0.7	5 539	36	12	15	2	36	3 239	2 663	21.6	
4 116	4 421	-6.9	4 072	26	7	9	2	34	2 034	1 740	16.9	
11 276	11 400	-1.1	11 201	11	34	26	4	39	4 348	3 922	10.9	
7 668	8 048	-4.7	7 603	11	25	25	4	32	3 020	2 814	7.3	
2 624	2 468	6.3	2 611	1	10	-	2	19	927	772	20.1	
577	547	5.5	573	-	4	-	-	2	224	199	12.6	
1 802	1 536	17.3	39	-	1 763	-	-	1	576	473	21.8	
310	168	84.5	309	1	-	-	-	1	726	338	114.8	
1 110	1 022	8.6	1 097	4	9	-	-	3	785	671	17.0	
1 491	1 299	14.8	1 474	-	8	2	7	4	495	363	36.4	
55 153	52 637	4.8	54 369	473	77	143	91	305	25 507	21 977	16.1	
463	294	57.5	460	-	-	2	1	-	344	267	28.8	
4 074	3 542	15.0	4 057	8	4	3	2	8	2 028	1 657	22.4	
1 363	1 469	-5.9	1 361	-	-	1	-	4	540	513	5.3	
1 177	822	43.2	1 172	1	5	-	-	4	1 713	1 538	11.4	
1 564	1 297	20.6	1 552	-	2	6	4	3	603	425	41.9	
17 836	19 677	-9.4	17 437	286	28	41	44	113	7 795	7 514	3.7	
9 360	10 045	-6.8	9 194	62	17	67	20	61	3 912	3 693	5.9	
6 719	5 750	16.9	6 686	22	1	5	5	18	2 412	1 937	24.5	
5 439	4 522	20.3	5 393	18	8	12	8	18	2 650	1 961	35.1	
52	3	1000+	52	-	-	-	-	-	18	-	1000+	
944	981	-3.8	938	3	1	2	-	3	416	368	13.0	
2 829	2 379	18.9	2 827	-	1	-	1	30	1 685	1 258	32.9	
1 374	1 192	9.4	1 302	-	1	-	-	12	588	468	25.6	
1 542	1 431	26.2	1 796	2	5	3	-	4	691	544	27.0	
1 242	1 175	-7.4	1 61	1	-	-	-	-	74	74	-	
2 241	2 383	36.8	3 172	75	4	4	6	35	1 143	751	52.2	
625	495	26.3	623	-	2	-	-	11	531	422	25.8	
59 400	58 722	1.2	57 414	1 122	613	101	150	325	21 264	18 381	15.7	
1 926	1 872	2.9	1 888	23	14	-	1	8	636	560	13.6	
2 367	2 351	0.7	2 360	2	-	2	3	8	769	662	16.2	
483	474	1.9	481	-	-	1	1	4	166	149	11.4	
16	2	700.0	16	-	-	-	-	-	7	1	600.0	
16 703	17 338	-3.7	15 910	600	62	65	66	149	6 392	5 868	8.9	
5 565	5 440	2.3	5 487	49	17	6	6	2	2 093	1 700	23.1	
2 568	2 281	12.6	2 528	15	6	1	18	32	866	692	25.1	
976	1 018	-4.1	969	1	-	-	-	12	353	316	11.7	
1 876	1 978	-5.2	1 865	6	2	2	1	3	617	515	19.8	
2 242	2 020	11.0	2 203	28	5	-	6	15	731	581	25.8	

Table 1. Persons by Race and Spanish Origin and Housing Unit Counts: 1980—Con.

[Counts relate to areas as delineated at each census. For meaning of symbols, see text]

The State Counties County Subdivisions

Massachusetts County—Con.												
Marblehead town	38 272	40 374	-5.2	24 376	11 874	70	285	1 667	4 160	13 129	12 822	2.4
Marblehead village	22 927	25 373	-9.6	22 246	243	4	297	137	438	7 261	7 453	-2.6
Marblehead Neck village	40 454	39 411	2.5	15 550	23 333	109	325	1 386	3 445	14 879	13 162	13.0
Marblehead Neck village (pt.)	489	586	-16.6	469	15	1	2	1	8	141	172	-18.0
Marblehead Harbor village	1 331	1 512	-12.0	1 296	33	1	1	1	3	151	147	2.7
Marblehead Neck village	472	529	-10.8	460	11	1	1	1	3	151	147	2.7
Marblehead Neck village (pt.)	4 847	5 396	-10.2	4 688	23	5	21	109	345	1 702	1 689	0.8
Marblehead Neck village	6 175	6 566	-6.3	5 025	95	1	26	29	161	2 201	2 106	4.5
Marblehead Neck village	20 431	23 151	-11.7	20 143	32	5	170	80	567	7 528	7 552	-0.3
Marblehead Neck village	9 262	10 036	-7.7	9 124	29	1	67	41	166	3 073	3 056	0.6
Marblehead Neck village (pt.)	52	101	-48.5	52	1	1	1	1	1	17	35	-51.4
Marblehead Neck village (pt.)	4 047	4 304	-6.0	4 005	1	1	29	11	59	1 378	1 252	10.1
Marblehead Neck village	25 405	27 444	-7.4	24 072	854	11	189	279	1 057	9 188	8 692	5.7
Marblehead Neck village	1 490	1 032	44.4	2 129	712	4	7	26	58	452	277	63.2
Marblehead Neck village	2 373	2 183	8.7	2 741	3	1	12	9	59	745	619	20.4
Marblehead Neck village	35 769	40 413	-11.5	35 349	45	12	283	80	800	12 234	11 975	2.2
Marblehead Neck village	847	817	3.7	832	8	1	5	2	14	301	247	21.9
Marblehead Neck village	34 073	33 127	2.9	29 612	3 293	43	281	844	2 552	15 203	15 024	1.2
Long Beach city												
Marblehead Neck town	218 624	235 007	-7.0	198 395	13 561	143	4 718	1 907	7 164	75 567	71 242	6.1
Marblehead Neck village	911	1 026	-11.2	894	1	1	14	3	26	387	340	13.8
Marblehead Neck village	7 146	8 505	-17.0	5 829	82	1	156	38	60	2 269	2 296	-1.2
Marblehead Neck village	2 708	2 808	-3.6	2 648	11	1	39	10	40	857	830	3.3
Marblehead Neck village	2 327	1 939	20.6	2 310	1	1	12	3	42	865	588	47.1
Marblehead Neck village	4 558	4 486	1.6	4 300	37	1	182	39	124	1 445	1 257	15.0
Marblehead Neck village	9 168	10 798	-15.1	8 401	523	9	152	83	327	3 420	3 490	-2.0
Marblehead Neck village	2 936	3 131	-6.2	2 785	90	1	36	25	162	993	949	4.6
Marblehead Neck village	5 604	6 043	-7.3	5 188	136	1	150	129	363	3 066	3 046	0.7
Marblehead Neck village	1 132	1 402	-19.3	1 108	13	1	10	1	24	405	427	-5.2
Marblehead Neck village	5 234	5 614	-6.8	4 980	138	3	77	36	98	1 362	1 333	2.2
Marblehead Neck village	2 396	3 254	-26.4	2 248	79	1	56	13	39	847	886	4.4
Marblehead Neck village	5 384	5 488	-1.8	5 178	24	2	126	54	272	2 129	1 824	16.7
Marblehead Neck village	20 705	21 744	-4.8	19 332	224	11	308	230	927	7 636	7 121	7.2
Marblehead Neck village	2 806	2 980	-5.0	2 759	10	1	27	9	35	845	817	3.4
Marblehead Neck village	5 754	5 812	-1.0	5 648	17	2	81	23	146	1 397	1 705	-11.3
Marblehead Neck village	1 587	2 295	-438.0	1 538	17	1	22	10	27	751	80	851.3
Marblehead Neck village	2 175	2 186	-0.5	2 015	49	1	95	16	44	660	612	11.1
Marblehead Neck village	1 503	1 593	-5.6	1 450	2	1	12	8	27	440	441	-0.2
Marblehead Neck village	963	1 032	-6.7	919	4	1	29	10	19	317	311	1.9
Marblehead Neck village	883	835	5.7	868	2	1	12	1	24	282	227	24.2
Marblehead Neck village	3 147	2 883	9.2	3 055	24	1	60	8	75	1 094	916	19.4
Marblehead Neck village	2 134	2 607	-18.1	1 968	91	1	57	17	76	1 032	1 033	-0.1
Marblehead Neck village	1 292	1 420	-9.0	1 253	16	1	16	7	40	408	391	4.3
Marblehead Neck village	785	1 207	-54.4	743	18	1	33	11	16	262	234	12.0
Marblehead Neck village	1 263	1 207	4.6	1 206	14	1	26	17	69	484	414	16.9
Marblehead Neck village	921	895	2.9	887	15	1	5	14	16	293	263	11.4
Marblehead Neck village	2 742	2 916	-6.0	2 562	44	1	111	25	54	862	845	2.0
Marblehead Neck village	2 284	2 811	-6.5	2 469	88	1	66	41	157	1 043	914	14.1
Marblehead Neck village	13 871	15 362	-9.7	11 299	2 017	21	310	224	731	4 764	4 468	6.6
Marblehead Neck village	8 216	9 154	-10.2	8 080	35	2	66	13	129	2 740	2 767	-1.0
Oyster Bay town	305 750	333 342	-8.3	297 500	3 750	133	3 148	1 219	6 177	93 921	87 508	7.3
Oyster Bay village	7 034	5 147	14.4	6 962	2	9	37	24	126	2 502	2 133	17.3
Oyster Bay village	3 290	3 212	2.4	2 888	287	6	38	71	111	553	486	13.8
Oyster Bay village	378	374	1.1	373	1	1	3	2	3	190	165	15.2
Oyster Bay village	331	344	-3.8	317	2	1	12	1	4	137	142	-3.5
Oyster Bay village	14	19	-26.3	14	1	1	1	1	1	4	6	-33.3
Oyster Bay village	7 946	9 297	-14.5	7 809	9	5	76	46	285	2 992	3 150	-5.0
Oyster Bay village	1 749	1 773	-1.4	1 730	9	1	2	8	22	614	514	19.5
Oyster Bay village	1 527	1 401	9.0	1 483	4	1	39	1	13	480	361	33.0
Oyster Bay village	19 779	22 112	-10.6	19 626	5	2	117	29	340	5 571	5 343	4.3
Oyster Bay village	985	841	17.1	966	1	1	13	4	15	353	260	35.8
Oyster Bay village	959	982	-2.3	924	14	1	12	9	34	365	310	17.7
Oyster Bay village	2 725	2 081	30.9	2 607	34	1	73	11	43	831	534	55.6
Oyster Bay village	1 574	1 785	-11.8	1 515	10	3	44	2	11	513	519	-1.2
Oyster Bay village	1 102	481	129.1	494	467	1	7	134	139	138	130	6.2
Oyster Bay village	1 799	1 320	36.3	1 759	6	1	22	12	19	576	393	46.6
Oyster Bay village	344	295	16.6	338	2	1	3	1	23	98	81	21.0
Oyster Bay village	5 364	5 890	-8.9	5 227	78	3	30	26	129	2 104	2 027	3.8
Oyster Bay village	1 245	1 182	5.3	1 205	17	1	16	7	26	403	315	27.9
New York County	1 427 533	1 539 233	-7.3	840 862	309 693	3 036	72 883	201 059	335 803	754 549	714 593	5.6
Manhattan borough	1 427 533	1 539 233	-7.3	840 862	309 693	3 036	72 883	201 059	335 803	754 549	714 593	5.6
New York City (pt.)	1 427 533	1 539 233	-7.3	840 862	309 693	3 036	72 883	201 059	335 803	754 549	714 593	5.6
Niagara County	227 101	235 720	-3.7	212 880	11 028	2 069	486	638	1 816	85 037	74 695	13.8
Niagara town	4 419	4 193	5.4	4 397	15	1	1	2	16	1 383	1 152	20.5
Niagara town	4 105	4 223	-2.9	4 051	40	4	6	4	20	1 348	1 242	8.5
Niagara town	163	383	-57.4	1 162	1	1	1	1	1	58	119	-51.9
Niagara town	16 219	15 888	2.1	15 951	122	73	47	26	121	4 948	4 160	18.9
Niagara town	3 326	3 292	1.0	3 308	2	8	5	3	26	1 292	1 024	26.2
Niagara town	24 844	25 399	-2.2	23 485	1 092	80	65	122	302	10 394	8 720	15.8
Niagara town	12 942	8 177	58.3	12 590	215	49	27	61	93	4 294	2 313	85.5
Niagara town	9 268	9 459	-2.0	9 070	99	68	14	17	45	3 411	3 132	8.9
Niagara town	9 648	8 368	15.3	9 294	206	60	44	44	93	3 488	2 261	54.3
Niagara town	71 384	85 615	-16.6	61 065	9 064	887	130	238	716	29 504	28 915	2.0
Niagara town	35 760	36 012	-0.7	35 511	41	89	63	56	219	13 237	11 011	20.2
Niagara town	4 726	4 733	-0.1	4 704	5	7	8	2	23	1 493	1 304	14.5
Niagara town	7 251	7 429	-2.4	7 154	21	36	28	12	38	2 531	2 306	9.8
Niagara town	2 191	2 169	1.0	2 176	2	2	2	16	16	764	667	14.5
Niagara town	7 765	7 375	5.3	7 674	40	14	23	14	22	2 574	2 180	19.2
Niagara town	1 832	1 749	4.7	1 807	5	14	6	2	2	681	580	17.4
Niagara town	2 701	2 677	0.9	2 622	53	13	4	9	10	1 018	927	9.8
Niagara town	535	567	-5.6	518	17	1	1	1	1	189	181	4.4
Niagara town	1 134	1 134	-0.1	1 134	47	1	1	1	1	216	327	-33.9
Niagara town	9 609	9 722	-1.2	9 44	10	37	10	8	45	3 264	2 894	12.8

Table 1. Persons by Race and Spanish Origin and Housing Unit Counts: 1980—Con.

(Counts relate to areas as delineated at each census. For meaning of symbols, see text.)

The State
Counties
County Subdivisions

Persons										Housing units		
Race										Percent change, 1970 to 1980		
White Black Am. Indian, Esqimo, and Aleut Asian and Pacific Islander Other										Spanish origin		
1980	1970	Percent change, 1970 to 1980	White	Black	Am. Indian, Esqimo, and Aleut	Asian and Pacific Islander	Other	Spanish origin	1980	1970	Percent change, 1970 to 1980	
5 792	5 316	9.0	5 721	16	24	16	15	47	2 234	1 871	19.4	
1 259	1 284	-1.9	1 247	1	4	7	-	5	487	476	2.3	
253 466	273 070	-7.2	243 022	7 719	383	841	1 501	2 619	95 834	88 258	8.6	
2 389	1 917	24.6	2 357	25	-	3	4	10	791	546	44.9	
2 080	2 025	2.7	2 076	-	2	2	-	6	709	604	17.4	
802	927	-13.5	800	-	-	2	-	-	327	297	10.1	
664	541	22.7	652	2	9	-	1	-	219	171	28.1	
4 094	3 947	3.7	4 078	3	6	4	3	11	1 644	1 501	9.5	
2 344	2 488	-5.8	2 338	2	1	2	1	5	920	867	6.1	
1 455	1 251	16.3	1 421	22	5	6	1	3	486	380	27.9	
578	601	-3.8	569	9	-	-	-	1	198	192	3.1	
4 925	4 942	-0.3	4 902	7	4	4	8	23	1 749	1 509	15.9	
2 667	2 936	-9.2	2 653	2	2	4	6	5	1 000	923	8.3	
3 934	4 104	-4.1	3 888	33	1	5	7	8	1 215	1 088	11.7	
688	610	12.8	684	-	2	-	2	1	249	211	18.0	
3 863	3 620	6.7	3 815	27	8	6	7	20	1 231	1 003	22.7	
1 380	1 173	17.6	1 365	7	1	2	5	1	1 653	1 277	29.4	
10 134	9 688	6.7	10 221	49	12	26	26	65	3 139	2 634	19.2	
2 107	2 271	-7.2	2 091	1	9	-	6	21	845	803	5.2	
6 892	6 095	13.1	6 786	57	9	15	25	39	2 299	1 687	36.3	
6 456	7 877	-18.0	6 209	160	6	36	45	52	1 836	1 457	26.0	
2 131	2 072	2.8	2 114	13	1	1	2	7	730	618	18.1	
306	295	3.7	305	1	-	-	-	1	117	101	15.8	
21 286	21 430	-0.7	21 084	47	10	111	34	76	7 703	6 553	17.5	
2 313	2 433	-4.9	2 295	5	7	1	5	7	832	771	7.9	
1 930	1 868	3.3	1 925	3	-	1	1	5	903	840	41.1	
4 456	4 579	-2.7	4 440	2	2	2	10	24	1 555	1 365	13.9	
478	535	-10.7	477	-	1	-	-	-	196	188	4.3	
1 614	1 366	18.2	1 602	3	5	1	3	7	686	664	3.3	
587	574	2.3	577	3	4	1	-	3	222	192	15.6	
43 826	50 149	-12.5	41 177	1 804	64	332	449	784	15 806	14 524	8.8	
2 397	2 475	-3.2	2 378	2	9	6	2	10	802	750	6.9	
1 366	1 513	-9.7	1 356	2	2	6	-	3	455	471	-3.4	
2 830	2 986	-5.2	2 815	2	3	6	4	6	1 050	932	12.7	
897	735	22.0	895	-	-	1	1	11	325	222	46.4	
4 449	4 429	0.5	4 422	9	4	11	3	17	1 571	1 435	9.5	
396	423	-6.4	396	-	-	-	-	1	129	136	-5.1	
534	556	-4.0	530	1	-	3	-	7	222	195	13.8	
368	392	-6.1	368	-	-	-	-	1	143	129	10.9	
34	28	21.4	34	-	-	-	-	-	14	11	27.3	
75 622	91 373	-17.2	69 240	5 304	133	175	780	1 230	31 796	32 734	-2.9	
5 354	4 871	9.9	5 279	8	34	23	10	20	2 014	1 561	29.0	
751	788	-4.7	739	1	10	1	-	4	285	273	4.4	
1 373	1 108	23.9	1 352	7	2	11	1	9	576	405	42.2	
6 681	6 290	6.2	6 614	13	31	12	11	24	2 360	2 026	16.5	
5 197	3 979	30.6	5 165	3	10	9	10	39	2 560	2 083	22.9	
1 243	-	-	1 236	-	3	4	-	8	857	-	-	
1 954	2 072	-5.7	1 934	9	1	4	6	8	697	669	4.2	
5 458	5 093	7.2	5 393	42	3	15	5	32	1 733	1 392	24.5	
20 150	21 382	-5.8	20 016	66	8	23	37	85	7 226	6 662	8.5	
1 619	1 957	-16.4	1 619	-	-	-	-	6	729	738	-1.2	
1 680	1 627	3.3	1 670	5	3	2	-	9	536	483	11.0	
4 460	4 805	-7.2	4 442	-	3	4	11	13	1 839	1 652	11.3	
3 115	3 425	-9.1	3 099	4	-	6	6	12	1 258	1 219	3.2	
463 324	472 835	-2.0	424 782	30 117	2 682	2 814	2 929	4 730	176 895	153 609	15.2	
24 333	26 841	-9.3	24 018	104	58	124	29	151	8 181	7 450	9.8	
1 298	1 534	-15.4	1 291	-	5	2	-	4	509	492	3.5	
23 689	22 539	5.1	23 054	348	65	115	107	183	7 875	6 357	23.9	
2 095	2 528	-17.1	2 057	6	14	14	4	10	770	801	-3.9	
52 838	36 274	45.7	50 742	1 269	182	439	206	415	18 222	10 835	68.2	
5 875	6 159	-4.6	5 707	51	42	48	27	42	2 164	1 949	17.4	
26 868	29 178	-8.0	25 756	639	78	266	129	186	9 573	8 581	11.6	
3 412	4 333	-21.3	3 380	2	20	4	5	23	1 468	1 325	10.8	
5 885	5 503	6.9	5 855	6	10	11	3	38	2 212	1 773	24.8	
1 099	1 040	5.7	1 095	2	-	-	-	2	409	337	21.4	
1 371	1 493	-8.2	1 361	1	5	4	-	17	487	461	5.6	
1 811	1 607	12.7	1 801	-	1	7	2	6	663	511	29.7	
367	374	-1.9	367	-	-	-	-	-	136	125	8.8	
18 528	21 032	-11.9	18 362	23	52	42	49	214	6 849	6 539	4.7	
7 140	8 280	-13.8	7 072	3	29	12	24	144	2 994	2 892	3.5	
4 488	4 401	2.0	4 414	10	53	2	9	13	1 540	1 225	25.7	
13 397	11 968	16.1	13 741	81	28	41	6	48	4 737	3 478	36.2	
3 932	3 943	-0.3	3 888	26	3	15	-	11	1 405	1 215	15.6	
28 489	26 071	9.3	28 051	76	73	223	56	175	9 866	7 430	32.8	
4 709	4 994	-5.7	4 658	18	4	16	13	35	1 620	1 605	1.4	
5 241	4 295	22.0	5 106	12	11	89	23	34	1 753	1 306	49.9	
3 640	2 245	62.1	3 579	8	16	35	2	15	1 156	512	88.9	
6 180	5 744	7.6	6 143	12	2	14	9	25	2 192	1 780	23.1	
1 870	2 017	-7.3	1 850	1	1	4	-	5	792	682	16.1	
-	785	-100.0	-	-	-	-	-	-	-	210	-100.0	
17 824	16 555	7.7	17 322	283	134	65	20	89	6 137	4 626	32.7	
2 112	1 470	43.7	2 097	2	10	1	2	7	949	630	50.6	
4 492	4 536	-1.0	4 452	12	12	10	6	11	1 439	1 217	18.2	
37 400	38 281	-2.3	36 697	332	113	187	71	234	13 751	11 671	17.8	
2 849	3 307	-13.8	2 816	18	10	5	-	14	1 204	1 188	1.3	
7 795	7 825	-0.4	7 764	6	2	16	7	27	3 083	2 713	13.6	
2 789	3 055	-8.7	2 773	3	2	7	4	6	1 102	1 031	6.9	
1 596	1 148	39.0	1 576	6	7	-	7	20	1 006	707	42.3	
170 105	197 297	-13.8	138 223	26 767	1 722	1 219	2 174	2 519	73 175	71 844	1.9	
2 409	1 901	26.7	2 381	1	6	7	14	11	902	685	31.7	

SELECTED ANALYTICAL RESULTS DOCUMENTATION
FOR PHASE II INVESTIGATION
(RECRA RESEARCH, INC., 1984)

ANALYTICAL RESULTS

93rd STREET SCHOOL
NIAGARA FALLS, NY
GAS CHROMATOGRAPHY

Report Date: 6/29/84

PARAMETER	UNITS OF MEASURE	SAMPLE IDENTIFICATION (DATE)			
		MW-1 (5/22/84)	MW-2 (5/22/84)	MW-3 (5/22/84)	MW-4 (5/22/84)
α -BHC	ug/l	<0.01	<0.01	<0.01	<0.01
β -BHC	ug/l	<0.01	<0.01	<0.01	<0.01
δ -BHC	ug/l	<0.01	<0.01	<0.01	<0.01
γ - BHC	ug/l	<0.01	<0.01	<0.01	<0.01
Total Polychlorinated Biphenyls	ug/l as Aroclor 1242	<0.1	<0.1	<0.1	<0.1
Halogenated Organic Scan (ECD)	ug/l as Chlorine; Lindane Standard	0.32	0.14	0.18	0.40
Volatile Organic Scan (FID)	ug/l as Carbon; Benzene Standard	<1	17	5.9	8.5

FOR RECRA ENVIRONMENTAL LABORATORIES

DATE

Margaret D. Hoch
6/29/84



RECRA ENVIRONMENTAL LABORATORIES

I.D. #84-512

ANALYTICAL RESULTS

93rd STREET SCHOOL
NIAGARA FALLS, NY
GAS CHROMATOGRAPHY

Report Date: 6/29/84

PARAMETER	UNITS OF MEASURE	SAMPLE IDENTIFICATION (DATE)		
		1W (5/24/84)	2W (5/24/84)	3W (5/24/84)
α -BHC	$\mu\text{g/l}$	<0.01	0.02	0.02
β -BHC	$\mu\text{g/l}$	<0.01	<0.01	<0.01
δ -BHC	$\mu\text{g/l}$	<0.01	<0.01	<0.01
γ -BHC	$\mu\text{g/l}$	<0.01	<0.01	<0.01
Total Polychlorinated Biphenyls	$\mu\text{g/l}$ as Aroclor 1242	<0.1	<0.1	<0.1
Halogenated Organic Scan (ECD)	$\mu\text{g/l}$ as Chlorine; Lindane Standard	0.17	0.17	0.26
Volatile Organic Scan (FID)	$\mu\text{g/l}$ as Carbon; Benzene Standard	<1	2.2	<1

FOR RECRA ENVIRONMENTAL LABORATORIES

Margaret D. Ford

DATE

6/29/84

RECRA ENVIRONMENTAL LABORATORIES

I.D. #84-512

ANALYTICAL RESULTS

93rd STREET SCHOOL
NIAGARA FALLS, NY
GAS CHROMATOGRAPHY

Report Date: 6/29/84

PARAMETER	UNITS OF MEASURE	SAMPLE IDENTIFICATION (DATE)
		5W (5/29/84)
α -BHC	$\mu\text{g/l}$	0.02
β -BHC	$\mu\text{g/l}$	0.03
δ -BHC	$\mu\text{g/l}$	<0.01
γ - BHC	$\mu\text{g/l}$	<0.01
Total Polychlorinated Biphenyls	$\mu\text{g/l}$ as Aroclor 1242	<0.1
Halogenated Organic Scan (ECD)	$\mu\text{g/l}$ as Chlorine; Lindane Standard	0.48
Volatile Organic Scan (FID)	$\mu\text{g/l}$ as Carbon; Benzene Standard	<1

FOR RECRA ENVIRONMENTAL LABORATORIES

Margaret D. Lock

DATE

6/29/84

RECRA ENVIRONMENTAL LABORATORIES

I.D. #84-512

ANALYTICAL RESULTS

93rd STREET SCHOOL
NIAGARA FALLS, NY
GAS CHROMATOGRAPHY

Report Date: 6/29/84

PARAMETER	UNITS OF MEASURE	SAMPLE IDENTIFICATION (DATE)	
		MW-1 S-3 (5/9/84)	MW-1 S-7 (5/9/84)
α -BHC	$\mu\text{g/g dry}$	<0.01	<0.01
β -BHC	$\mu\text{g/g dry}$	<0.01	<0.01
δ -BHC	$\mu\text{g/g dry}$	<0.01	<0.01
γ -BHC	$\mu\text{g/g dry}$	<0.01	<0.01
Total Polychlorinated Biphenyls	$\mu\text{g/g dry as}$ Aroclor 1242	<0.1	<0.1
Halogenated Organic Scan (ECD)	$\mu\text{g/g dry as Chlorine};$ Lindane Standard	<0.1	<0.1
Volatile Organic Scan (FID)	$\mu\text{g/g dry as Carbon};$ Benzene Standard	4.8	<1
Dry Weight (103°C)	%	94	88

FOR RECRA ENVIRONMENTAL LABORATORIES

Margaret D. Rock

DATE

6/29/84

RECRA ENVIRONMENTAL LABORATORIES

I.D. #84-512

ANALYTICAL RESULTS

93rd STREET SCHOOL
NIAGARA FALLS, NY
GAS CHROMATOGRAPHY

Report Date: 6/29/84

PARAMETER	UNITS OF MEASURE	SAMPLE IDENTIFICATION (DATE)		
		MW-2 S-4 (5/14/84)	MW-2 S-6 (5/14/84)	MW-2 S-8 (5/14/84)
α -BHC	$\mu\text{g/g dry}$	<0.01	<0.01	<0.01
β -BHC	$\mu\text{g/g dry}$	<0.01	<0.01	<0.01
δ -BHC	$\mu\text{g/g dry}$	<0.01	<0.01	<0.01
γ -BHC	$\mu\text{g/g dry}$	<0.01	<0.01	<0.01
Total Polychlorinated Biphenyls	$\mu\text{g/g dry as}$ Aroclor 1242	<0.1	<0.1	<0.1
Halogenated Organic Scan (ECD)	$\mu\text{g/g dry as Chlorine};$ Lindane Standard	<0.1	<0.1	<0.1
Volatile Organic Scan (FID)	$\mu\text{g/g dry as Carbon};$ Benzene Standard	<1	2.8	2.4
Dry Weight (103°C)	%	93	86	95

FOR RECRA ENVIRONMENTAL LABORATORIES

DATE

Margaret J. Lock
6/29/84



RECRA ENVIRONMENTAL LABORATORIES
I.D. #84-512

ANALYTICAL RESULTS

93rd STREET SCHOOL
NIAGARA FALLS, NY
GAS CHROMATOGRAPHY

Report Date: 6/29/84

PARAMETER	UNITS OF MEASURE	SAMPLE IDENTIFICATION (DATE)	
		MW-3 S-3 (5/16/84)	MW-3 S-7 (5/16/84)
α -BHC	$\mu\text{g/g dry}$	<0.01	<0.01
β -BHC	$\mu\text{g/g dry}$	<0.01	<0.01
δ -BHC	$\mu\text{g/g dry}$	<0.01	<0.01
γ -BHC	$\mu\text{g/g dry}$	<0.01	<0.01
Total Polychlorinated Biphenyls	$\mu\text{g/g dry as}$ Aroclor 1242	<0.1	<0.1
Halogenated Organic Scan (ECD)	$\mu\text{g/g dry as Chlorine};$ Lindane Standard	<0.1	<0.1
Volatile Organic Scan (FID)	$\mu\text{g/g dry as Carbon};$ Benzene Standard	<1	2.1
Dry Weight (103°C)	%	96	87

FOR RECRA ENVIRONMENTAL LABORATORIES

DATE

6/29/84

RECRA ENVIRONMENTAL LABORATORIES
I.D. #84-512

ANALYTICAL RESULTS

93rd STREET SCHOOL
NIAGARA FALLS, NY
GAS CHROMATOGRAPHY

Report Date: 6/29/84

PARAMETER	UNITS OF MEASURE	SAMPLE IDENTIFICATION (DATE)		
		MW-4 S-3 (5/17/84)	MW-4 S-6 (5/17/84)	MW-4 S-8 (5/17/84)
α -BHC	$\mu\text{g/g dry}$	<0.01	<0.01	<0.01
β -BHC	$\mu\text{g/g dry}$	<0.01	<0.01	<0.01
δ -BHC	$\mu\text{g/g dry}$	<0.01	<0.01	<0.01
γ -BHC	$\mu\text{g/g dry}$	<0.01	<0.01	<0.01
Total Polychlorinated Biphenyls	$\mu\text{g/g dry as}$ Aroclor 1242	<0.1	<0.1	<0.1
Halogenated Organic Scan (ECD)	$\mu\text{g/g dry as Chlorine};$ Lindane Standard	<0.1	<0.1	<0.1
Volatile Organic Scan (FID)	$\mu\text{g/g dry as Carbon};$ Benzene Standard	<1	11	10
Dry Weight (103°C)	%	67	73	98

FOR RECRA ENVIRONMENTAL LABORATORIES

Margaret D. Loch

DATE

6/29/84

RECRA ENVIRONMENTAL LABORATORIES

I.D. #84-512

ANALYTICAL RESULTS

93rd STREET SCHOOL
NIAGARA FALLS, NY
GAS CHROMATOGRAPHY

Report Date: 6/29/84

PARAMETER	UNITS OF MEASURE	SAMPLE IDENTIFICATION (DATE)	
		6S (5/24/84)	7S (5/24/84)
α -BHC	ug/g dry	<0.01	<0.01
β -BHC	ug/g dry	<0.01	<0.01
δ -BHC	ug/g dry	<0.01	<0.01
γ -BHC	ug/g dry	<0.01	<0.01
Total Polychlorinated Biphenyls	ug/g dry as Aroclor 1242	<0.1	<0.1
halogenated Organic Scan (ECD)	ug/g dry as Chlorine; Lindane Standard	<0.1	<0.1
Volatile Organic Scan (FID)	ug/g dry as Carbon; Benzene Standard	12	8.4
Dry Weight (103°C)	%	76	68

FOR RECRA ENVIRONMENTAL LABORATORIES

Margaret C. Loch

DATE

6/29/84

RECRA ENVIRONMENTAL LABORATORIES

I.D. #84-512

ANALYTICAL RESULTS

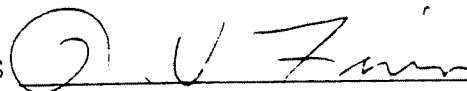
93rd STREET SCHOOL
NIAGARA FALLS, NY

Report Date: 6/29/84

PARAMETER	UNITS OF MEASURE	SAMPLE IDENTIFICATION (DATE)			
		MW-1 (5/22/84)	MW-2 (5/22/84)	MW-3 (5/22/84)	MW-4 (5/22/84)
Chloride	mg/l	34	16	21	23
Sulfate	mg/l	820	233	91	640
Total Organic Carbon	mg/l	7.5	16	6.0	14
Soluble Cadmium	mg/l	<0.005	<0.005	<0.005	<0.005
Soluble Chromium	mg/l	0.006	<0.005	<0.005	<0.005
Soluble Hexavalent Chromium	mg/l	<0.005	<0.005	<0.005	<0.005
Soluble Copper	mg/l	<0.01	<0.01	<0.01	<0.01
Soluble Iron	mg/l	<0.03	0.15	<0.03	<0.03
Soluble Lead	mg/l	<0.005	<0.005	0.007	<0.005
Soluble Mercury	mg/l	<0.0008	<0.0008	<0.0008	<0.0008
Soluble Nickel	mg/l	<0.005	<0.005	<0.005	<0.005
Soluble Silver	mg/l	<0.008	<0.008	<0.008	<0.008
Soluble Zinc	mg/l	0.044	0.260	0.653	0.036

FOR RECRA ENVIRONMENTAL LABORATORIES

DATE


6/29/84

RECRA ENVIRONMENTAL LABORATORIES

I.D.# 84-512

ANALYTICAL RESULTS

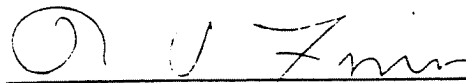
93rd STREET SCHOOL
NIAGARA FALLS, NY

Report Date: 6/29/84

PARAMETER	UNITS OF MEASURE	SAMPLE IDENTIFICATION (DATE)			
		1W (5/24/84)	2W (5/24/84)	3W (5/24/84)	5W (5/29/84)
Chloride	mg/l	23	23	24	41
Sulfate	mg/l	47	43	42	795
Total Organic Carbon	mg/l	28	37	33	18
Total Cadmium	mg/l	0.011	0.012	<0.008	0.014
Total Chromium	mg/l	<0.005	<0.005	<0.005	<0.005
Hexavalent Chromium	mg/l	<0.005	<0.005	<0.005	<0.005
Total Copper	mg/l	<0.005	0.005	0.009	0.006
Total Iron	mg/l	0.63	1.14	0.40	0.36
Total Lead	mg/l	<0.005	<0.005	<0.005	<0.005
Total Mercury	mg/l	<0.0008	<0.0008	<0.0008	<0.0008
Total Nickel	mg/l	0.008	0.011	0.008	<0.005
Total Silver	mg/l	<0.008	<0.008	<0.008	<0.008
Total Zinc	mg/l	0.091	0.072	0.111	0.034

FOR RECRA ENVIRONMENTAL LABORATORIES

DATE


6/29/84RECRA ENVIRONMENTAL LABORATORIES
I.D. #84-512

ANALYTICAL RESULTS

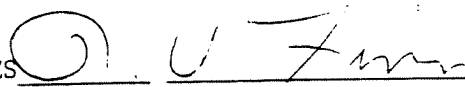
93rd STREET SCHOOL
NIAGARA FALLS, NY

Report Date: 6/29/84

PARAMETER	UNITS OF MEASURE	SAMPLE IDENTIFICATION (DATE)			
		MW-1 S-3 (5/9/84)	MW-1 S-7 (5/9/84)	MW-2 S-4 (5/14/84)	MW-2 S-6 (5/14/84)
Total Cadmium	ug/g dry	<0.6	<0.6	<0.7	<0.7
Total Chromium	ug/g dry	24.4	25.7	16.9	25.6
Hexavalent Chromium	ug/g dry	2.66	<2	<2	<2
Total Copper	ug/g dry	24.4	27.8	26.0	32.0
Total Iron	ug/g dry	13,500	16,300	4,870	252
Total Lead	ug/g dry	7.4	5.2	11	5.9
Total Mercury	ug/g dry	<0.08	<0.06	<0.07	<0.08
Total Nickel	ug/g dry	28.6	36.4	25.6	34.9
Total Silver	ug/g dry	0.88	<0.7	<0.7	<0.6
Total Zinc	ug/g dry	53.1	54.1	56.8	54.2

FOR RECRA ENVIRONMENTAL LABORATORIES

DATE


6/29/84

RECRA ENVIRONMENTAL LABORATORIES

I.D. #84-512

ANALYTICAL RESULTS

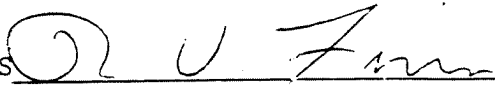
93rd STREET SCHOOL
NIAGARA FALLS, NY

Report Date: 6/29/84

PARAMETER	UNITS OF MEASURE	SAMPLE IDENTIFICATION (DATE)			
		MW-2 S-8 (5/14/84)	MW-3 S-3 (5/16/84)	MW-3 S-7 (5/16/84)	MW-4 S-3 (5/17/84)
Total Cadmium	ug/g dry	<0.6	<0.6	<0.6	<0.7
Total Chromium	ug/g dry	12.7	26.6	21.6	14.1
Hexavalent Chromium	ug/g dry	<2	<2	<2	<2
Total Copper	ug/g dry	17.2	20.9	18.5	18.2
Total Iron	ug/g dry	6,830	16,500	8,890	13,300
Total Lead	ug/g dry	17.4	12.4	12.5	6.67
Total Mercury	ug/g dry	<0.1	<0.1	<0.2	<0.2
Total Nickel	ug/g dry	13.9	40.9	32.6	12.3
Total Silver	ug/g dry	<0.6	<0.6	<0.7	<0.7
Total Zinc	ug/g dry	84.7	57.2	57.7	16.2

FOR RECRA ENVIRONMENTAL LABORATORIES

DATE


6/29/84

RECRA ENVIRONMENTAL LABORATORIES

I.D. #84-512

ANALYTICAL RESULTS

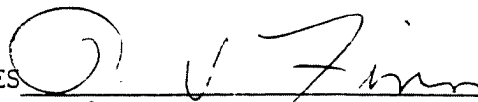
93rd STREET SCHOOL
NIAGARA FALLS, NY

Report Date: 6/29/84

PARAMETER	UNITS OF MEASURE	SAMPLE IDENTIFICATION (DATE)			
		MW-4 S-6 (5/17/84)	MW-4 S-8 (5/17/84)	6S (5/24/84)	7S (5/24/84)
Total Cadmium	ug/g dry	<0.7	<0.4	<0.7	<0.7
Total Chromium	ug/g dry	28.6	6.80	21.2	17.9
Hexavalent Chromium	ug/g dry	<2	<2	<2	<2
Total Copper	ug/g dry	30.8	17.8	26.7	8.76
Total Iron	ug/g dry	20,400	3,430	14,100	9,260
Total Lead	ug/g dry	23.2	13.1	22.8	16.6
Total Mercury	ug/g dry	<0.07	<0.07	0.37	<0.2
Total Nickel	ug/g dry	47.9	9.2	26.3	17.3
Total Silver	ug/g dry	<0.7	<0.6	<0.6	<0.7
Total Zinc	ug/g dry	76.0	72.0	45.9	58.5

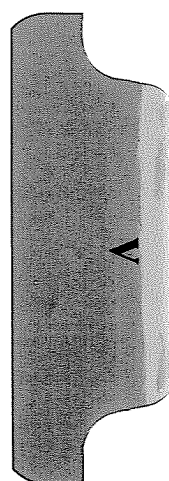
FOR RECRA ENVIRONMENTAL LABORATORIES

DATE



6/29/84

RECRA ENVIRONMENTAL LABORATORIES
I.D. #84-512



E. P. A. FORM 2070-13



RECRA RESEARCH, INC.



Site Inspection Report



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

I. IDENTIFICATION

01 STATE 02 SITE NUMBER
NY 9-32-078

II. SITE NAME AND LOCATION

01 SITE NAME (Legal, common, or descriptive name of site) 93rd Street School		02 STREET, ROUTE NO., OR SPECIFIC LOCATION IDENTIFIER 93rd Street				
03 CITY Niagara Falls		04 STATE NY	05 ZIP CODE 14301	06 COUNTY Niagara	07 COUNTY CODE	08 CONG DIST
09 COORDINATES LATITUDE 43° 05' 15.0" LONGITUDE 079° 57' 14.0"		10 TYPE OF OWNERSHIP (Check one) ☐ A. PRIVATE ☐ B. FEDERAL ☐ C. STATE ☐ D. COUNTY ☒ E. MUNICIPAL ☐ F. OTHER ☐ G. UNKNOWN				

III. INSPECTION INFORMATION

01 DATE OF INSPECTION 6 / 3 / 83 MONTH DAY YEAR	02 SITE STATUS ☐ ACTIVE ☒ INACTIVE	03 YEARS OF OPERATION 1954 1954 BEGINNING YEAR ENDING YEAR		UNKNOWN
04 AGENCY PERFORMING INSPECTION (Check all that apply) ☐ A. EPA ☐ B. EPA CONTRACTOR ☐ C. MUNICIPAL ☐ D. MUNICIPAL CONTRACTOR ☐ E. STATE ☒ F. STATE CONTRACTOR Recra Research Inc. ☐ G. OTHER				

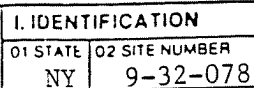
05 CHIEF INSPECTOR Kevin C. Owen	06 TITLE Environmental Specialist	07 ORGANIZATION Recra Research Inc.	08 TELEPHONE NO. (716) 838-6200
09 OTHER INSPECTORS Jim Stachowski	10 TITLE Geologist	11 ORGANIZATION Recra Research Inc.	12 TELEPHONE NO. (716) 838-6200
Andre LaPres	Geologist		()
			()
			()
			()

13 SITE REPRESENTATIVES INTERVIEWED Dr. Reed H. Hagen	14 TITLE Superintendent of Schools	15 ADDRESS 607 Walnut Ave.	16 TELEPHONE NO. (716) 278-5613
			()
			()
			()
			()
			()

17 ACCESS GAINED BY (Check one) ☒ PERMISSION ☐ WARRANT	18 TIME OF INSPECTION 10:00 A.M.	19 WEATHER CONDITIONS Sunny/warm

IV. INFORMATION AVAILABLE FROM

01 CONTACT Richard L. Crouch	02 OF (Agency/Organization) Recra Research Inc.		03 TELEPHONE NO. (716) 838-6200
04 PERSON RESPONSIBLE FOR SITE INSPECTION FORM Diane M. Werneiwski	05 AGENCY	06 ORGANIZATION Recra	07 TELEPHONE NO. (716) 838-6200
			08 DATE 8 / 20 / 84 MONTH DAY YEAR



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

CATEGORY	SUBSTANCE NAME	01 GROSS AMOUNT	02 UNIT OF MEASURE	03 COMMENTS
SLU	SLUDGE			
OLW	OILY WASTE			
SOL	SOLVENTS			
PSD	PESTICIDES			
OCC	OTHER ORGANIC CHEMICALS			
IOC	INORGANIC CHEMICALS			
ACD	ACIDS			
BAS	BASES			
MES	HEAVY METALS	unknown		Lead, chromium, iron, zinc, nickel

[illegible]

V. FEEDSTOCKS (See Appendix for CAS Numbers)					
CATEGORY	01 FEEDSTOCK NAME	02 CAS NUMBER	CATEGORY	01 FEEDSTOCK NAME	02 CAS NUMBER
FDS			FDS		
FDS			FDS		
FDS			FDS		
FDS			FDS		

EPA FORM 2070-13(7-81)



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

I. IDENTIFICATION

01 STATE 02 SITE NUMBER
NY 9-32-078

II. HAZARDOUS CONDITIONS AND INCIDENTS

01 ☒ A. GROUNDWATER CONTAMINATION
03 POPULATION POTENTIALLY AFFECTED: _____

02 ☒ OBSERVED (DATE: 5/82, 7/84)
04 NARRATIVE DESCRIPTION

☐ POTENTIAL ☐ ALLEGED

Benzene, dioxin and toluene and a variety of heavy metals detected

01 ☒ B. SURFACE WATER CONTAMINATION
03 POPULATION POTENTIALLY AFFECTED: < 70,000

02 ☒ OBSERVED (DATE: 5/82, 7/84)
04 NARRATIVE DESCRIPTION

☐ POTENTIAL ☐ ALLEGED

Dioxin detected in on-site surface waters, benzene and γ -BHC detected in adjacent storm sewers and Bergholtz Creek. Niagara Falls water intakes located 3.4 stream miles downstream of site. (Ref. 3, 4, 7)

01 ☒ C. CONTAMINATION OF AIR
03 POPULATION POTENTIALLY AFFECTED: _____

02 ☐ OBSERVED (DATE: _____)
04 NARRATIVE DESCRIPTION

☐ POTENTIAL ☐ ALLEGED

None detected

01 ☒ D. FIRE/EXPLOSIVE CONDITIONS
03 POPULATION POTENTIALLY AFFECTED: _____

02 ☐ OBSERVED (DATE: _____)
04 NARRATIVE DESCRIPTION

☐ POTENTIAL ☐ ALLEGED

Unknown, no documentation of incidents

01 ☒ E. DIRECT CONTACT approx.
03 POPULATION POTENTIALLY AFFECTED: 5,000

02 ☐ OBSERVED (DATE: _____)
04 NARRATIVE DESCRIPTION

☒ POTENTIAL ☐ ALLEGED

Fill contaminated with dioxin, benzene and γ -BHC overlain by topsoil. Exposure to population using schoolyard possible. 5,000 people (estimated population) within one-mile radius.

01 ☒ F. CONTAMINATION OF SOIL
03 AREA POTENTIALLY AFFECTED: _____ (Acres)

02 ☒ OBSERVED (DATE: 5/82, 7/84)
04 NARRATIVE DESCRIPTION

☐ POTENTIAL ☐ ALLEGED

On-site soils contaminated with dioxin, benzene, γ -BHC, and various heavy metals (Ref. 2 and this study)

01 ☒ G. DRINKING WATER CONTAMINATION
03 POPULATION POTENTIALLY AFFECTED: 770,000

02 ☐ OBSERVED (DATE: _____)
04 NARRATIVE DESCRIPTION

☐ POTENTIAL ☐ ALLEGED

City of Niagara Falls water intakes located within 3 miles downstream of site (Ref. 4)

01 ☐ H. WORKER EXPOSURE/INJURY
03 WORKERS POTENTIALLY AFFECTED: _____

02 ☐ OBSERVED (DATE: _____)
04 NARRATIVE DESCRIPTION

☐ POTENTIAL ☐ ALLEGED

Unknown

01 ☐ I. POPULATION EXPOSURE/INJURY
03 POPULATION POTENTIALLY AFFECTED: _____

02 ☐ OBSERVED (DATE: _____)
04 NARRATIVE DESCRIPTION

☐ POTENTIAL ☐ ALLEGED

Unknown



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

I. IDENTIFICATION

01 STATE 02 SITE NUMBER
NY 9-32-078

II. HAZARDOUS CONDITIONS AND INCIDENTS (Continued)

01 ☐ J. DAMAGE TO FLORA
04 NARRATIVE DESCRIPTION

02 ☐ OBSERVED (DATE _____)

☒ POTENTIAL

☐ ALLEGED

Unknown

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

02 ☐ OBSERVED (DATE _____)

☒ POTENTIAL

☐ ALLEGED

Unknown

01 ☐ L. CONTAMINATION OF FOOD CHAIN
04 NARRATIVE DESCRIPTION

02 ☐ OBSERVED (DATE _____)

☐ POTENTIAL

☐ ALLEGED

Unknown

01 ☒ M. UNSTABLE CONTAINMENT OF WASTES
(Spills/Runoff/Standing liquids Leaking drums)
03 POPULATION POTENTIALLY AFFECTED: _____

02 ☐ OBSERVED (DATE _____)

☐ POTENTIAL

☐ ALLEGED

04 NARRATIVE DESCRIPTION

No containment employed

01 ☒ N. DAMAGE TO OFFSITE PROPERTY
04 NARRATIVE DESCRIPTION

02 ☐ OBSERVED (DATE _____)

☐ POTENTIAL

☐ ALLEGED

Unknown

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

02 ☒ OBSERVED (DATE 5/82)

☐ POTENTIAL

☐ ALLEGED

BHC and dioxin detected in storm sewer

Lindane detected in storm sewers adjacent to site (Ref. 3 & 7)

01 ☐ P. ILLEGAL/UNAUTHORIZED DUMPING
04 NARRATIVE DESCRIPTION

02 ☐ OBSERVED (DATE _____)

☐ POTENTIAL

☐ ALLEGED

Unknown

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

Unknown

III. TOTAL POPULATION POTENTIALLY AFFECTED: _____

IV. COMMENTS

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

References: 2, 3, 4, 6 and 7



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

I. IDENTIFICATION

01 STATE NY 02 SITE NUMBER 9-32-078

II. PERMIT INFORMATION

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

III. SITE DESCRIPTION

01 STORAGE/DISPOSAL (Check all that apply)	02 AMOUNT	03 UNIT OF MEASURE	04 TREATMENT (Check all that apply)	05 OTHER
☐ A. SURFACE IMPOUNDMENT			☐ A. INCINERATION	☐ A. BUILDINGS ON SITE
☐ B. PILES			☐ B. UNDERGROUND INJECTION	
☐ C. DRUMS, ABOVE GROUND			☐ C. CHEMICAL/PHYSICAL	
☐ D. TANK, ABOVE GROUND			☐ D. BIOLOGICAL	
☐ E. TANK, BELOW GROUND			☐ E. WASTE OIL PROCESSING	
☒ F. LANDFILL	3,000	cu. yards	☐ F. SOLVENT RECOVERY	06 AREA OF SITE approximately 10 (Acres)
☐ G. LANDFARM			☐ G. OTHER RECYCLING/RECOVERY	
☐ H. OPEN DUMP			☐ H. OTHER (Specify)	
☐ I. OTHER (Specify)				

07 COMMENTS

IV. CONTAINMENT

01 CONTAINMENT OF WASTES (Check one)
☐ A. ADEQUATE, SECURE ☐ B. MODERATE ☒ C. INADEQUATE, POOR ☐ D. INSECURE, UNSOUND, DANGEROUS

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

Layer of topsoil over contaminated fill, no containment, no measures to provide for surface run-off control or to prevent infiltration

V. ACCESSIBILITY

01 WASTE EASILY ACCESSIBLE: ☒ YES ☐ NO
02 COMMENTS

School grounds accessible to public

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

References 2, 3 and 7



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

I. IDENTIFICATION
01 STATE 02 SITE NUMBER
NY 9-32-078

II. DRINKING WATER SUPPLY

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

III. GROUNDWATER

01 GROUNDWATER USE IN VICINITY (Check one)

☐ A ONLY SOURCE FOR DRINKING ☐ B DRINKING (Other sources available)
COMMERCIAL, INDUSTRIAL, IRRIGATION (No other water sources available)

☒ C COMMERCIAL, INDUSTRIAL, IRRIGATION (Limited other sources available) ☐ D NOT USED, UNUSEABLE

02 POPULATION SERVED BY GROUND WATER industrial only 03 DISTANCE TO NEAREST DRINKING WATER WELL _____ (mi)

04 DEPTH TO GROUNDWATER < 10 (ft) 05 DIRECTION OF GROUNDWATER FLOW south 06 DEPTH TO AQUIFER OF CONCERN approx. 20 (ft) 07 POTENTIAL YIELD OF AQUIFER variable (gpd) 08 SOLE SOURCE AQUIFER ☐ YES ☒ NO

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

Industrial wells used to provide process waters

0 RECHARGE AREA	11 DISCHARGE AREA
☒ YES COMMENTS Bedrock aquifer recharges via infiltration from overlying deposits	☒ YES COMMENTS Possible discharge to Bergholtz Creek. Bedrock aquifer discharges to Niagara River
☐ NO	☐ NO

IV. SURFACE WATER

01 SURFACE WATER USE (Check one):

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

02 AFFECTED/POTENTIALLY AFFECTED BODIES OF WATER

NAME:	AFFECTED	DISTANCE TO SITE
<u>Bergholtz Creek</u>	☐	<u>Adjacent</u> (mi)
<u>Cayuga Creek</u>	☐	_____ (mi)
<u>Niagara River</u>	☐	_____ (mi)

V. DEMOGRAPHIC AND PROPERTY INFORMATION

01 TOTAL POPULATION WITHIN	02 DISTANCE TO NEAREST POPULATION						
<table><tr><td>ONE (1) MILE OF SITE</td><td>TWO (2) MILES OF SITE</td><td>THREE (3) MILES OF SITE</td></tr><tr><td>A. _____ NO. OF PERSONS</td><td>B. _____ NO. OF PERSONS</td><td>C. <u>770,000</u> NO. OF PERSONS</td></tr></table>	ONE (1) MILE OF SITE	TWO (2) MILES OF SITE	THREE (3) MILES OF SITE	A. _____ NO. OF PERSONS	B. _____ NO. OF PERSONS	C. <u>770,000</u> NO. OF PERSONS	<u>Adjacent</u> (mi)
ONE (1) MILE OF SITE	TWO (2) MILES OF SITE	THREE (3) MILES OF SITE					
A. _____ NO. OF PERSONS	B. _____ NO. OF PERSONS	C. <u>770,000</u> NO. OF PERSONS					
03 NUMBER OF BUILDINGS WITHIN TWO (2) MILES OF SITE	04 DISTANCE TO NEAREST OFF-SITE BUILDING						
_____	_____ (mi)						

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

School located in residential district of Niagara Falls



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

I. IDENTIFICATION

01 STATE 02 SITE NUMBER
NY 9-32-078

VI. ENVIRONMENTAL INFORMATION

01 PERMEABILITY OF UNSATURATED ZONE (Check one)

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

02 PERMEABILITY OF BEDROCK (Check one)

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

03 DEPTH TO BEDROCK
approximately

25 (ft)

04 DEPTH OF CONTAMINATED SOIL ZONE

0 - 25 (ft)

05 SOIL pH

unknown

06 NET PRECIPITATION

7 (in)

07 ONE YEAR 24 HOUR RAINFALL

2.1 (in)

08 SLOPE
SITE SLOPE

< 3 %

DIRECTION OF SITE SLOPE

north

TERRAIN AVERAGE SLOPE

< 3 %

09 FLOOD POTENTIAL

SITE IS IN 100 YEAR FLOODPLAIN

10

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

11 DISTANCE TO WETLANDS (5 acre minimum)

ESTUARINE

OTHER

A. (mi)

B. 5 (mi)

12 DISTANCE TO CRITICAL HABITAT (of endangered species)

(mi)

None in area

ENDANGERED SPECIES: (mi)

13 LAND USE IN VICINITY

DISTANCE TO:

COMMERCIAL/INDUSTRIAL

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

AGRICULTURAL LANDS
PRIME AG LAND AG LAND

Residential

A. (mi)

B. adjacent (mi)

C. (mi) D. (mi)

14 DESCRIPTION OF SITE IN RELATION TO SURROUNDING TOPOGRAPHY

Topography in the area is generally flat. On northern edge of site there is a 5- to 10-foot drop-off to Bergholtz Creek with a slope of about 16%. School grounds have apparently been landscaped to direct run-off to Bergholtz Creek.

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

References 4, 10, 11 and 14



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

I. IDENTIFICATION

01 STATE 02 SITE NUMBER
NY 9-32-078

II. SAMPLES TAKEN

SAMPLE TYPE	01 NUMBER OF SAMPLES TAKEN	02 SAMPLES SENT TO	03 ESTIMATED DATE RESULTS AVAILABLE
GROUNDWATER	4	Recra Environmental Lab Environdyne Engineering	8/84
SURFACE WATER	5	Recra Environmental Lab Environdyne Engineering	8/84
WASTE			
AIR			
RUNOFF			
SPIII			
SOIL	9	Recra Environmental Lab Environdyne Engineering	8/84
VEGETATION			
OTHER			

III. FIELD MEASUREMENTS TAKEN

01 TYPE	02 COMMENTS
HNU	No air contamination detected
pH	
Specific cond.	
temperature	

IV. PHOTOGRAPHS AND MAPS

01 TYPE ☐ GROUND ☐ AERIAL	02 IN CUSTODY OF _____ (Name of organization or individual)
03 MAPS ☐ YES ☐ NO	04 LOCATION OF MAPS _____

V. OTHER FIELD DATA COLLECTED (Provide narrative description)

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



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

I. IDENTIFICATION

01 STATE 02 SITE NUMBER
NY 9-32-078

II. CURRENT OWNER(S)

PARENT COMPANY (if applicable)

01 NAME Niagara Falls Board of Education			02 D+B NUMBER		08 NAME			09 D+B NUMBER	
03 STREET ADDRESS (P.O. Box, RFD #, etc.) 607 Walnut Ave.			04 SIC CODE		10 STREET ADDRESS (P.O. Box, RFD #, etc.)			11 SIC CODE	
05 CITY Niagara Falls		06 STATE NY	07 ZIP CODE 14301		12 CITY		13 STATE	14 ZIP CODE	
01 NAME			02 D+B NUMBER		08 NAME			09 D+B NUMBER	
03 STREET ADDRESS (P.O. Box, RFD #, etc.)			04 SIC CODE		10 STREET ADDRESS (P.O. Box, RFD #, etc.)			11 SIC CODE	
05 CITY		06 STATE	07 ZIP CODE		12 CITY		13 STATE	14 ZIP CODE	
01 NAME			02 D+B NUMBER		08 NAME			09 D+B NUMBER	
03 STREET ADDRESS (P.O. Box, RFD #, etc.)			04 SIC CODE		10 STREET ADDRESS (P.O. Box, RFD #, etc.)			11 SIC CODE	
05 CITY		06 STATE	07 ZIP CODE		12 CITY		13 STATE	14 ZIP CODE	
01 NAME			02 D+B NUMBER		08 NAME			09 D+B NUMBER	
03 STREET ADDRESS (P.O. Box, RFD #, etc.)			04 SIC CODE		10 STREET ADDRESS (P.O. Box, RFD #, etc.)			11 SIC CODE	
05 CITY		06 STATE	07 ZIP CODE		12 CITY		13 STATE	14 ZIP CODE	

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

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

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

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

NYSDEC Region 9



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

I. IDENTIFICATION

01 STATE 02 SITE NUMBER
NY 9-32-078

II. CURRENT OPERATOR (Provide if different from owner)

OPERATOR'S PARENT COMPANY (If applicable)

01 NAME Inactive		02 D+B NUMBER		10 NAME		11 D+B NUMBER	
03 STREET ADDRESS (P.O. Box, RFD #, etc.)		04 SIC CODE		12 STREET ADDRESS (P.O. Box, RFD #, etc.)		13 SIC CODE	
05 CITY		06 STATE	07 ZIP CODE	14 CITY		15 STATE	16 ZIP CODE
08 YEARS OF OPERATION		09 NAME OF OWNER					

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

PREVIOUS OPERATORS' PARENT COMPANIES (If applicable)

01 NAME		02 D+B NUMBER		10 NAME		11 D+B NUMBER	
03 STREET ADDRESS (P.O. Box, RFD #, etc.)		04 SIC CODE		12 STREET ADDRESS (P.O. Box, RFD #, etc.)		13 SIC CODE	
05 CITY		06 STATE	07 ZIP CODE	14 CITY		15 STATE	16 ZIP CODE
08 YEARS OF OPERATION 1954		09 NAME OF OWNER DURING THIS PERIOD					

01 NAME		02 D+B NUMBER		10 NAME		11 D+B NUMBER	
03 STREET ADDRESS (P.O. Box, RFD #, etc.)		04 SIC CODE		12 STREET ADDRESS (P.O. Box, RFD #, etc.)		13 SIC CODE	
05 CITY		06 STATE	07 ZIP CODE	14 CITY		15 STATE	16 ZIP CODE
08 YEARS OF OPERATION		09 NAME OF OWNER DURING THIS PERIOD					

01 NAME		02 D+B NUMBER		10 NAME		11 D+B NUMBER	
03 STREET ADDRESS (P.O. Box, RFD #, etc.)		04 SIC CODE		12 STREET ADDRESS (P.O. Box, RFD #, etc.)		13 SIC CODE	
05 CITY		06 STATE	07 ZIP CODE	14 CITY		15 STATE	16 ZIP CODE
08 YEARS OF OPERATION		09 NAME OF OWNER DURING THIS PERIOD					

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



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

I. IDENTIFICATION

01 STATE 02 SITE NUMBER
NY 9-32-078

II. ON-SITE GENERATOR

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

III. OFF-SITE GENERATOR(S)

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

IV. TRANSPORTER(S)

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

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

Note: 3,000 cubic yards of fly ash and BHC cake from Love Canal used as fill
at 93rd Street School
(Ref. 2)



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

I. IDENTIFICATION

01 STATE NY 02 SITE NUMBER 9-32-078

II. PAST RESPONSE ACTIVITIES

01 ☐ A. WATER SUPPLY CLOSED
04 DESCRIPTION

02 DATE _____

03 AGENCY _____

No action of this nature taken

01 ☐ B. TEMPORARY WATER SUPPLY PROVIDED
04 DESCRIPTION

02 DATE _____

03 AGENCY _____

No

01 ☐ C. PERMANENT WATER SUPPLY PROVIDED
04 DESCRIPTION

02 DATE _____

03 AGENCY _____

No

01 ☐ D. SPILLED MATERIAL REMOVED
04 DESCRIPTION

02 DATE _____

03 AGENCY _____

No

01 ☐ E. CONTAMINATED SOIL REMOVED
04 DESCRIPTION

02 DATE _____

03 AGENCY _____

No

01 ☐ F. WASTE REPACKAGED
04 DESCRIPTION

02 DATE _____

03 AGENCY _____

No

01 ☐ G. WASTE DISPOSED ELSEWHERE
04 DESCRIPTION

02 DATE _____

03 AGENCY _____

No

01 ☐ H. ON SITE BURIAL
04 DESCRIPTION

02 DATE _____

03 AGENCY _____

3,000 cubic yards of fly ash and BHC cake from Love Canal
used as fill at 93rd Street School

01 ☐ I. IN SITU CHEMICAL TREATMENT
04 DESCRIPTION

02 DATE _____

03 AGENCY _____

No

01 ☐ J. IN SITU BIOLOGICAL TREATMENT
04 DESCRIPTION

02 DATE _____

03 AGENCY _____

No

01 ☐ K. IN SITU PHYSICAL TREATMENT
04 DESCRIPTION

02 DATE _____

03 AGENCY _____

No

01 ☐ L. ENCAPSULATION
04 DESCRIPTION

02 DATE _____

03 AGENCY _____

No

01 ☐ M. EMERGENCY WASTE TREATMENT
04 DESCRIPTION

02 DATE _____

03 AGENCY _____

No

01 ☐ N. CUTOFF WALLS
04 DESCRIPTION

02 DATE _____

03 AGENCY _____

No

01 ☐ O. EMERGENCY DIKING/SURFACE WATER DIVERSION
04 DESCRIPTION

02 DATE _____

03 AGENCY _____

No

01 ☐ P. CUTOFF TRENCHES/SUMP
04 DESCRIPTION

02 DATE _____

03 AGENCY _____

No

01 ☐ Q. SUBSURFACE CUTOFF WALL
04 DESCRIPTION

02 DATE _____

03 AGENCY _____

No



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

L IDENTIFICATION

01 STATE | 02 SITE NUMBER
NY | 9-32-078

II PAST RESPONSE ACTIVITIES (Continued)

01 ☐ R. BARRIER WALLS CONSTRUCTED
04 DESCRIPTION

02 DATE _____

03 AGENCY _____

No

01 ☐ S. CAPPING/COVERING
04 DESCRIPTION

02 DATE unknown

03 AGENCY _____

Layer of topsoil covers waste

01 ☐ T. BULK TANKAGE REPAIRED
04 DESCRIPTION

02 DATE _____

03 AGENCY _____

No

01 ☐ U. GROUT CURTAIN CONSTRUCTED
04 DESCRIPTION

02 DATE _____

03 AGENCY _____

No

01 ☐ V. BOTTOM SEALED
04 DESCRIPTION

02 DATE _____

03 AGENCY _____

No

01 ☐ W. GAS CONTROL
04 DESCRIPTION

02 DATE _____

03 AGENCY _____

No

01 ☐ X. FIRE CONTROL
04 DESCRIPTION

02 DATE _____

03 AGENCY _____

No

01 ☐ Y. LEACHATE TREATMENT
04 DESCRIPTION

02 DATE _____

03 AGENCY _____

No

01 ☐ Z. AREA EVACUATED
04 DESCRIPTION

02 DATE _____

03 AGENCY _____

93rd Street School, located adjacent to Love Canal - School has
been closed - Love Canal evacuated

01 ☐ 1. ACCESS TO SITE RESTRICTED
04 DESCRIPTION

02 DATE _____

03 AGENCY _____

No

01 ☐ 2. POPULATION RELOCATED
04 DESCRIPTION

02 DATE _____

03 AGENCY _____

Love Canal population relocated

01 ☐ 3. OTHER REMEDIAL ACTIVITIES
04 DESCRIPTION

02 DATE _____

03 AGENCY _____

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

References 2, 3 and 7



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

I. IDENTIFICATION

01 STATE NY	02 SITE NUMBER 9-32-078

II. ENFORCEMENT INFORMATION

01 PAST REGULATORY/ENFORCEMENT ACTION ☐ YES ☒ NO

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

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

SECTION 6

6.0 PRELIMINARY ENGINEERING ASSESSMENT OF REMEDIAL ALTERNATIVES

The purpose of this section is to provide a preliminary assessment of viable remedial alternatives at the 93rd Street School site. This assessment is based upon the site characterization presented in previous sections of this report. It is limited in scope, and should not be regarded as a detailed cost-effective evaluation. Rather, the preliminary assessment is intended to serve the following basic functions:

- o Identify individual remedial measures which appear to be feasible at the site;
- o Insofar as the available data allows, prepare order-of-magnitude cost estimates for these remedial measures; and
- o Combine the measures into several comprehensive, alternate remedial plans which may subsequently be evaluated as part of a detailed Remedial Investigation/Feasibility Study (RI/FS) for the site.

The preliminary assessment is not intended to determine whether or not remedial action or further study is required at the site. Such a determination must be based upon the site's overall condition as discussed previously and reflected in the revised Hazard Ranking System (HRS) score. Since "no-action" is technically feasible at any site, it has been identified below as an alternative for further evaluation as part of a detailed RI/FS.

6.1 Identification of Feasible Remedial Measures

Based upon available data and information, remedial measures which presently appear to be feasible at the 93rd Street School site are listed and briefly discussed below. Where appropriate, the discussion includes an identification of additional field data which would be necessary to confirm the feasibility and/or evaluate the cost-effectiveness of these measures.

o No Action

As previously mentioned, the no-action alternative is always technically feasible. At the 93rd Street School, this alternative would appear to warrant special consideration in light of the well-established condition of the site. In evaluating the no-action alternative, a careful distinction should be maintained between the 93rd Street School site itself, and other potential sources in the surrounding Love Canal area. The need for and type of action required at the School site might be quite different than that for other nearby sources.

o Excavation and Removal

Previous information concerning the 93rd Street School, including the Phase I report, indicates that a number of hazardous substances may be contained within and/or originating from the fly ash and BHC cake fill which were placed at the site in 1954. Although the presence of some of these substances was generally confirmed during this Phase II investigation (see Section 4.0), it has been assumed that "excavation and removal" would apply to the fly ash fill and

all overlying soil material. (Even if uncontaminated, this overlying soil would be difficult to segregate from the fly ash during any construction activities; therefore, a conservative assumption is that the soil would also be removed.) After this material had been excavated and removed off-site to a secure landfill, clean fill and topsoil would be brought on to restore the site to its existing contours. The benefit of excavation and removal depends upon the degree of contamination of the fly ash itself and the mobility of the substances which might be contained within it. Both of these aspects would have to be studied in greater detail prior to the final evaluation of this remedial measure.

o Capping and Regrading

The site is presently graded to drain gently (typically one to two percent) toward a northerly-flowing swale which traverses the central portion of the school yard and discharges into Bergholtz Creek. The school yard is covered with an established and well-maintained growth of grass. Although the surface of the site appears to offer a fairly positive drainage pattern, several of its features tend to promote infiltration and thus could benefit from capping and regrading. These are:

1. The drainage swale collects surface run-off from the school yard and concentrates it over the fill. (A "better" grading plan would provide convex slopes pitching surface runoff away from the fill area.)

2. The overland slopes are relatively flat. (Minimum gradients of around three percent would be recommended.)
3. The overlying soil material, which consists of a silty clay in some places and topsoil everywhere, appears insufficient to significantly retard infiltration into the fly ash. (An impermeable cap would be required to accomplish this.)

The primary benefit of "capping and regrading," as indicated above, would be to reduce the amount of infiltration into the buried wastes and, consequently, to reduce the production of leachate. Before a grading plan could be developed and the concept finalized, it would be necessary to obtain a surveyed topographic map of the site. It appears from observation, however, that there is sufficient fall from the school yard to Bergholtz Creek to permit substantial regrading of the site. In developing a regrading plan, it would be necessary to take into account both the drainage impact on adjacent properties and the final land use of the 93rd Street School site itself. Depending upon such considerations, one potentially economic alternative to capping and regrading would be to simply extend the paved surface on the east side of the school, thereby converting the field recreation area to court recreation. For present purposes, however, it has been assumed that the school yard will remain as a grass surface, and that capping and regrading would involve the placement of a 50-mil high density polyethylene (HDPE) liner and a clay cap or sufficient cover material to provide the recommended three percent minimum, convex overland slope.

o Leachate Collection

The value of a leachate collection system at the 93rd Street School site depends upon the degree of subsurface contamination on-site and the pathways of migration for this contamination. The data generated during this study is generally inconclusive with regard to the direction and rate of groundwater flow at the site. It is reasonable to surmise, however, that the direction of groundwater flow in the shallow water table aquifer is generally northward toward Bergholtz Creek. The water level during the period of measurement (typical elevation 565) generally intersected, or fell within one foot below, the bottom of the fly ash fill; the water level in Bergholtz Creek (typical elevation 564) was approximately one foot below the typical on-site water table elevation. The fly ash fill appears to be underlain by a mottled silty clay. Although permeability data is unavailable, it would seem reasonable to assume that the fly ash and overlying material have significantly greater permeability than this underlying silty clay. The above assumptions, which must be confirmed by additional field investigations, have several implications with regard to an on-site leachate collection system:

1. Leachate from the fly ash probably tends to travel in a predominantly horizontal direction at relatively shallow depths. A shallow collection system would, therefore, probably suffice.

2. The most likely focus for leachate movement, and therefore the most likely location for a collection system, is along the northern edge of the school yard.

Based on the above discussion, the leachate collection system is envisioned as extending approximately 700 feet along the north edge of the school yard, and consisting of a gravel drain which would extend just into the silty clay material underlying the fly ash fill. A small collection sump and pump station would receive flow from this collection system and pump it into an above-ground storage tank from where it would either be treated on-site or removed off-site.

- o Slurry Containment Wall

A slurry wall would serve the function of containing leachate on-site. Even with an effective cap, it would probably be necessary to construct an interior subsurface drainage system along at least one edge of the contained area in order to prevent the possible build-up of leachate behind the wall. A major question concerning the slurry wall, and one which would require considerable additional field data, is the depth of the wall. It would appear that the wall should be tied into the silty clay material or into the dolostone bedrock underlying the site. The average depth to the former is approximately eight feet, whereas the average depth to bedrock is approximately twenty-eight feet. Besides the relative hydraulic conductivities of the two alternate wall foundations, it would be necessary to evaluate the potential for vertical contaminant migra-

tion due to the probable downward hydraulic gradient from surficial soils to bedrock. For present purposes, it has been conservatively assumed that the slurry wall would extend into bedrock around the entire school yard, and that it would be accompanied by interval well points within the north edge of the wall. (The purpose of these well points would be to draw the water table within the enclosed area down to the piezometric level of the underlying bedrock.)

o Leachate Disposal

Disposal of leachate would be necessary with either a leachate collection system or slurry containment wall. The following methods of leachate disposal might be considered:

1. Discharge to the existing sewer system. A sanitary sewer runs along 93rd Street in front of the school. Although discharge to this sewer would undoubtedly prove to be the most economical method of leachate disposal, sewer use ordinances and public opinion might render this option unfeasible. Nevertheless, it should be evaluated as part of a detailed RI/FS.
2. Off-site disposal at the Love Canal treatment facility. A leachate treatment facility has been constructed and is presently operational in the Love Canal area close to the 93rd Street School site. The feasibility of collecting leachate from the school site and transporting it to this existing facility would depend upon the facility's capacity, treatment process, and practical availability, as well as the expected

quality and quantity of leachate from the school.

3. Off-site disposal at a private treatment facility. It would be feasible to collect leachate and transport it to a private hazardous waste treatment facility of which several are available in the Western New York area. This method would, however, be subject to certain litigation and contractual settlement with the private facilities due to the sensitive political situation created because of the toxic nature of chemicals detected at the site (i.e. 2,3,7,8-TCDD).
4. On-site treatment. An on-site leachate treatment facility is probably feasible from a technical standpoint but it would require a State Pollution Discharge Elimination System (SPDES) permit. The choice between on-site and off-site treatment might be affected as much by public opinion as by economics.

The available groundwater quality data for 93rd Street School is insufficient to determine a leachate treatment process or to select from the various methods of leachate disposal listed above. Since the quality and production rate of leachate cannot be accurately determined, it has simply been assumed in the following analysis facility. For moderate to large quantities of leachate, this assumption would generally be conservative from an economic standpoint.

6.2 Estimated Cost of Remedial Measures

This section provides order-of-magnitude cost estimates for the separate remedial measures identified in Section 6.1. Since the primary purpose of these estimates is to provide budgetary planning guidelines, they have been prepared from a conservative standpoint, insofar as practical. It should be recognized, however, that the estimates are based upon very limited data, and are therefore considerably less reliable than those which would be developed as part of a RI/FS. The costs of the various measures include construction and engineering services (15%), contingencies (30%), and operation/maintenance (O&M). They do not include the cost of a detailed RI/FS, nor of any associated administrative or legal tasks. Table 6-1 summarizes the costs of the various remedial measures. The following paragraphs highlight the major assumptions and quantities upon which these costs are based.

TABLE 6 - 1
ESTIMATED COST OF INDIVIDUAL REMEDIAL MEASURES
93RD STREET SCHOOL

Remedial Measure	Costs (\$000's)				
	Construction	Engineering	Contingency	O&M ¹	Total
Excavation and Removal	\$3,821.9	\$ 573.3	\$ 955.5	0	\$5,350.7
Capping and Regrading	616.1	92.4	154.0	0	862.5
Leachate Collection	63.2	9.5	15.8	3.5	92.0
Slurry Containment Wall	467.0	70.0	116.8	7.0	660.8
Leachate Disposal	0	0	0	1,000.0	1,000.0

¹ Operation & Maintenance, converted to present worth at 7 5/8% interest.

o Excavation and Removal

It has been assumed, on the basis of available information, that 24,000 cubic yards (CY) of contaminated soil and overburden would be excavated and transported to a secure landfill for disposal. This material would be replaced with common borrow and topsoil, then seeded and mulched to restore the site to its present condition.

o Capping and Regrading

A site area of approximately 6.2 acres (AC) would be capped with a 50-mil high density polyethylene (HDPE) liner and regraded. The new grading plan would provide a convex shape over the fill area, pitching water away from the fill at a gradient of three percent. To achieve this grading, approximately 55,000 CY of fill would be required, of which 10,000 CY would be a sand layer under the HDPE liner and 5,000 CY would be a final topsoil layer.

o Leachate Collection

A leachate collection drain approximately 700 linear feet (LF) in length would be constructed along the northern edge of the school yard. This drain would include filter stone backfill, a perforated PVC drain pipe, and would be wrapped in a filter fabric. The drain would discharge to a centrally-located, duplex pumping station, from which leachate would be pumped to an above-ground tank for temporary storage prior to on-site treatment or off-site disposal.

- o Slurry Containment Wall

A slurry wall around the perimeter of the school yard would be approximately 2,100 LF in length, and would extend to an average depth of approximately thirty feet so as to tie into the bedrock underlying the site. A well point system would be constructed along the inside northern edge of the wall. This well point system would include a header and pumping system, and would discharge to an above-ground tank for temporary storage prior to treatment or disposal.

- o Leachate Disposal

Leachate disposal would be at a private, off-site treatment facility. Leachate would be removed from the above-ground storage tank on a scheduled contract basis. The cost estimate for leachate disposal is based upon a time-averaged production rate of 200,000 gallons per year over a 20-year period.

6.3 Remedial Alternatives

Table 6-2 lists five comprehensive remedial alternatives which consist of various combinations of the individual remedial measures identified previously. The rationale for these combinations is explained below.

- o Alternative #1, the no-action alternative, is self-explanatory.

- o Alternative #2, consists solely of excavation and removal. By itself, this measure would effectively remove the primary source of contamination at the site. Whether or not it would provide "complete" cleanup depends upon the degree to which contaminants

have already migrated from the fill to underlying soils and groundwater. Available data from the present study indicates that such migration is suggested; however, more detailed analytical testing would be required for any quantitative migration determination.

- o Alternative #3, consists solely of capping and regrading the site. Although the contaminated soils would remain onsite, this alternative would tend to isolate them. At the present time it appears that the primary potential method of contaminant migration is via infiltration and downward percolation of surface water through the fill material. The onsite water table during the period of the study was at a level generally intersecting or just below the bottom limit of the fill material, implying that the contaminated soil was not in substantial direct contact with groundwater. Although capping and regrading alone would probably not have a pronounced effect on the water table, it would tend to lower it somewhat, thereby improving the existing condition. Much more important, however, is that this measure would greatly reduce the potential for contaminants reaching the water table via infiltration.
- o Alternative #4 goes beyond Alternative #3 in that it provides leachate collection and disposal in addition to capping and regrading. As previously discussed, available data suggests that a shallow collection system just into the silty clay layer underlying the fly ash would effectively collect most of the leachate generated onsite. The provision for leachate disposal is, of course, a necessary adjunct to the collection system. Capping and regrading

has also been included within this alternative, since it is felt that, from a long-term operation/ maintenance standpoint, any effort expended to collect and dispose of leachate should be accompanied by an attempt to reduce its production.

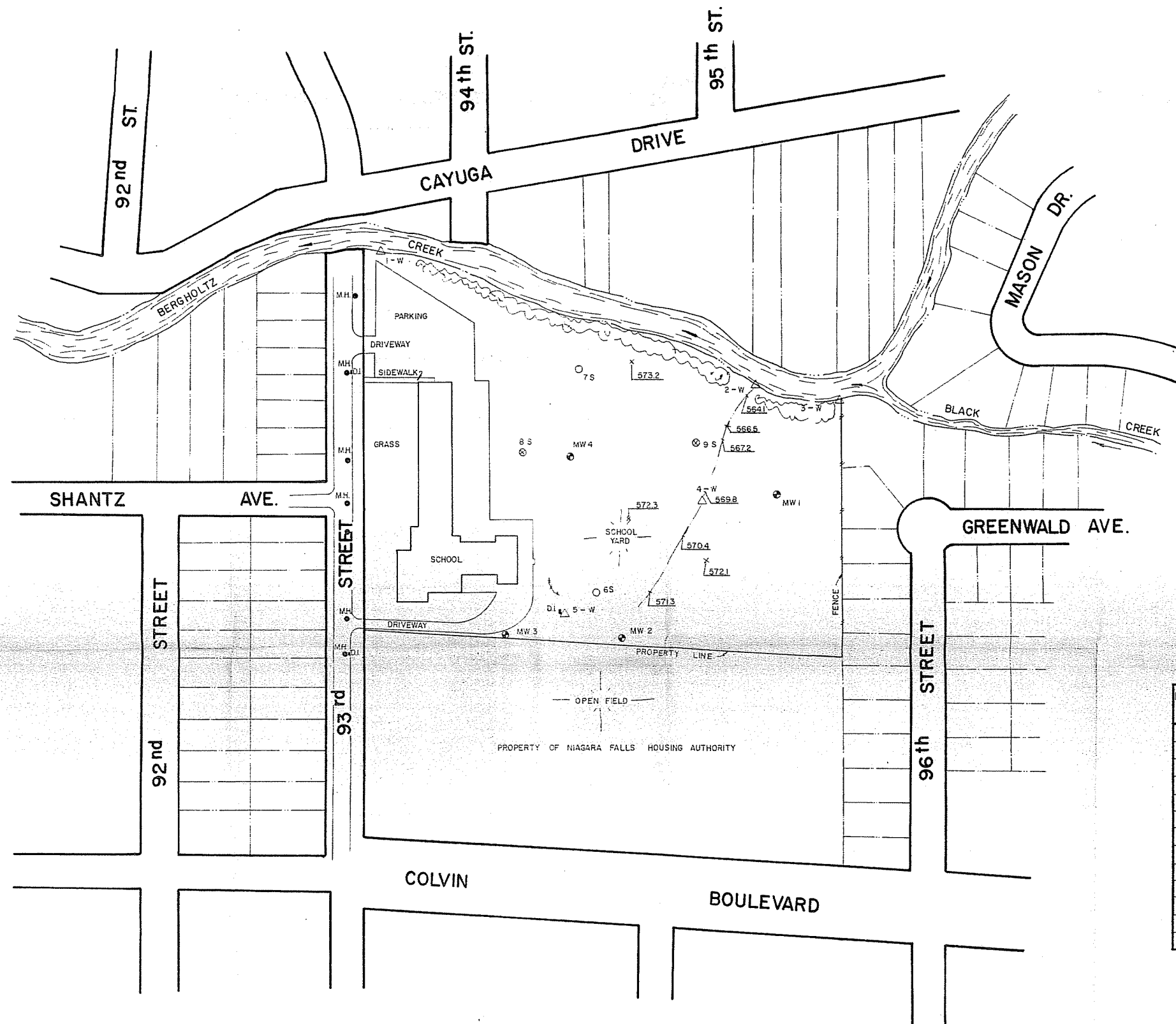
- o Alternative #5 is similar to Alternative #4 except that a slurry containment wall is substituted for a leachate collection system. Since the slurry wall measure includes an internal dewatering provision, this alternative actually provides a higher degree of contaminant control than does the previous alternative. Besides controlling the production of leachate and collecting/disposing of it, Alternative #5 also isolates any contaminant which might already exist in the unconsolidated soils underlying the site; contaminants would not be in the isolated bedrock. Obviously, the relative benefit of this alternative as compared with Alternative #4 depends upon the extent to which subsurface contamination presently exists.

TABLE 6 - 2
REMEDIAL ALTERNATIVES
93RD STREET SCHOOL

Remedial Measure	Estimated Cost (\$000's)	Alt. # 1	Alt. # 2	Alt. # 3	Alt. # 4	Alt. # 5
No Action	0	*				
Excavation and Removal ¹	\$5,370.7		*			
Capping and Regrading	862.5			*	*	*
Leachate Collection	92.0				*	
Slurry Containment Wall	660.8					*
Leachate Disposal ¹	1,000.0				*	*
Total Alternative Cost (\$000's)		0	5,370.7	862.5	1,954.5	2,523.3

¹ As mentioned earlier in this section (6.1), off-site removal may either be prohibitive, or the above estimated cost substantially impacted increased, due to the nature of certain chemical compounds detected in past studies and this current study.

APPENDIX 1
SITE PLATE.



- LEGEND**
- MW - MONITORING WELL
 - S - SOIL SAMPLE
 - ⊗ S - SOIL SAMPLE (NO ANALYSIS)
 - MH - MANHOLE
 - DI - DRAIN INLET
 - △ SURFACE WATER / SEDIMENT SAMPLE
 - x 573.2 - Surface Spot Elevations

DESCRIPTION	TOP OF CASING ELEVATION	GROUND ELEVATION
MW - 1	574.9	572.8
MW - 2	574.2	571.6
MW - 3	574.6	572.4
MW - 4	575.1	572.9
6S		573.0
7S		573.6
8S		573.4
9S		570.0
1-W		564.5
2-W		564.1
3-W		564.5
-W		570.1
5-W		572.8

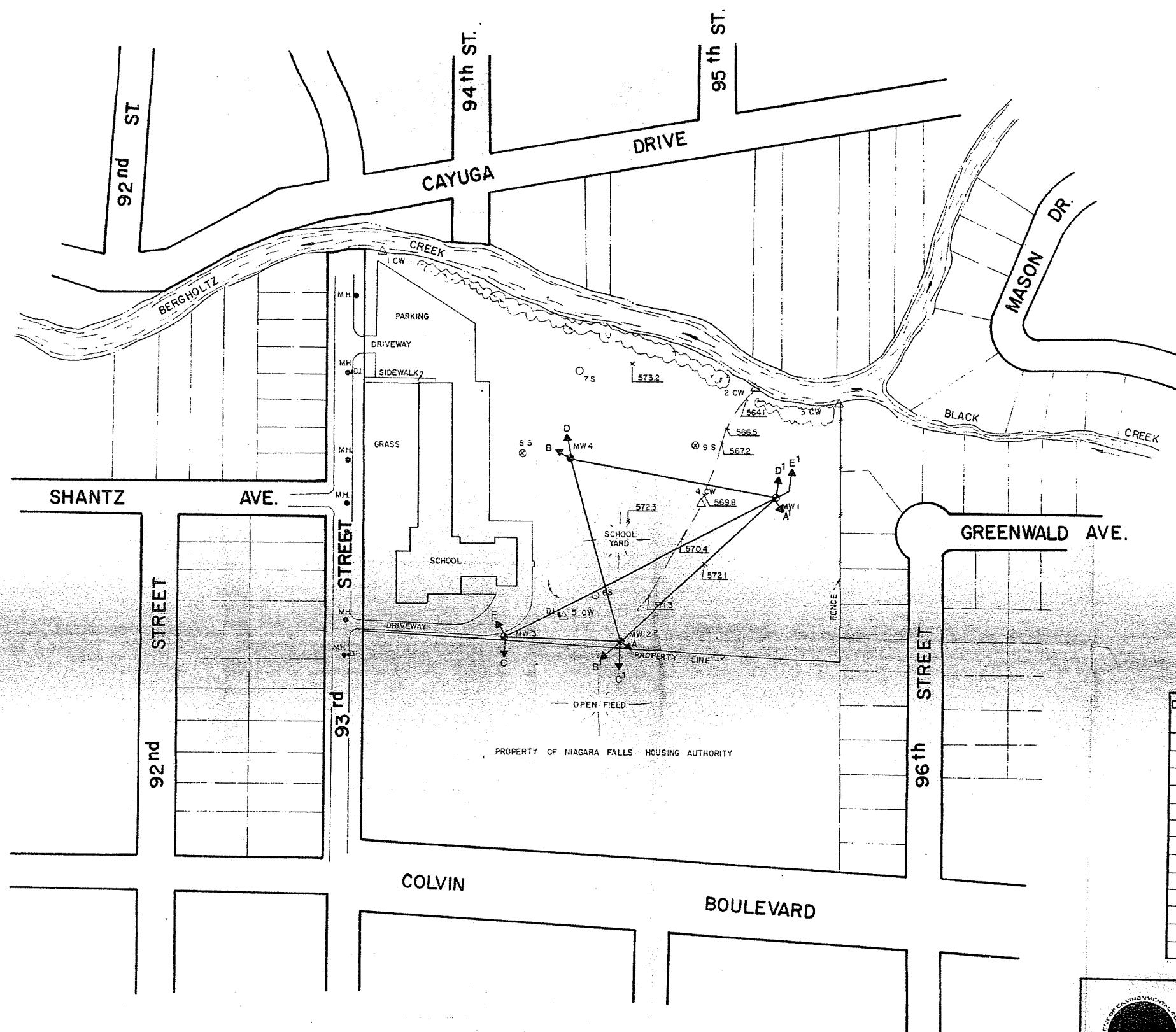
AUG 28 1985
Plate A

DESIGNED BY: MJS		URS URS Company, Inc. CONSULTING ENGINEERS NEW YORK NEW JERSEY	NEW YORK STATE SUPERFUND	93 rd STREET SCHOOL LANDFILL CITY OF NIAGARA FALLS, NIAGARA CO., NEW YORK	SITE PLAN	
DRAWN BY: MJS					Scale: 1" = 100' Date: JUNE 1984	DWG. NO. D-1070
CHECKED BY: C.M.H.						
PROJ. ENGR.: D.W.R.						
JOB No. 35015-10-002						

NO.	DATE	DESCRIPTION	NO.	DATE	DESCRIPTION
REVISIONS					

Appendix 2

APPENDIX 2
CROSS SECTIONS



- MW - MONITORING WELL
- S - SOIL SAMPLE
- ⊗ S - SOIL SAMPLE (NO ANALYSIS)
- MH - MANHOLE
- D.I. - DRAIN INLET
- △ SURFACE WATER / SEDIMENT SAMPLE

DESCRIPTION	TOP OF CASING ELEVATION	GROUND ELEVATION
MW - 1	574.9	572.8
MW - 2	574.2	571.6
MW - 3	574.6	572.4
MW - 4	575.1	572.9
6S		573.0
7S		573.6
8S		573.4
9S		570.0
1 CW		564.5
2 CW		564.1
3 CW		564.5
4 CW		570.1
5 CW		572.8

Plate B



Prepared for:
NEW YORK STATE
DEPARTMENT OF ENVIRONMENTAL CONSERVATION
50 Wolf Road, Albany New York 12233

Henry G. Williams, Commissioner

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

AUG

AUG 28 1985

Location Map for 93rd Street School Site
Geologic Cross Sections
A-A¹, B-B¹, C-C¹, D-D¹, E-E¹

Scale: 1"=100'	Date: JUNE 1984	DWG. NO. D-1070

										DESIGNED BY:	MJS	
										DRAWN BY:	MJS	
										CHECKED BY:	C.M.H.	
NO	DATE	DESCRIPTION				NO	DATE	DESCRIPTION				PROJ. ENGR:
REVISIONS											DWR	

DESIGNED BY: MJS
DRAWN BY: MJS
CHECKED BY: C.M.
PROJ. ENGR.: D.W.F.

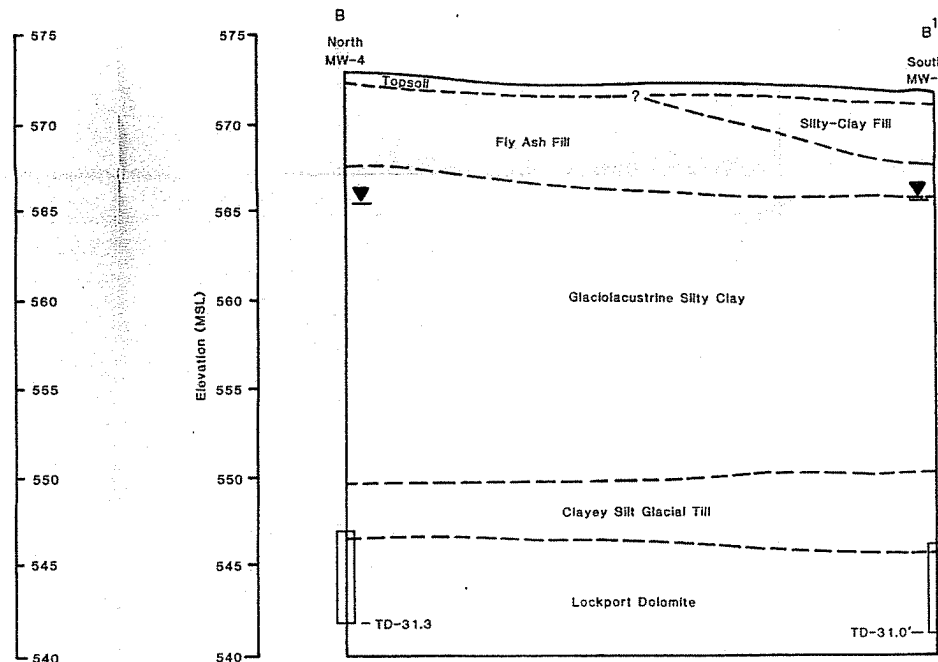
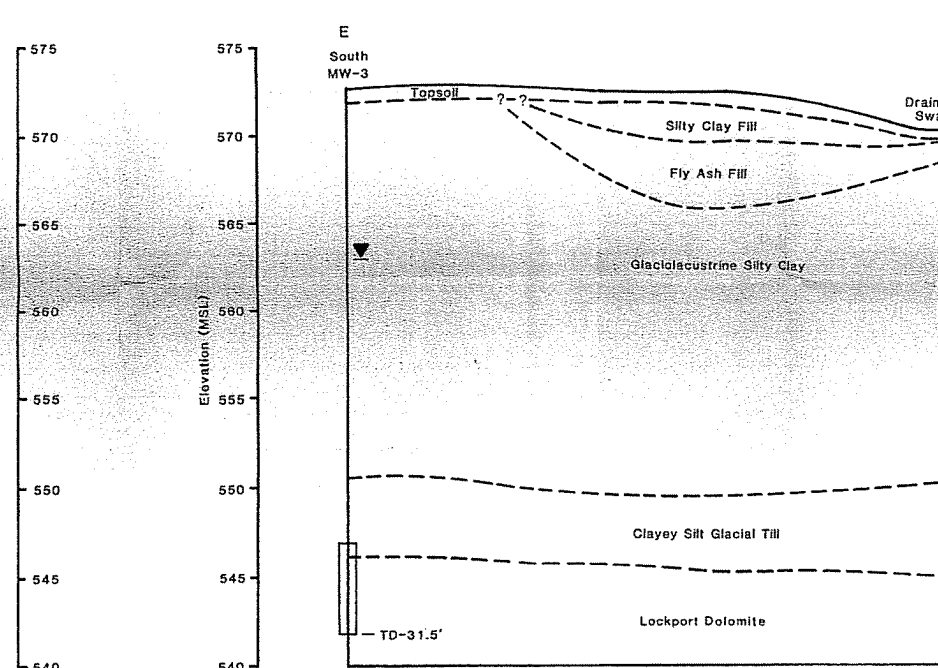
URS URS Company, Inc.
CONSULTING ENGINEERS
NEW YORK NEW JERSEY

JOB No. 35015 - 10 - 002

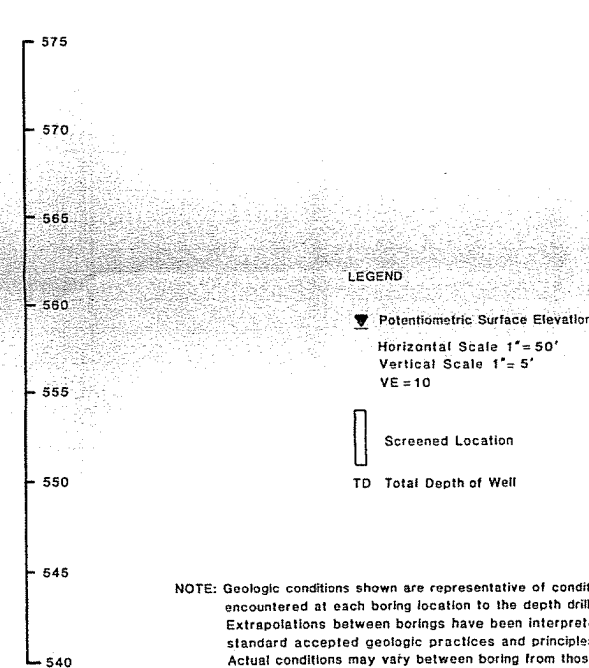
NEW YORK STATE
SUPERFUND

93 rd STREET SCHOOL
LANDFILL

CITY OF NIAGARA FALLS, NIAGARA CO., NEW YORK

GEOLOGIC CROSS SECTION B-B¹

GEOLOGIC CROSS SECTION E-E'



NOTE: Geologic conditions shown are representative of conditions encountered at each boring location to the depth drilled. Extrapolations between borings have been interpreted using standard accepted geologic practices and principles. Actual conditions may vary between boring from those shown.

LEGEND

 Potentiometric Surface Elevation

Horizontal Scale 1" = 50'

Vertical Scale 1" = 5'

VE = 10

 Screened Location

TD Total Depth of Well

Prepared for:
NEW YORK STATE
DEPARTMENT OF ENVIRONMENTAL CONSERVATION
50 Wolf Road, Albany New York 12233

Henry G. Williams, Commissioner

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

AUG 2

AUG 28 1965

NYS DEC SUPERFUND
93rd Street School

Project No. 2EM84001.4000

Geologic Cross Sections
A-A¹, B-B¹, C-C¹, D-D¹,
& E-E¹

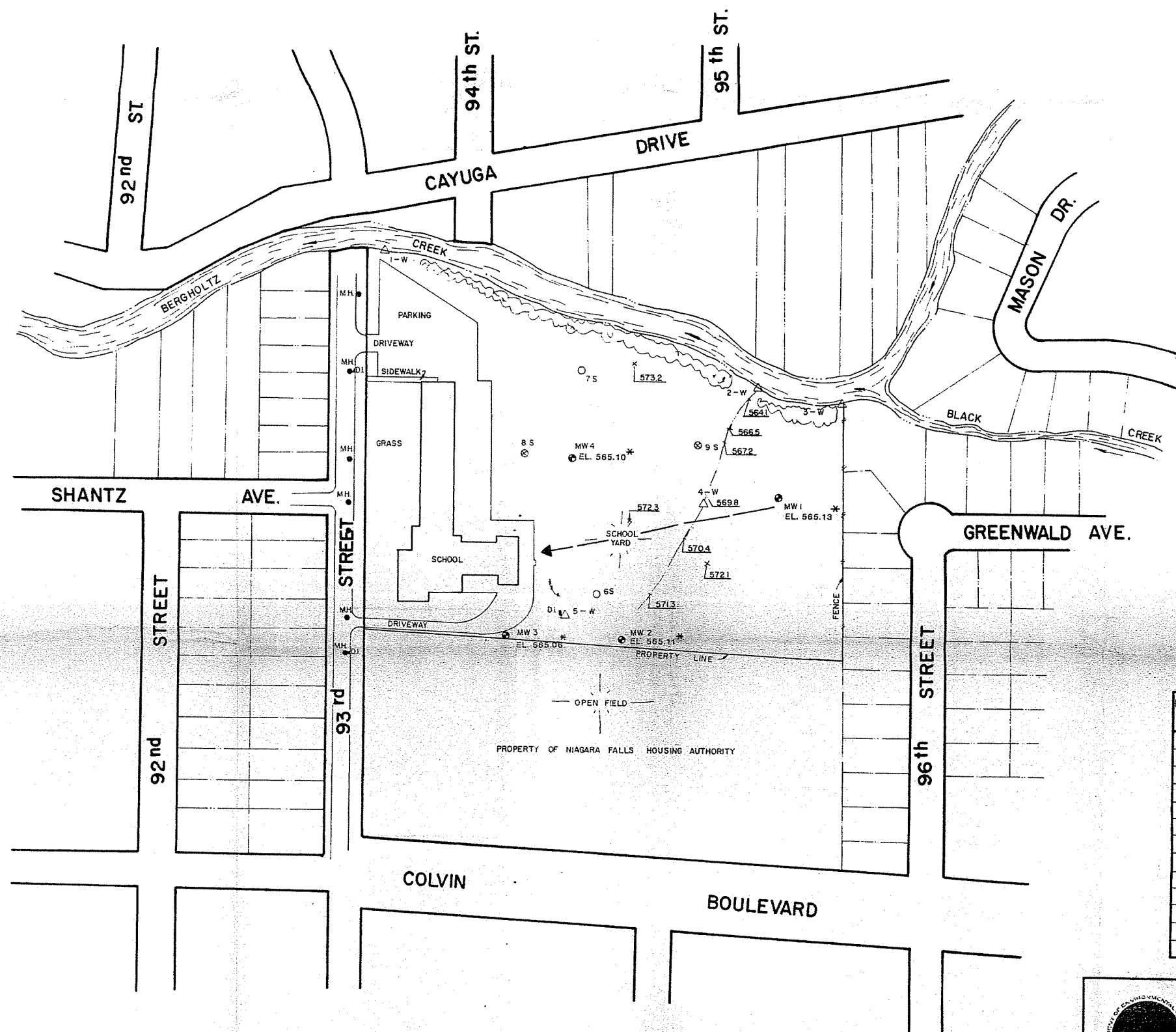
D



RECRA RESEARCH, INC.
RUSSELL NEW YORK

Scale:	See Legend
By:	Da
Dwn.	KMO 8/84
Ckd.	MPB 8/84
App.	GWC 8/84
App.	

[illegible]



- ⊙ MW - MONITORING WELL
- S - SOIL SAMPLE
- ⊗ S - SOIL SAMPLE (NO ANALYSIS)
- MH - MANHOLE
- D.I - DRAIN INLET
- △ SURFACE WATER / SEDIMENT SAMPLE

 Inferred Ground Water Direction Of Flow
 Monitoring Well Water Elevations

DESCRIPTION	TOP OF CASING ELEVATION	GROUND ELEVATION
MW - 1	574.9	572.8
MW - 2	574.2	571.6
MW - 3	574.6	572.4
MW - 4	575.1	572.9
6S		573.0
7S		573.6
8S		573.4
9S		570.0
1-W		564.5
2-W		564.1
3-W		564.5
4-W		570.1
5-W		572.8

Prepared for:
NEW YORK STATE
DEPARTMENT OF ENVIRONMENTAL CONSERVATION
50 Wolf Road, Albany New York 12233

Henry G. Williams, Commissioner

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

				DESIGNED BY: MJS	 URS Company, Inc. <i>CONSULTING ENGINEERS</i> NEW YORK NEW JERSEY	NEW YORK STATE	93 rd STREET SCHOOL LANDFILL	Potentiometric Surface Map for 93rd Street School			
				DRAWN BY: MJS				CITY OF NIAGARA FALLS, NIAGARA CO., NEW YORK	Scale: 1"=100'	Date: JUNE 1984	DWG. NO. D-1070
				CHECKED BY: C.M.H.							
NO	DATE	DESCRIPTION	NO	DATE							
REVISIONS						PROJ. ENGR.: D.W.R.	AUG 28 1985				
						JOB No. 35015-10-002					

Appendix 3

APPENDIX 3
BORING LOGS/WELL CONSTRUCTION

SYMBOLS

SS - Split Spoon Sample

WOR - Weight On Rod

NX - Specifies Core Diameter Type (2-1/8")

 - Bentonite/Concrete Grout

 - Bentonite Seal

 - Sand Pack

- Bedrock

DATE STARTED <u>5/9/84</u> FINISHED <u>5/10/84</u> SHEET <u>1</u> OF <u>1</u>	RECRA RESEARCH, INC. SUBSURFACE LOG	HOLE NO. <u>MW1 A</u> SURFACE ELEV. _____ G.W. ELEV. _____

PROJECT <u>NYS Superfund Phase II</u> <u>93rd Street School</u>	LOCATION <u>See Site Plan</u>

DEPTH-FT	LOG	SAMPLE TYPE	SAMPLE NO	BLOWS ON SAMPLER		DESCRIPTION	NOTES
				0	6		
				12	18		
		SS	S-1	1	1	Topsoil - Dark brown organic clayey silt, wet, soft	
				2	2		
		SS	S-2	2	3	Grading to mottled gray, brown clayey silt/silty clay wet, stiff	S-2 (2.0-4.0') Retained for chemical analysis
				3	9		
5		SS	S-3	5	10	Becoming very stiff with trace of fine gravel	S-3 (4.0-6.0') Retained for chemical analysis
				22	21		
		SS	S-4	66	70	Becoming hard	
				100/.5"			
10		SS	S-5	6	17		
				15	13		
		SS	S-6	2	3	Becoming saturated	S-6 (10.0-12.0') Retained for chemical analysis
				3	4		
		SS	S-7	6	6		
				6	6		
15		SS	S-8	1	1		
				1	1		
		SS	S-9	1	2		
				1	2		
		SS	S-10	WOR	WOR		
				1	1		
20		SS	S-11	WOR	WOR	Becoming Sandy	
				WOR	WOR		
		SS	S-12	WOR	43	Till - Reddish brown, brown Clayey silt, wet, dense, abundant coarse sand and gravel.	S-13 (24.0-26.0') Retained for chemical analysis
				76	100/.5'		
25		SS	S-13	43	67		
				50	71		
		SS	S-14	14	74		
				84	100/.2'		
30		NX	NX-1	REC = 100%		Dolostone Bedrock - Moderate gray, hard, very fine texture, well cemented. Occurrences of gypsum and calcite parting planes and silty sandy fractured zones	Borehole abandoned and grouted to ground surface due to trouble with removal of rock cuttings.
				RQD = 15%			
						Boring Terminated at 32.7'	

CLASSIFICATION	Field Visual
METHOD OF INVESTIGATION	CME-45c Drill Rig

DATE 5/11/84
STARTED 5/11/84
FINISHED 5/11/84
SHEET 1 OF 1

RECRA RESEARCH, INC.

HOLE NO. MW1
SURFACE ELEV. 572.8
G.W. ELEV. 565.13

SUBSURFACE LOG

PROJECT NYS Superfund Phase II
93rd Street School

LOCATION See Site Plan

DEPTH-FT	LOG	SAMPLE TYPE	SAMPLE NO	BLOWS ON SAMPLER				DESCRIPTION	NOTES
				0	6	6	12		
				12	18	18	24		
5								Auger to top of bedrock at 27.5 feet	Due to borehole stability problems the initial boring was abandoned. That boring is now referred to as MW-1A.
								Roller bit drilling into bedrock 27.5 to 32.5 feet	
								No samples taken due to close proximity of MW1	
								Refer to subsurface log for MW1A for descriptions	
10									
15									
20									
25									
30									

CLASSIFICATION

METHOD OF INVESTIGATION

CME-45c Drill Rig

DATE
STARTED 5/14/84
FINISHED 5/15/84
SHEET 1 OF 1

RECRA RESEARCH, INC.

SUBSURFACE LOG

HOLE NO. MW2
SURFACE ELEV. 571.6
G.W. ELEV. 565.11

PROJECT NYS Superfund Phase II
93rd Street School
LOCATION See Site Plan

DEPTH-FT	LOG	SAMPLE TYPE	SAMPLE NO	BLOWS ON SAMPLER				DESCRIPTION	NOTES
				0-6		6-12			
				0	6	6	12		
				12	18	18	24		
		SS	S-1	2	3	topsoil - Dark brown organic clayey silt fill. Moist			
				3	6	Grading to mottled orange brown dark brown silty clay fill, moist soft			
		SS	S-2	6	8				
				8	9				
5		SS	S-3	3	2	Black granular silty fine sand textured material, wet			
				4	4				
		SS	S-4	6	6	Mottled black, dark brown, orange brown silty clay fill, moist,			S-4 (6.0'-7.0') Retained for chemical analysis
				8	10				
		SS	S-5	4	6	plastic, trace of fine gravel and wood fragments			S-5 (8.0'-9.0') Retained for chemical analysis
10				8	10				
		SS	S-6	3	3	Becoming saturated			S-6 (11.0'-12.0') Retained for chemical analysis
				4	6				
15		SS	S-7	WOR	1				
				1	1				
20		SS	S-8	1	1	Till - Reddish brown, brown clayey silt, moist, dense, abundant pebbles and coarse sand.			S-8 (20.5'-21.5') Retained for chemical analysis
				1	30				
25		SS	S-9	70	105	Dolostone Bedrock - Moderate gray, hard, very fine texture, well cemented occurrences of gypsum and calcite parting planes and silty sandy fractured zones			
		NX	NX-2	REC = 100%					
				ROD = 0%					
30									
						Boring Terminated at 31.0 ft.			

CLASSIFICATION Field Visual
METHOD OF INVESTIGATION CME-45c Drill Rig

DATE
STARTED 5/16/84
FINISHED 5/17/84
SHEET 1 OF 1

RECRA RESEARCH, INC.

HOLE NO. MW3
SURFACE ELEV. 572.4
G.W. ELEV. 565.06

SUBSURFACE LOG

PROJECT NYS Superfund Phase II
93rd Street School

LOCATION See Site Plan

DEPTH-FT	LOG	SAMPLE TYPE	SAMPLE NO	BLOWS ON SAMPLER		DESCRIPTION	NOTES		
				0	6			6	12
				12	18			18	24
		SS	S-1	2	3	Topsoil - Dark brown organic clayey silt fill, moist	S-1 (0.0'-2.0') Retained for chemical analysis		
				5	7	Grading to mottled olive green,			
		SS	S-2	6	8	brown, reddish brown, gray silty clay, moist, slightly plastic			
				10	10	occurrences of small pebbles and			
	5		SS	S-3	7	12	wood fragments. No noticeable odor.	S-3 (5.0'-6.0') Retained for chemical analysis	
				20	30				
		SS	S-4	15	21				
				30	32				
		SS	S-5	6	9	Becoming more plastic and sticky, occurrences of gray silty clay nodules and stringers			
				12	15				
	10		SS	S-6	4	6			
				7	8				
	15		SS	S-7	1	2	Becoming very wet	S-7 (15.0'-17.0') Retained for chemical analysis	
					1	2			
	20		SS	S-8	WOR	WOR	Becoming saturated		
					1	1			
25		SS	S-9	38	50	Till - Reddish brown, brown clayey silt, moist, dense, abundant pebbles and coarse sand.	S-9 (25.0'-26.5') Retained for chemical analysis		
				58	100/0.0				
		NX	NX-3	REC = 84%		Dolostone Bedrock - Moderate gray, hard, very fine texture well cemented, occurrences of gypsum and calcite parting planes and silty sandy fractured zones.			
				RQD = 0%					
30									
						Boring Terminated at 31.5 ft.			

CLASSIFICATION Field Visual

METHOD OF INVESTIGATION CME-45c Drill Rig

DATE STARTED 5/17/84
 FINISHED 5/18/84
 SHEET 1 OF 1

RECRA RESEARCH, INC.

HOLE NO. MW4
 SURFACE ELEV. 572.9
 G.W. ELEV. 565.10

SUBSURFACE LOG

PROJECT NYS Superfund Phase II
93rd Street School

LOCATION See Site Plan

DEPTH - FT	LOG	SAMPLE TYPE	SAMPLE NO	BLOWS ON SAMPLER		DESCRIPTION	NOTES
				0	6		
				12	18		
5		SS	S-1	2	2	Tonsoil - Dark brown organic clayey silt fill, moist	S-1 (0.0'-2.0') Retained for chemical analysis
				1	2	Black granular fly ash fill, fine sand texture, saturated. No noticeable odor.	
		SS	S-2	1	1		
				1	1		
5		SS	S-3	WOR	WOR		S-3 (4.0'-5.6') Retained for chemical analysis
				1	1		
		SS	S-4	4	5	Mottled reddish brown, light brown silty clay, moist plastic	
				7	8		
10		SS	S-5	4	5		
				7	8		
		SS	S-6	WOR	1	Becoming very wet and very plastic	S-6 (15.0'-17.0') Retained for chemical analysis
				1	1		
20		SS	S-7	WOR	WOR	Becoming saturated	
				1	1		
25		SS	S-8		82	Till-Medium brown fine sandy clayey silt, abundant gravel and coarse sand, slightly moist, stiff	S-8 (23.5'-25.5') Retained for chemical analysis
				95	75		
		NX	NX-4	REC = 100%		Dolostone Bedrock - Moderate gray, hard, very fine texture, well cemented occurrences of gypsum and calcite parting planes and silty sandy fractured zones	
				RQD = 32%			
30						Boring Terminated at 31.3 ft.	

CLASSIFICATION Field Visual
 METHOD OF INVESTIGATION CME-45c Drill Rig

Appendix 4

APPENDIX 4

ANALYTICAL DATA

GEOTECHNICAL DATA

3/907

INTEROFFICE MEMO

TO: Andre J. LaPres/Gary W. Cox
FROM: Carmen M. Panuccio
DATE: August 10, 1984
RE: Analytical Results - Soil Physical Properties

Please find attached the analytical results of I.D. #2EM84001.4000.
Physical properties of the following soil samples were determined:

MW2	S-2	(2 - 4 feet)
MW3	S-2	(2 - 4 feet)
MW4	S-4	(6 - 8 feet)
MW4	S-7	(20-22 feet)

Carmen M. Panuccio

Carmen M. Panuccio

CMP/mjr

Attachment

cc: RGL Central File
RRI Central File

I.D. #2EM84001.4000

ANALYTICAL PROCEDURES
NYS DEC SUPERFUND93rd Street School
Niagara Falls, New York

Report Date: 8-10-84

Soil samples, which were received by Recra Geotechnical Laboratory, were prepared and tested in accordance with procedures from the American Society for Testing and Materials (ASTM), Annual Book of ASTM Standards: Part 19 Natural Building Stones; Soil and Rock, c-1982. The following standard test methods were utilized in whole or in part:

- o ASTM D 2216-80 Laboratory Determination of Water (Moisture) Content of Soil, Rock, and Soil-Aggregate Mixtures.
- o ASTM D 421-58 Dry Preparation of Soil Samples for Particle-Size Analysis and Determination of Soil Constants.
- o ASTM D 1140-54 Amount of Material in Soils Finer Than the No. 200 (75-um) Sieve.
- o ASTM D 422-63 Particle-Size Analysis of Soils.
- o ASTM D 423-66 Liquid Limit of Soils.
- o ASTM D 424-59 Plastic Limit and Plasticity Index of Soils.
- o ASTM D 2487-69 Classification of Soils for Engineering Purposes.

FOR RECRA GEOTECHNICAL LABORATORY

Carmen M. PanuccioDATE 8-10-84I.D.# 2EM84001.4000

ANALYTICAL RESULTS
NYS DEC SUPERFUND93rd Street School
Niagara Falls, New York

Report Date: 8-10-84

PARAMETER	UNITS OF MEASURE	SAMPLE IDENTIFICATION			
		MW2 S-2	MW3 S-2	MW4 S-4	MW4 S-7
Moisture Content (As Received)	%	24.3	19.4	25.8	34.4
Gravel (> 4.75 mm)	%	0.0	0.0	0.0	0.0
Sand (4.75 mm > and > 0.075 mm)	%	8.0	21.2	2.2	10.4
Silt and Clay (< 0.075 mm)	%	92.0	78.8	97.8	89.6
Coefficient of Uniformity (Cu)	-	-	-	-	-
Coefficient of Curvature (Cz)	-	-	-	-	-
Liquid Limit	%	37.8	32.5	29.3	28.8
Plastic Limit	%	21.9	16.8	19.5	17.0
Plasticity Index	%	15.9	15.7	9.8	11.8
Flow Index	%	5.9	7.4	4.7	22.0
Soil Classification	-	CL	CL	CL	CL

Additional Sample Information

Sample Date	5-14-84	5-16-84	5-17-84	5-17-84
Analysis Date: Moisture Content	7-24-84	7-24-84	7-24-84	7-24-84
Analysis Date: Particle Size	8-2-84	7-27-84	7-31-84	7-31-84
Analysis Date: Atterberg Limits	8-8-84	7-30-84	8-8-84	8-8-84

FOR RECRA GEOTECHNICAL LABORATORY

*Carmen M. Panucio*DATE 8-10-84I.D. # 2EM84001.4000

3/907

ANALYTICAL RESULTS
NYS DEC SUPERFUND

93rd Street School
Niagara Falls, New York

QUALITY CONTROL

Report Date: 8-10-84

REPLICATE ANALYSIS OF SAMPLE MW4 S-7

PARAMETER	UNITS OF MEASURE	VALUE 1	VALUE 2	VALUE 3	MEAN	STANDARD DEVIATION	PERCENT COEFFICIENT OF VARIATION
Moisture content (as received)	%	30.5	38.2	-	34.4	5.4	15.9

REPLICATE ANALYSIS OF SAMPLE MW3 S-2

PARAMETER	UNITS OF MEASURE	VALUE 1	VALUE 2	VALUE 3	MEAN	STANDARD DEVIATION	PERCENT COEFFICIENT OF VARIATION
Liquid Limit	%	32.5	32.5	-	32.5	0.0	0.0

REPLICATE ANALYSIS OF SAMPLE MW3 S-2

PARAMETER	UNITS OF MEASURE	VALUE 1	VALUE 2	VALUE 3	MEAN	STANDARD DEVIATION	PERCENT COEFFICIENT OF VARIATION
Plastic Limit	%	17.1	16.5	-	16.8	0.4	2.5

REPLICATE ANALYSIS OF SAMPLE MW3 S-2

PARAMETER	UNITS OF MEASURE	VALUE 1	VALUE 2	VALUE 3	MEAN	STANDARD DEVIATION	PERCENT COEFFICIENT OF VARIATION
Plasticity Index	%	15.4	16.0	-	15.7	0.4	2.7

FOR RECRA GEOTECHNICAL LABORATORY Carmen M. Parvud

DATE 8-10-84

I.D.# 2EM84001.4000

3/907

ANALYTICAL RESULTS
NYS DEC SUPERFUND

93rd Street School
Niagara Falls, New York

QUALITY CONTROL

Report Date: 8-10-84

REPLICATE ANALYSIS OF SAMPLE MW4 S-4

PARAMETER	UNITS OF MEASURE	VALUE 1	VALUE 2	VALUE 3	MEAN	STANDARD DEVIATION	PERCENT COEFFICIENT OF VARIATION
Plastic Limit	%	19.1	20.0	-	19.5	0.6	3.3

FOR RECRA GEOTECHNICAL LABORATORY Carmen M. Panuccio

DATE 8-10-84

I.D.# 2EM84001.4000

ANALYTICAL NOTATIONS
NYS DEC SUPERFUND

93rd Street School
Niagara Falls, New York

Report Date: 8-10-84

1. The identification numbers for samples MW2 S-2, MW4 S-4, and MW4 S-7 included a two (2) as a superscript after the sample number.
2. Moisture was present on the inside walls of sample bottles for MW2 S-2 and MW4 S-4.
3. Sample MW4 S-7 was composed of a reddish "clay" with a gray soil ("silt") at one end of the specimen.
4. Complete particle size curves for the four (4) samples were not required for classification purposes.

FOR RECRA GEOTECHNICAL LABORATORY

Carmen M. Panuccio

DATE 8-10-84

I.D. # 2EM84001.4000

PHASE II
ANALYTICAL DATA

ANALYTICAL RESULTS

93rd STREET SCHOOL
 NIAGARA FALLS, NY
 GAS CHROMATOGRAPHY/MASS SPECTROMETRY

Report Date: 6/29/84

COMPOUND	DETECTION LIMIT (ug/l)	SAMPLE IDENTIFICATION			
		MW-1	MW-2	MW-3	MW-4
2,3,4-trichlorophenol	2.5	ND	ND	ND	ND
2,3,5-trichlorophenol	2.5	ND	ND	ND	ND
2,3,6-trichlorophenol	2.5	ND	ND	ND	ND
2,4,5-trichlorophenol	2.5	ND	ND	ND	ND
2,4,6-trichlorophenol	2.5	ND	ND	ND	ND
3,4,5-trichlorophenol	2.5	ND	ND	ND	ND

ADDITIONAL SAMPLE INFORMATION

Sample Date	5/22/84	5/22/84	5/22/84	5/22/84
Extraction Date	6/6/84	6/6/84	6/6/84	6/6/84
Analysis Date	6/19/84	6/19/84	6/19/84	6/19/84
Internal Standard (IS) - Level	20 ug/l	20 ug/l	20 ug/l	20 ug/l
deuterated phenanthrene - Recovery	130%	130%	140%	140%
Surrogate Standard (SS1) - Level	100 ug/l	100 ug/l	100 ug/l	100 ug/l
2-fluorophenol - Recovery	35%	38%	35%	58%
Surrogate Standard (SS2) - Level	98 ug/l	98 ug/l	98 ug/l	98 ug/l
pentafluorophenol - Recovery	42%	31%	30%	46%

FOR RECRA ENVIRONMENTAL LABORATORIES

DATE

Barbara J. Kujewski
 6/29/84



RECRA ENVIRONMENTAL LABORATORIES

I.D. #84-512

ANALYTICAL RESULTS

93rd STREET SCHOOL
NIAGARA FALLS, NY
GAS CHROMATOGRAPHY/MASS SPECTROMETRY

Report Date: 6/29/84

COMPOUND	DETECTION LIMIT ($\mu\text{g}/\text{l}$)	SAMPLE IDENTIFICATION		
		1W	2W	3W
2,3,4-trichlorophenol	2.5	ND	ND	ND
2,3,5-trichlorophenol	2.5	ND	ND	ND
2,3,6-trichlorophenol	2.5	ND	ND	ND
2,4,5-trichlorophenol	2.5	ND	ND	ND
2,4,6-trichlorophenol	2.5	ND	ND	ND
3,4,5-trichlorophenol	2.5	ND	ND	ND

ADDITIONAL SAMPLE INFORMATION

Sample Date	5/24/84	5/24/84	5/24/84
Extraction Date	6/6/84	6/6/84	6/6/84
Analysis Date	6/19/84	6/19/84	6/19/84
Internal Standard (IS) - Level	20 $\mu\text{g}/\text{l}$	20 $\mu\text{g}/\text{l}$	20 $\mu\text{g}/\text{l}$
deuterated phenanthrene - Recovery	125%	120%	110%
Surrogate Standard (SS1) - Level	100 $\mu\text{g}/\text{l}$	100 $\mu\text{g}/\text{l}$	100 $\mu\text{g}/\text{l}$
2-fluorophenol - Recovery	44%	53%	73%
Surrogate Standard (SS2) - Level	98 $\mu\text{g}/\text{l}$	98 $\mu\text{g}/\text{l}$	98 $\mu\text{g}/\text{l}$
pentafluorophenol - Recovery	40%	56%	62%

FOR RECRA ENVIRONMENTAL LABORATORIES

DATE

Barbara J. Kajerwski
6/29/84



RECRA ENVIRONMENTAL LABORATORIES

I.D. #84-512

ANALYTICAL RESULTS

93rd STREET SCHOOL
NIAGARA FALLS, NY
GAS CHROMATOGRAPHY/MASS SPECTROMETRY

Report Date: 6/29/84

COMPOUND	DETECTION LIMIT ($\mu\text{g}/\text{l}$)	SAMPLE IDENTIFICATION
		5W
2,3,4-trichlorophenol	2.5	ND
2,3,5-trichlorophenol	2.5	ND
2,3,6-trichlorophenol	2.5	ND
2,4,5-trichlorophenol	2.5	ND
2,4,6-trichlorophenol	2.5	ND
3,4,5-trichlorophenol	2.5	ND

ADDITIONAL SAMPLE INFORMATION

Sample Date	5/29/84
Extraction Date	6/6/84
Analysis Date	6/19/84
Internal Standard (IS) - Level	20 $\mu\text{g}/\text{l}$
deuterated phenanthrene - Recovery	100%
Surrogate Standard (SS1) - Level	100 $\mu\text{g}/\text{l}$
2-fluorophenol - Recovery	46%
Surrogate Standard (SS2) - Level	98 $\mu\text{g}/\text{l}$
pentafluorophenol - Recovery	26%

FOR RECRA ENVIRONMENTAL LABORATORIES

DATE

Barbara J. Kapsch
6/29/84



ANALYTICAL RESULTS

93rd STREET SCHOOL
 NIAGARA FALLS, NY
 GAS CHROMATOGRAPHY/MASS SPECTROMETRY

Report Date: 6/29/84

COMPOUND	DETECTION LIMIT ($\mu\text{g/g dry}$)	SAMPLE IDENTIFICATION	
		MW-1 S-3	MW-1 S-7
2,3,4-trichlorophenol	1.5	ND	ND
2,3,5-trichlorophenol	1.5	ND	ND
2,3,6-trichlorophenol	1.5	ND	ND
2,4,5-trichlorophenol	1.5	ND	ND
2,4,6-trichlorophenol	1.5	ND	ND
3,4,5-trichlorophenol	1.5	ND	ND

ADDITIONAL SAMPLE INFORMATION

Sample Date	5/9/84	5/9/84
Extraction Date	6/15/84	6/15/84
Analysis Date	6/19/84	6/19/84
Internal Standard (IS) - Level	1 $\mu\text{g/g}$	1 $\mu\text{g/g}$
deuterated phenanthrene - Recovery	150%	130%
Surrogate Standard (SS1) - Level	5.0 $\mu\text{g/g}$	5.0 $\mu\text{g/g}$
2-flucrophenol - Recovery	79%	79%
Surrogate Standard (SS2) - Level	4.9 $\mu\text{g/g}$	4.9 $\mu\text{g/g}$
pentafluorophenol - Recovery	60%	73%

FOR RECRA ENVIRONMENTAL LABORATORIES

DATE

Barbara J. Kasperiski
6/29/84



RECRA ENVIRONMENTAL LABORATORIES

I.D. #84-512

ANALYTICAL RESULTS

93rd STREET SCHOOL
 NIAGARA FALLS, NY
 GAS CHROMATOGRAPHY/MASS SPECTROMETRY

Report Date: 6/29/84

COMPOUND	DETECTION LIMIT ($\mu\text{g/g}$ drv)	SAMPLE IDENTIFICATION		
		MW-2 S-4	MW-2 S-6	MW-2 S-8
2,3,4-trichlorophenol	1.5	ND	ND	ND
2,3,5-trichlorophenol	1.5	ND	ND	ND
2,3,6-trichlorophenol	1.5	ND	ND	ND
2,4,5-trichlorophenol	1.5	ND	ND	ND
2,4,6-trichlorophenol	1.5	ND	ND	ND
3,4,5-trichlorophenol	1.5	ND	ND	ND

ADDITIONAL SAMPLE INFORMATION

Sample Date	5/14/84	5/14/84	5/14/84
Extraction Date	6/15/84	6/15/84	6/15/84
Analysis Date	6/19/84	6/19/84	6/19/84
Internal Standard (IS) - Level	1 $\mu\text{g/g}$	1 $\mu\text{g/g}$	1 $\mu\text{g/g}$
deuterated phenanthrene - Recovery	97%	140%	140%
Surrogate Standard (SS1) - Level	5.0 $\mu\text{g/g}$	5.0 $\mu\text{g/g}$	5.0 $\mu\text{g/g}$
2-fluorophenol - Recovery	82%	57%	65%
Surrogate Standard (SS2) - Level	4.9 $\mu\text{g/g}$	4.9 $\mu\text{g/g}$	4.9 $\mu\text{g/g}$
pentafluorophenol - Recovery	70%	61%	58%

FOR RECRA ENVIRONMENTAL LABORATORIES

DATE

Barbara J. Kasper
 6/29/84



RECRA ENVIRONMENTAL LABORATORIES

I.D. #84-512

ANALYTICAL RESULTS

93rd STREET SCHOOL
NIAGARA FALLS, NY
GAS CHROMATOGRAPHY/MASS SPECTROMETRY

Report Date: 6/29/84

COMPOUND	DETECTION LIMIT ($\mu\text{g/g dry}$)	SAMPLE IDENTIFICATION	
		MW-3 S-3	MW-3 S-7
2,3,4-trichlorophenol	1.5	ND	ND
2,3,5-trichlorophenol	1.5	ND	ND
2,3,6-trichlorophenol	1.5	ND	ND
2,4,5-trichlorophenol	1.5	ND	ND
2,4,6-trichlorophenol	1.5	ND	ND
3,4,5-trichlorophenol	1.5	ND	ND

ADDITIONAL SAMPLE INFORMATION

Sample Date	5/16/84	5/16/84
Extraction Date	6/15/84	6/15/84
Analysis Date	6/19/84	6/19/84
Internal Standard (IS) - Level	1 $\mu\text{g/g}$	1 $\mu\text{g/g}$
deuterated phenanthrene - Recovery	100%	110%
Surrogate Standard (SS1) - Level	5.0 $\mu\text{g/g}$	5.0 $\mu\text{g/g}$
2-fluorophenol - Recovery	80%	70%
Surrogate Standard (SS2) - Level	4.9 $\mu\text{g/g}$	4.9 $\mu\text{g/g}$
pentafluorophenol - Recovery	77%	58%

FOR RECRA ENVIRONMENTAL LABORATORIES

DATE

Brida J. Kapustin
6/29/84



ANALYTICAL RESULTS
93rd STREET SCHOOL
NIAGARA FALLS, NY
GAS CHROMATOGRAPHY/MASS SPECTROMETRY

Report Date: 6/29/84

COMPOUND	DETECTION LIMIT (ug/g dry)	SAMPLE IDENTIFICATION		
		MW-4 S-3	MW-4 S-6	MW-4 S-8
2,3,4-trichlorophenol	1.5	ND	ND	ND
2,3,5-trichlorophenol	1.5	ND	ND	ND
2,3,6-trichlorophenol	1.5	ND	ND	ND
2,4,5-trichlorophenol	1.5	ND	ND	ND
2,4,6-trichlorophenol	1.5	ND	ND	ND
3,4,5-trichlorophenol	1.5	ND	ND	ND

ADDITIONAL SAMPLE INFORMATION

Sample Date	5/17/84	5/17/84	5/17/84
Extraction Date	6/15/84	6/15/84	6/15/84
Analysis Date	6/19/84	6/19/84	6/19/84
Internal Standard (IS) - Level	1 ug/g	1 ug/g	1 ug/g
deuterated phenanthrene - Recovery	100%	140%	92%
Surrogate Standard (SS1) - Level	5.0 ug/g	5.0 ug/g	5.0 ug/g
2-fluorophenol -Recovery	80%	38%	46%
Surrogate Standard (SS2) - Level	4.9 ug/g	4.9 ug/g	4.9 ug/g
pentafluorophenol - Recovery	80%	39%	49%

FOR RECRA ENVIRONMENTAL LABORATORIES

DATE

Paula J. Kujewski
6/29/84



RECRA ENVIRONMENTAL LABORATORIES

I.D. #84-512

ANALYTICAL RESULTS

93rd STREET SCHOOL
 NIAGARA FALLS, NY
 GAS CHROMATOGRAPHY/MASS SPECTROMETRY

Report Date: 6/29/84

COMPOUND	DETECTION LIMIT ($\mu\text{g/g dry}$)	SAMPLE IDENTIFICATION	
		6S	7S
2,3,4-trichlorophenol	1.5	ND	ND
2,3,5-trichlorophenol	1.5	ND	ND
2,3,6-trichlorophenol	1.5	ND	ND
2,4,5-trichlorophenol	1.5	ND	ND
2,4,6-trichlorophenol	1.5	ND	ND
3,4,5-trichlorophenol	1.5	ND	ND

ADDITIONAL SAMPLE INFORMATION

Sample Date	5/24/84	5/24/84
Extraction Date	6/15/84	6/15/84
Analysis Date	6/19/84	6/19/84
Internal Standard (IS) - Level	1 $\mu\text{g/g}$	1 $\mu\text{g/g}$
deuterated phenanthrene - Recovery	100%	110%
Surrogate Standard (SS1) - Level	5.0 $\mu\text{g/g}$	5.0 $\mu\text{g/g}$
2-fluorophenol - Recovery	59%	45%
Surrogate Standard (SS2) - Level	4.9 $\mu\text{g/g}$	4.9 $\mu\text{g/g}$
pentafluorophenol - Recovery	34%	49%

FOR RECRA ENVIRONMENTAL LABORATORIES

DATE

Barbara J. Kopsinski
 6/29/84



ANALYTICAL RESULTS

93rd STREET SCHOOL
 NIAGARA FALLS, NY
 GAS CHROMATOGRAPHY/MASS SPECTROMETRY

Report Date: 6/29/84

COMPOUND	DETECTION LIMIT (ug/l)	SAMPLE IDENTIFICATION			
		MW-1	MW-2	MW-3	MW-4
monochlorobenzene	1.9	ND	ND	ND	ND
1,2-dichlorobenzene	1.9	ND	ND	ND	ND
1,3-dichlorobenzene	1.9	ND	ND	ND	ND
1,4-dichlorobenzene	1.9	ND	ND	ND	ND
1,2,3-trichlorobenzene	1.9	ND	ND	ND	ND
1,2,4-trichlorobenzene	1.9	ND	ND	ND	ND
1,3,5-trichlorobenzene	1.9	ND	ND	ND	ND
1,2,3,4-tetrachlorobenzene	1.9	ND	ND	ND	ND
1,2,3,5-tetrachlorobenzene	1.9	ND	ND	ND	ND
penta-chlorobenzene	1.9	ND	ND	ND	ND
hexachlorobenzene	1.9	ND	ND	ND	ND

ADDITIONAL SAMPLE INFORMATION

Sample Date	5/22/84	5/22/84	5/22/84	5/22/84
Extraction Date	6/6/84	6/6/84	6/6/84	6/6/84
Analysis Date	6/19/84	6/19/84	6/19/84	6/19/84
Internal Standard - Level	20 ug/l	20 ug/l	20 ug/l	20 ug/l
Deuterated phenanthrene - Recovery	130%	130%	140%	140%
Surrogate Standard (SS3) - Level	100 ug/l	100 ug/l	100 ug/l	100 ug/l
Decafluorobiphenyl - Recovery	50%	55%	50%	69%
Surrogate Standard (SS4) - Level	100 ug/l	100 ug/l	100 ug/l	100 ug/l
2-fluorobiphenyl - Recovery	82%	75%	74%	110%

FOR RECRA ENVIRONMENTAL LABORATORIES

DATE

Barbara J. Kravendin
 6/29/84



ANALYTICAL RESULTS

93rd STREET SCHOOL
 NIAGARA FALLS, NY
 GAS CHROMATOGRAPHY/MASS SPECTROMETRY

Report Date: 6/29/84

COMPOUND	DETECTION LIMIT ($\mu\text{g/l}$)	SAMPLE IDENTIFICATION		
		1W	2W	3W
monochlorobenzene	1.9	ND	ND	ND
1,2-dichlorobenzene	1.9	ND	ND	ND
1,3-dichlorobenzene	1.9	ND	ND	ND
1,4-dichlorobenzene	1.9	ND	ND	ND
1,2,3-trichlorobenzene	1.9	ND	ND	ND
1,2,4-trichlorobenzene	1.9	ND	ND	ND
1,3,5-trichlorobenzene	1.9	ND	ND	ND
1,2,3,4-tetrachlorobenzene	1.9	ND	ND	ND
1,2,3,5-tetrachlorobenzene	1.9	ND	ND	ND
pentachlorobenzene	1.9	ND	ND	ND
hexachlorobenzene	1.9	ND	ND	ND

ADDITIONAL SAMPLE INFORMATION

Sample Date	5/24/84	5/24/84	5/24/84
Extraction Date	6/6/84	6/6/84	6/6/84
Analysis Date	6/19/84	6/19/84	6/19/84
Internal Standard - Level	20 $\mu\text{g/l}$	20 $\mu\text{g/l}$	20 $\mu\text{g/l}$
deuterated phenanthrene - Recovery	125%	120%	110%
Surrogate Standard (SS3) - Level	100 $\mu\text{g/l}$	100 $\mu\text{g/l}$	100 $\mu\text{g/l}$
decafluorobiphenyl - Recovery	54%	58%	66%
Surrogate Standard (SS4) - Level	100 $\mu\text{g/l}$	100 $\mu\text{g/l}$	100 $\mu\text{g/l}$
2-fluorobiphenyl - Recovery	65%	78%	92%

FOR RECRA ENVIRONMENTAL LABORATORIES

DATE

Barbara J. Karpinski
6/29/84



ANALYTICAL RESULTS

93rd STREET SCHOOL
 NIAGARA FALLS, NY
 GAS CHROMATOGRAPHY/MASS SPECTROMETRY

Report Date: 6/29/84

COMPOUND	DETECTION LIMIT (ug/l)	SAMPLE IDENTIFICATION
		5W
monochlorobenzene	1.9	ND
1,2-dichlorobenzene	1.9	ND
1,3-dichlorobenzene	1.9	ND
1,4-dichlorobenzene	1.9	ND
1,2,3-trichlorobenzene	1.9	ND
1,2,4-trichlorobenzene	1.9	ND
1,3,5-trichlorobenzene	1.9	ND
1,2,3,4-tetrachlorobenzene	1.9	ND
1,2,3,5-tetrachlorobenzene	1.9	ND
penta-chlorobenzene	1.9	ND
hexachlorobenzene	1.9	ND

ADDITIONAL SAMPLE INFORMATION

Sample Date	5/29/84
Extraction Date	6/6/84
Analysis Date	6/19/84
Internal Standard - Level	20 ug/l
fluorene - Recovery	110%
Surrogate Standard (SS3) - Level	100 ug/l
decafluorobiphenyl - Recovery	55%
Surrogate Standard (SS4) - Level	100 ug/l
2,2'-difluorobiphenyl - Recovery	67%

FOR RECRA ENVIRONMENTAL LABORATORIES

DATE

Barbara J. Krajenda
6/29/84



ANALYTICAL RESULTS

93rd STREET SCHOOL
 NIAGARA FALLS, NY
 GAS CHROMATOGRAPHY/MASS SPECTROMETRY

Report Date: 6/29/84

COMPOUND	DETECTION LIMIT ($\mu\text{g/g}$ dry)	SAMPLE IDENTIFICATION	
		MW-1 S-3	MW-1 S-7
monochlorobenzene	1.0	ND	ND
1,2-dichlorobenzene	1.0	ND	ND
1,3-dichlorobenzene	1.0	ND	ND
1,4-dichlorobenzene	1.0	ND	ND
1,2,3-trichlorobenzene	1.0	ND	ND
1,2,4-trichlorobenzene	1.0	ND	ND
1,3,5-trichlorobenzene	1.0	ND	ND
1,2,3,4-tetrachlorobenzene	1.0	ND	ND
1,2,3,5-tetrachlorobenzene	1.0	ND	ND
penta-chlorobenzene	1.0	ND	ND
hexachlorobenzene	1.0	ND	ND

ADDITIONAL SAMPLE INFORMATION

Sample Date	5/9/84	5/9/84
Extraction Date	6/15/84	6/15/84
Analysis Date	6/19/84	6/19/84
Internal Standard - Level	1 $\mu\text{g/g}$	1 $\mu\text{g/g}$
labeled phenanthrene - Recovery	150%	130%
Surrogate Standard (SS3) - Level	5.0 $\mu\text{g/g}$	5.0 $\mu\text{g/g}$
decafluorobiphenyl - Recovery	62%	73%
Surrogate Standard (SS4) - Level	5.0 $\mu\text{g/g}$	5.0 $\mu\text{g/g}$
fluorobiphenyl - Recovery	93%	94%

FOR RECRA ENVIRONMENTAL LABORATORIES

DATE

Barbara J. Kapevski
 6/29/84



ECRA ENVIRONMENTAL LABORATORIES

I.D. #84-512

ANALYTICAL RESULTS

93rd STREET SCHOOL
 NIAGARA FALLS, NY
 GAS CHROMATOGRAPHY/MASS SPECTROMETRY

Report Date: 6/29/84

COMPOUND	DETECTION LIMIT (ug/g dry)	SAMPLE IDENTIFICATION		
		MW-2 S-4	MW-2 S-6	MW-2 S-8
monochlorobenzene	1.0	ND	ND	ND
1,2-dichlorobenzene	1.0	ND	ND	ND
1,3-dichlorobenzene	1.0	ND	ND	ND
1,4-dichlorobenzene	1.0	ND	ND	ND
1,2,3-trichlorobenzene	1.0	ND	ND	ND
1,2,4-trichlorobenzene	1.0	ND	ND	ND
1,3,5-trichlorobenzene	1.0	ND	ND	ND
1,2,3,4-tetrachlorobenzene	1.0	ND	ND	ND
1,2,3,5-tetrachlorobenzene	1.0	ND	ND	ND
pentachlorobenzene	1.0	ND	ND	ND
hexachlorobenzene	1.0	ND	ND	ND

ADDITIONAL SAMPLE INFORMATION

Sample Date	5/14/84	5/14/84	5/14/84
Extraction Date	6/15/84	6/15/84	6/15/84
Analysis Date	6/19/84	6/19/84	6/19/84
Internal Standard - Level	1 ug/g	1 ug/g	1 ug/g
Deuterated phenanthrene - Recovery	97%	140%	140%
Surrogate Standard (SS3) - Level	5.0 ug/g	5.0 ug/g	5.0 ug/g
Decafluorobiphenyl - Recovery	80%	57%	57%
Surrogate Standard (SS4) - Level	5.0 ug/g	5.0 ug/g	5.0 ug/g
1,2,3,4,5-pentafluorobiphenyl - Recovery	100%	74%	75%

FOR RECRA ENVIRONMENTAL LABORATORIES

DATE

Barbara Klapsinski
 6/29/84



RECRA ENVIRONMENTAL LABORATORIES

I.D. #84-512

ANALYTICAL RESULTS

93rd STREET SCHOOL
 NIAGARA FALLS, NY
 GAS CHROMATOGRAPHY/MASS SPECTROMETRY

Report Date: 6/29/84

COMPOUND	DETECTION LIMIT ($\mu\text{g/g dry}$)	SAMPLE IDENTIFICATION	
		MW-3 S-3	MW-3 S-7
monochlorobenzene	1.0	ND	ND
1,2-dichlorobenzene	1.0	ND	ND
1,3-dichlorobenzene	1.0	ND	ND
1,4-dichlorobenzene	1.0	ND	ND
1,2,3-trichlorobenzene	1.0	ND	ND
1,2,4-trichlorobenzene	1.0	ND	ND
1,3,5-trichlorobenzene	1.0	ND	ND
1,2,3,4-tetrachlorobenzene	1.0	ND	ND
1,2,3,5-tetrachlorobenzene	1.0	ND	ND
pentachlorobenzene	1.0	ND	ND
hexachlorobenzene	1.0	ND	ND

ADDITIONAL SAMPLE INFORMATION

Sample Date	5/16/84	5/16/84
Extraction Date	6/15/84	6/15/84
Analysis Date	6/19/84	6/19/84
Internal Standard - Level	1 $\mu\text{g/g}$	1 $\mu\text{g/g}$
deuterated phenanthrene - Recovery	100%	110%
Surrogate Standard (SS3) - Level	5.0 $\mu\text{g/g}$	5.0 $\mu\text{g/g}$
decafluorobiphenyl - Recovery	64%	60%
Surrogate Standard (SS4) - Level	5.0 $\mu\text{g/g}$	5.0 $\mu\text{g/g}$
-fluorobiphenyl - Recovery	84%	87%

FOR RECRA ENVIRONMENTAL LABORATORIES

DATE

Farida J. Kapadia
 6/29/84



ANALYTICAL RESULTS

93rd STREET SCHOOL
 NIAGARA FALLS, NY
 GAS CHROMATOGRAPHY/MASS SPECTROMETRY

Report Date: 6/29/84

COMPOUND	DETECTION LIMIT (ug/g dry)	SAMPLE IDENTIFICATION		
		MW-4 S-3	MW-4 S-6	MW-4 S-8
monochlorobenzene	1.0	ND	ND	ND
1,2-dichlorobenzene	1.0	ND	ND	ND
1,3-dichlorobenzene	1.0	ND	ND	ND
1,4-dichlorobenzene	1.0	ND	ND	ND
1,2,3-trichlorobenzene	1.0	ND	ND	ND
1,2,4-trichlorobenzene	1.0	ND	ND	ND
1,3,5-trichlorobenzene	1.0	ND	ND	ND
1,2,3,4-tetrachlorobenzene	1.0	ND	ND	ND
1,2,3,5-tetrachlorobenzene	1.0	ND	ND	ND
pentachlorobenzene	1.0	ND	ND	ND
hexachlorobenzene	1.0	ND	ND	ND

ADDITIONAL SAMPLE INFORMATION

Sample Date	5/17/84	5/17/84	5/17/84
Extraction Date	6/15/84	6/15/84	6/15/84
Analysis Date	6/19/84	6/19/84	6/19/84
Internal Standard - Level	1 ug/g	1 ug/g	1 ug/g
fluorinated phenanthrene - Recovery	100%	140%	92%
Surrogate Standard (SS3) - Level	5.0 ug/g	5.0 ug/g	5.0 ug/g
decafluorobiphenyl - Recovery	64%	52%	62%
Surrogate Standard (SS4) - Level	5.0 ug/g	5.0 ug/g	5.0 ug/g
1,2-difluorobiphenyl - Recovery	89%	56%	49%

FOR RECRA ENVIRONMENTAL LABORATORIES

DATE

Barbara Krapinski
 6/29/84



RECRA ENVIRONMENTAL LABORATORIES

I.D. #84-512

ANALYTICAL RESULTS

93rd STREET SCHOOL
 NIAGARA FALLS, NY
 GAS CHROMATOGRAPHY/MASS SPECTROMETRY

Report Date: 6/29/84

COMPOUND	DETECTION LIMIT (ug/g dry)	SAMPLE IDENTIFICATION	
		6S	7S
onochlorobenzene	1.0	ND	ND
1,2-dichlorobenzene	1.0	ND	ND
,3-dichlorobenzene	1.0	ND	ND
1,4-dichlorobenzene	1.0	ND	ND
,2,3-trichlorobenzene	1.0	ND	ND
1,2,4-trichlorobenzene	1.0	ND	ND
1,3,5-trichlorobenzene	1.0	ND	ND
,2,3,4-tetrachlorobenzene	1.0	ND	ND
1,2,3,5-tetrachlorobenzene	1.0	ND	ND
entachlorobenzene	1.0	ND	ND
hexachlorobenzene	1.0	ND	ND

ADDITIONAL SAMPLE INFORMATION

Sample Date	5/24/84	5/24/84
Extraction Date	6/15/84	6/15/84
Analysis Date	6/19/84	6/19/84
Internal Standard - Level	1 ug/g	1 ug/g
labeled phenanthrene - Recovery	100%	110%
Surrogate Standard (SS3) - Level	5.0 ug/g	5.0 ug/g
decafluorobiphenyl - Recovery	56%	53%
Surrogate Standard (SS4) - Level	5.0 ug/g	5.0 ug/g
2-fluorobiphenyl - Recovery	65%	67%

FOR RECRA ENVIRONMENTAL LABORATORIES

DATE



RECRA ENVIRONMENTAL LABORATORIES

I.D. #84-512

ANALYTICAL RESULTS

93rd STREET SCHOOL
 NIAGARA FALLS, NY
 GAS CHROMATOGRAPHY/MASS SPECTROMETRY

Report Date: 6/29/84

COMPOUND	DETECTION LIMIT ($\mu\text{g/l}$)	SAMPLE IDENTIFICATION (DATE)			
		MW-1 (5/22/84)	MW-2 (5/22/84)	MW-3 (5/22/84)	MW-4 (5/22/84)
α -chlorotoluene	5.0	ND	ND	ND	ND
2-chlorotoluene	5.0	ND	ND	ND	ND
3-chlorotoluene	5.0	ND	ND	ND	ND
4-chlorotoluene	5.0	ND	ND	ND	ND
α,α -dichlorotoluene	5.0	ND	ND	ND	ND
$\alpha,2$ -dichlorotoluene	5.0	ND	ND	ND	ND
$\alpha,3$ -dichlorotoluene	5.0	ND	ND	ND	ND
$\alpha,4$ -dichlorotoluene	5.0	ND	ND	ND	ND
2,4-dichlorotoluene	5.0	ND	ND	ND	ND
2,5-dichlorotoluene	5.0	ND	ND	ND	ND
2,6-dichlorotoluene	5.0	ND	ND	ND	ND
3,4-dichlorotoluene	5.0	ND	ND	ND	ND
α,α,α -trichlorotoluene	5.0	ND	ND	ND	ND
$\alpha,2,4$ -trichlorotoluene	5.0	ND	ND	ND	ND
$\alpha,2,6$ -trichlorotoluene	5.0	ND	ND	ND	ND
$\alpha,3,4$ -trichlorotoluene	5.0	ND	ND	ND	ND
2,3,6-trichlorotoluene	5.0	ND	ND	ND	ND
2,4,5-trichlorotoluene	5.0	ND	ND	ND	ND
$\alpha,\alpha,2,6$ -tetrachlorotoluene	5.0	ND	ND	ND	ND
2,3,4,5,6-pentachlorotoluene	5.0	ND	ND	ND	ND

FOR RECRA ENVIRONMENTAL LABORATORIES

DATE

Barbara J. Kapsinski
 6/29/84



RECRA ENVIRONMENTAL LABORATORIES

I D #84-512

ANALYTICAL RESULTS

93rd STREET SCHOOL
 NIAGARA FALLS, NY
 GAS CHROMATOGRAPHY/MASS SPECTROMETRY

Report Date: 6/29/84

COMPOUND	DETECTION LIMIT (ug/l)	SAMPLE IDENTIFICATION (DATE)		
		1W (5/24/84)	2W (5/24/84)	3W (5/24/84)
α -chlorotoluene	5.0	ND	ND	ND
2-chlorotoluene	5.0	ND	ND	ND
3-chlorotoluene	5.0	ND	ND	ND
4-chlorotoluene	5.0	ND	ND	ND
α,α -dichlorotoluene	5.0	ND	ND	ND
$\alpha,2$ -dichlorotoluene	5.0	ND	ND	ND
$\alpha,3$ -dichlorotoluene	5.0	ND	ND	ND
$\alpha,4$ -dichlorotoluene	5.0	ND	ND	ND
2,4-dichlorotoluene	5.0	ND	ND	ND
2,5-dichlorotoluene	5.0	ND	ND	ND
2,6-dichlorotoluene	5.0	ND	ND	ND
3,4-dichlorotoluene	5.0	ND	ND	ND
α,α,α -trichlorotoluene	5.0	ND	ND	ND
$\alpha,2,4$ -trichlorotoluene	5.0	ND	ND	ND
$\alpha,2,6$ -trichlorotoluene	5.0	ND	ND	ND
$\alpha,3,4$ -trichlorotoluene	5.0	ND	ND	ND
2,3,6-trichlorotoluene	5.0	ND	ND	ND
2,4,5-trichlorotoluene	5.0	ND	ND	ND
$\alpha,\alpha,2,6$ -tetrachlorotoluene	5.0	ND	ND	ND
2,3,4,5,6-pentachlorotoluene	5.0	ND	ND	ND

FOR RECRA ENVIRONMENTAL LABORATORIES

DATE

Barbara J. Kujawa
 6/29/84



RECRA ENVIRONMENTAL LABORATORIES

I.D. #84-512

ANALYTICAL RESULTS

93rd STREET SCHOOL
NIAGARA FALLS, NY
GAS CHROMATOGRAPHY/MASS SPECTROMETRY

Report Date: 6/29/84

COMPOUND	DETECTION LIMIT (ug/l)	SAMPLE IDENTIFICATION (DATE)
		5W (5/29/84)
α -chlorotoluene	5.0	ND
2-chlorotoluene	5.0	ND
3-chlorotoluene	5.0	ND
4-chlorotoluene	5.0	ND
α,α -dichlorotoluene	5.0	ND
$\alpha,2$ -dichlorotoluene	5.0	ND
$\alpha,3$ -dichlorotoluene	5.0	ND
$\alpha,4$ -dichlorotoluene	5.0	ND
2,4-dichlorotoluene	5.0	ND
2,5-dichlorotoluene	5.0	ND
2,6-dichlorotoluene	5.0	ND
3,4-dichlorotoluene	5.0	ND
α,α,α -trichlorotoluene	5.0	ND
$\alpha,2,4$ -trichlorotoluene	5.0	ND
$\alpha,2,6$ -trichlorotoluene	5.0	ND
$\alpha,3,4$ -trichlorotoluene	5.0	ND
2,3,6-trichlorotoluene	5.0	ND
2,4,5-trichlorotoluene	5.0	ND
$\alpha,\alpha,2,6$ -tetrachlorotoluene	5.0	ND
2,3,4,5,6-pentachlorotoluene	5.0	ND

FOR RECRA ENVIRONMENTAL LABORATORIES

DATE

Barbara J. Krajewski
6/29/84



ANALYTICAL RESULTS
93rd STREET SCHOOL
NIAGARA FALLS, NY
GAS CHROMATOGRAPHY/MASS SPECTROMETRY

Report Date: 6/29/84

COMPOUND	DETECTION LIMIT (ug/g dry)	SAMPLE IDENTIFICATION (DATE)	
		MW-1 S-3 (5/9/84)	MW-1 S-7 (5/9/84)
α -chlorotoluene	3.0	ND	ND
2-chlorotoluene	3.0	ND	ND
3-chlorotoluene	3.0	ND	ND
4-chlorotoluene	3.0	ND	ND
α,α -dichlorotoluene	3.0	ND	ND
$\alpha,2$ -dichlorotoluene	3.0	ND	ND
$\alpha,3$ -dichlorotoluene	3.0	ND	ND
$\alpha,4$ -dichlorotoluene	3.0	ND	ND
2,4-dichlorotoluene	3.0	ND	ND
2,5-dichlorotoluene	3.0	ND	ND
2,6-dichlorotoluene	3.0	ND	ND
3,4-dichlorotoluene	3.0	ND	ND
α,α,α -trichlorotoluene	3.0	ND	ND
$\alpha,2,4$ -trichlorotoluene	3.0	ND	ND
$\alpha,2,6$ -trichlorotoluene	3.0	ND	ND
$\alpha,3,4$ -trichlorotoluene	3.0	ND	ND
2,3,6-trichlorotoluene	3.0	ND	ND
2,4,5-trichlorotoluene	3.0	ND	ND
$\alpha,\alpha,2,6$ -tetrachlorotoluene	3.0	ND	ND
2,3,4,5,6-pentachlorotoluene	3.0	ND	ND

FOR RECRA ENVIRONMENTAL LABORATORIES

DATE

Sandra J. Kapuski
6/29/84



RECRA ENVIRONMENTAL LABORATORIES

I.D. #84-512

ANALYTICAL RESULTS

93rd STREET SCHOOL
NIAGARA FALLS, NY
GAS CHROMATOGRAPHY/MASS SPECTROMETRY

Report Date: 6/29/84

COMPOUND	DETECTION LIMIT ($\mu\text{g/g dry}$)	SAMPLE IDENTIFICATION (DATE)		
		MW-2 S-4 (5/14/84)	MW-2 S-6 (5/14/84)	MW-2 S-8 (5/14/84)
α -chlorotoluene	3.0	ND	ND	ND
2-chlorotoluene	3.0	ND	ND	ND
3-chlorotoluene	3.0	ND	ND	ND
4-chlorotoluene	3.0	ND	ND	ND
α,α -dichlorotoluene	3.0	ND	ND	ND
$\alpha,2$ -dichlorotoluene	3.0	ND	ND	ND
$\alpha,3$ -dichlorotoluene	3.0	ND	ND	ND
$\alpha,4$ -dichlorotoluene	3.0	ND	ND	ND
2,4-dichlorotoluene	3.0	ND	ND	ND
2,5-dichlorotoluene	3.0	ND	ND	ND
2,6-dichlorotoluene	3.0	ND	ND	ND
3,4-dichlorotoluene	3.0	ND	ND	ND
α,α,α -trichlorotoluene	3.0	ND	ND	ND
$\alpha,2,4$ -trichlorotoluene	3.0	ND	ND	ND
$\alpha,2,6$ -trichlorotoluene	3.0	ND	ND	ND
$\alpha,3,4$ -trichlorotoluene	3.0	ND	ND	ND
2,3,6-trichlorotoluene	3.0	ND	ND	ND
2,4,5-trichlorotoluene	3.0	ND	ND	ND
$\alpha,\alpha,2,6$ -tetrachlorotoluene	3.0	ND	ND	ND
2,3,4,5,6-pentachlorotoluene	3.0	ND	ND	ND

FOR RECRA ENVIRONMENTAL LABORATORIES

DATE

Barbara J. Kapevski
6/29/84



ANALYTICAL RESULTS

93rd STREET SCHOOL
NIAGARA FALLS, NY
GAS CHROMATOGRAPHY/MASS SPECTROMETRY

Report Date: 6/29/84

COMPOUND	DETECTION LIMIT (ug/l)	SAMPLE IDENTIFICATION (DATE)	
		MW-3 S-3 (5/16/84)	MW-3 S-7 (5/16/84)
α -chlorotoluene	3.0	ND	ND
2-chlorotoluene	3.0	ND	ND
3-chlorotoluene	3.0	ND	ND
4-chlorotoluene	3.0	ND	ND
α,α -dichlorotoluene	3.0	ND	ND
$\alpha,2$ -dichlorotoluene	3.0	ND	ND
$\alpha,3$ -dichlorotoluene	3.0	ND	ND
$\alpha,4$ -dichlorotoluene	3.0	ND	ND
2,4-dichlorotoluene	3.0	ND	ND
2,5-dichlorotoluene	3.0	ND	ND
2,6-dichlorotoluene	3.0	ND	ND
3,4-dichlorotoluene	3.0	ND	ND
α,α,α -trichlorotoluene	3.0	ND	ND
$\alpha,2,4$ -trichlorotoluene	3.0	ND	ND
$\alpha,2,6$ -trichlorotoluene	3.0	ND	ND
$\alpha,3,4$ -trichlorotoluene	3.0	ND	ND
2,3,6-trichlorotoluene	3.0	ND	ND
2,4,5-trichlorotoluene	3.0	ND	ND
$\alpha,\alpha,2,6$ -tetrachlorotoluene	3.0	ND	ND
2,3,4,5,6-pentachlorotoluene	3.0	ND	ND

FOR RECRA ENVIRONMENTAL LABORATORIES

DATE

Barbara J. Krajewski
6/29/84



ANALYTICAL RESULTS

93rd STREET SCHOOL
 NIAGARA FALLS, NY
 GAS CHROMATOGRAPHY/MASS SPECTROMETRY

Report Date: 6/29/84

COMPOUND	DETECTION LIMIT ($\mu\text{g/g dry}$)	SAMPLE IDENTIFICATION (DATE)		
		MW-4 S-3 (5/17/84)	MW-4 S-6 (5/17/84)	MW-4 S-8 (5/17/84)
α -chlorotoluene	3.0	ND	ND	ND
2-chlorotoluene	3.0	ND	ND	ND
3-chlorotoluene	3.0	ND	ND	ND
4-chlorotoluene	3.0	ND	ND	ND
α,α -dichlorotoluene	3.0	ND	ND	ND
$\alpha,2$ -dichlorotoluene	3.0	ND	ND	ND
$\alpha,3$ -dichlorotoluene	3.0	ND	ND	ND
$\alpha,4$ -dichlorotoluene	3.0	ND	ND	ND
2,4-dichlorotoluene	3.0	ND	ND	ND
2,5-dichlorotoluene	3.0	ND	ND	ND
2,6-dichlorotoluene	3.0	ND	ND	ND
3,4-dichlorotoluene	3.0	ND	ND	ND
α,α,α -trichlorotoluene	3.0	ND	ND	ND
$\alpha,2,4$ -trichlorotoluene	3.0	ND	ND	ND
$\alpha,2,6$ -trichlorotoluene	3.0	ND	ND	ND
$\alpha,3,4$ -trichlorotoluene	3.0	ND	ND	ND
2,3,6-trichlorotoluene	3.0	ND	ND	ND
2,4,5-trichlorotoluene	3.0	ND	ND	ND
$\alpha,\alpha,2,6$ -tetrachlorotoluene	3.0	ND	ND	ND
2,3,4,5,6-pentachlorotoluene	3.0	ND	ND	ND

FOR RECRA ENVIRONMENTAL LABORATORIES

DATE

Juliana J. Kasper
 6/29/84



ANALYTICAL RESULTS

93rd STREET SCHOOL
NIAGARA FALLS, NY
GAS CHROMATOGRAPHY/MASS SPECTROMETRY

Report Date: 6/29/84

COMPOUND	DETECTION LIMIT (ug/g dry)	SAMPLE IDENTIFICATION (DATE)	
		6S (5/24/84)	7S (5/24/84)
α -chlorotoluene	3.0	ND	ND
2-chlorotoluene	3.0	ND	ND
3-chlorotoluene	3.0	ND	ND
4-chlorotoluene	3.0	ND	ND
α,α -dichlorotoluene	3.0	ND	ND
$\alpha,2$ -dichlorotoluene	3.0	ND	ND
$\alpha,3$ -dichlorotoluene	3.0	ND	ND
$\alpha,4$ -dichlorotoluene	3.0	ND	ND
2,4-dichlorotoluene	3.0	ND	ND
2,5-dichlorotoluene	3.0	ND	ND
2,6-dichlorotoluene	3.0	ND	ND
3,4-dichlorotoluene	3.0	ND	ND
α,α,α -trichlorotoluene	3.0	ND	ND
$\alpha,2,4$ -trichlorotoluene	3.0	ND	ND
$\alpha,2,6$ -trichlorotoluene	3.0	ND	ND
$\alpha,3,4$ -trichlorotoluene	3.0	ND	ND
2,3,6-trichlorotoluene	3.0	ND	ND
2,4,5-trichlorotoluene	3.0	ND	ND
$\alpha,\alpha,2,6$ -tetrachlorotoluene	3.0	ND	ND
2,3,4,5,6-pentachlorotoluene	3.0	ND	ND

FOR RECRA ENVIRONMENTAL LABORATORIES

DATE

Barbara J. Kaporoski
6/29/84



ANALYTICAL RESULTS

93rd STREET SCHOOL
NIAGARA FALLS, NY
GAS CHROMATOGRAPHY

Report Date: 6/29/84

PARAMETER	UNITS OF MEASURE	SAMPLE IDENTIFICATION (DATE)			
		MW-1 (5/22/84)	MW-2 (5/22/84)	MW-3 (5/22/84)	MW-4 (5/22/84)
α -BHC	$\mu\text{g/l}$	<0.01	<0.01	<0.01	<0.01
β -BHC	$\mu\text{g/l}$	<0.01	<0.01	<0.01	<0.01
γ -BHC	$\mu\text{g/l}$	<0.01	<0.01	<0.01	<0.01
δ -BHC	$\mu\text{g/l}$	<0.01	<0.01	<0.01	<0.01
Total Polychlorinated Biphenyls	$\mu\text{g/l}$ as Aroclor 1242	<0.1	<0.1	<0.1	<0.1
Halogenated Organic Scan (ECD)	$\mu\text{g/l}$ as Chlorine; Lindane Standard	0.32	0.14	0.18	0.40
Volatile Organic Scan (FID)	$\mu\text{g/l}$ as Carbon; Benzene Standard	<1	17	5.9	8.5

FOR RECRA ENVIRONMENTAL LABORATORIES

DATE

Margaret D. Loch
6/29/84



RECRA ENVIRONMENTAL LABORATORIES

I.D. #84-512

ANALYTICAL RESULTS

93rd STREET SCHOOL
NIAGARA FALLS, NY
GAS CHROMATOGRAPHY

Report Date: 6/29/84

PARAMETER	UNITS OF MEASURE	SAMPLE IDENTIFICATION (DATE)		
		1W (5/24/84)	2W (5/24/84)	3W (5/24/84)
α -BHC	$\mu\text{g/l}$	<0.01	0.02	0.02
β -BHC	$\mu\text{g/l}$	<0.01	<0.01	<0.01
δ -BHC	$\mu\text{g/l}$	<0.01	<0.01	<0.01
γ -BHC	$\mu\text{g/l}$	<0.01	<0.01	<0.01
Total Polychlorinated Biphenyls	$\mu\text{g/l}$ as Aroclor 1242	<0.1	<0.1	<0.1
Halogenated Organic Scan (ECD)	$\mu\text{g/l}$ as Chlorine; Lindane Standard	0.17	0.17	0.26
Volatile Organic Scan (FID)	$\mu\text{g/l}$ as Carbon; Benzene Standard	<1	2.2	<1

FOR RECRA ENVIRONMENTAL LABORATORIES.

Margaret D. Lock

DATE

6/29/84

RECRA ENVIRONMENTAL LABORATORIES

I.D. #84-512

ANALYTICAL RESULTS

93rd STREET SCHOOL
NIAGARA FALLS, NY
GAS CHROMATOGRAPHY

Report Date: 6/29/84

PARAMETER	UNITS OF MEASURE	SAMPLE IDENTIFICATION (DATE)
		5W (5/29/84)
γ-BHC	μg/l	0.02
β-BHC	μg/l	0.03
α-BHC	μg/l	<0.01
γ-BHC	μg/l	<0.01
Total Polychlorinated Biphenyls	μg/l as Aroclor 1242	<0.1
Halogenated Organic Scan (ECD)	μg/l as Chlorine; Lindane Standard	0.48
Volatile Organic Scan (FID)	μg/l as Carbon; Benzene Standard	<1

FOR RECRA ENVIRONMENTAL LABORATORIES

Margaret D. Lock

DATE

6/29/84

RECRA ENVIRONMENTAL LABORATORIES

I.D. #84-512

ANALYTICAL RESULTS

93rd STREET SCHOOL
NIAGARA FALLS, NY
GAS CHROMATOGRAPHY

Report Date: 6/29/84

PARAMETER	UNITS OF MEASURE	SAMPLE IDENTIFICATION (DATE)	
		MW-1 S-3 (5/9/84)	MW-1 S-7 (5/9/84)
α -BHC	$\mu\text{g/g dry}$	<0.01	<0.01
β -BHC	$\mu\text{g/g dry}$	<0.01	<0.01
δ -BHC	$\mu\text{g/g dry}$	<0.01	<0.01
γ -BHC	$\mu\text{g/g dry}$	<0.01	<0.01
Total Polychlorinated Biphenyls	$\mu\text{g/g dry as}$ Aroclor 1242	<0.1	<0.1
Halogenated Organic Scan (ECD)	$\mu\text{g/g dry as Chlorine};$ Lindane Standard	<0.1	<0.1
Volatile Organic Scan (FID)	$\mu\text{g/g dry as Carbon};$ Benzene Standard	4.8	<1
Dry Weight (103°C)	%	94	88

FOR RECRA ENVIRONMENTAL LABORATORIES

Margaret D. Rock

DATE

6/29/84

ECRA ENVIRONMENTAL LABORATORIES

I.D. #84-512

ANALYTICAL RESULTS

93rd STREET SCHOOL
NIAGARA FALLS, NY
GAS CHROMATOGRAPHY

Report Date: 6/29/84

PARAMETER	UNITS OF MEASURE	SAMPLE IDENTIFICATION (DATE)		
		MW-2 S-4 (5/14/84)	MW-2 S-6 (5/14/84)	MW-2 S-8 (5/14/84)
α -BHC	ug/g dry	<0.01	<0.01	<0.01
β -BHC	ug/g dry	<0.01	<0.01	<0.01
δ -BHC	ug/g dry	<0.01	<0.01	<0.01
γ -BHC	ug/g dry	<0.01	<0.01	<0.01
Total Polychlorinated Biphenyls	ug/g dry as Aroclor 1242	<0.1	<0.1	<0.1
Halogenated Organic Scan (ECD)	ug/g dry as Chlorine; Lindane Standard	<0.1	<0.1	<0.1
Volatile Organic Scan (FID)	ug/g dry as Carbon; Benzene Standard	<1	2.8	2.4
Dry Weight (103°C)	%	93	86	95

FOR RECRA ENVIRONMENTAL LABORATORIES

Margaret D. Loch

DATE

6/29/84

ANALYTICAL RESULTS

93rd STREET SCHOOL
NIAGARA FALLS, NY
GAS CHROMATOGRAPHY

Report Date: 6/29/84

PARAMETER	UNITS OF MEASURE	SAMPLE IDENTIFICATION (DATE)	
		MW-3 S-3 (5/16/84)	MW-3 S-7 (5/16/84)
α -BHC	$\mu\text{g/g dry}$	<0.01	<0.01
β -BHC	$\mu\text{g/g dry}$	<0.01	<0.01
δ -BHC	$\mu\text{g/g dry}$	<0.01	<0.01
γ -BHC	$\mu\text{g/g dry}$	<0.01	<0.01
Total Polychlorinated Biphenyls	$\mu\text{g/g dry as}$ Aroclor 1242	<0.1	<0.1
Halogenated Organic Scan (ECD)	$\mu\text{g/g dry as Chlorine};$ Lindane Standard	<0.1	<0.1
Volatile Organic Scan (FID)	$\mu\text{g/g dry as Carbon};$ Benzene Standard	<1	2.1
Dry Weight (103°C)	%	96	87

FOR RECRA ENVIRONMENTAL LABORATORIES

DATE

Margaret D. Lock
6/29/84



ANALYTICAL RESULTS

93rd STREET SCHOOL
NIAGARA FALLS, NY
GAS CHROMATOGRAPHY

Report Date: 6/29/84

PARAMETER	UNITS OF MEASURE	SAMPLE IDENTIFICATION (DATE)		
		MW-4 S-3 (5/17/84)	MW-4 S-6 (5/17/84)	MW-4 S-8 (5/17/84)
α -BHC	$\mu\text{g/g dry}$	<0.01	<0.01	<0.01
β -BHC	$\mu\text{g/g dry}$	<0.01	<0.01	<0.01
δ -BHC	$\mu\text{g/g dry}$	<0.01	<0.01	<0.01
γ -BHC	$\mu\text{g/g dry}$	<0.01	<0.01	<0.01
Total Polychlorinated Biphenyls	$\mu\text{g/g dry as}$ Aroclor 1242	<0.1	<0.1	<0.1
Halogenated Organic Scan (ECD)	$\mu\text{g/g dry as Chlorine};$ Lindane Standard	<0.1	<0.1	<0.1
Volatile Organic Scan (FID)	$\mu\text{g/g dry as Carbon};$ Benzene Standard	<1	11	10
Dry Weight (103°C)	%	67	73	98

FOR RECRA ENVIRONMENTAL LABORATORIES

Margaret D. Koch

DATE

6/29/84

RECRA ENVIRONMENTAL LABORATORIES

I.D. #84-512

ANALYTICAL RESULTS

93rd STREET SCHOOL
NIAGARA FALLS, NY
GAS CHROMATOGRAPHY

Report Date: 6/29/84

PARAMETER	UNITS OF MEASURE	SAMPLE IDENTIFICATION (DATE)	
		6S (5/24/84)	7S (5/24/84)
α -BHC	ug/g dry	<0.01	<0.01
β -BHC	ug/g dry	<0.01	<0.01
δ -BHC	ug/g dry	<0.01	<0.01
γ -BHC	ug/g dry	<0.01	<0.01
Total Polychlorinated Biphenyls	ug/g dry as Aroclor 1242	<0.1	<0.1
halogenated Organic Scan (ECD)	ug/g dry as Chlorine; Lindane Standard	<0.1	<0.1
Volatile Organic Scan (FID)	ug/g dry as Carbon; Benzene Standard	12	8.4
Dry Weight (103°C)	%	76	68

FOR RECRA ENVIRONMENTAL LABORATORIES

Margaret C. Loch

DATE

6/29/84

ANALYTICAL RESULTS

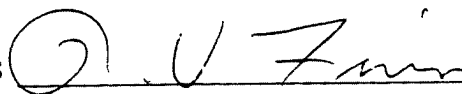
93rd STREET SCHOOL
NIAGARA FALLS, NY

Report Date: 6/29/84

PARAMETER	UNITS OF MEASURE	SAMPLE IDENTIFICATION (DATE)			
		MW-1 (5/22/84)	MW-2 (5/22/84)	MW-3 (5/22/84)	MW-4 (5/22/84)
Chloride	mg/l	34	16	21	23
Sulfate	mg/l	820	233	91	640
Total Organic Carbon	mg/l	7.5	16	6.0	14
Soluble Cadmium	mg/l	<0.005	<0.005	<0.005	<0.005
Soluble Chromium	mg/l	0.006	<0.005	<0.005	<0.005
Soluble Hexavalent Chromium	mg/l	<0.005	<0.005	<0.005	<0.005
Soluble Copper	mg/l	<0.01	<0.01	<0.01	<0.01
Soluble Iron	mg/l	<0.03	0.15	<0.03	<0.03
Soluble Lead	mg/l	<0.005	<0.005	0.007	<0.005
Soluble Mercury	mg/l	<0.0008	<0.0008	<0.0008	<0.0008
Soluble Nickel	mg/l	<0.005	<0.005	<0.005	<0.005
Soluble Silver	mg/l	<0.008	<0.008	<0.008	<0.008
Soluble Zinc	mg/l	0.044	0.260	0.653	0.036

FOR RECRA ENVIRONMENTAL LABORATORIES

DATE


6/29/84

ANALYTICAL RESULTS

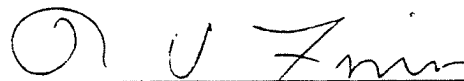
93rd STREET SCHOOL
NIAGARA FALLS, NY

Report Date: 6/29/84

PARAMETER	UNITS OF MEASURE	SAMPLE IDENTIFICATION (DATE)			
		1W (5/24/84)	2W (5/24/84)	3W (5/24/84)	5W (5/29/84)
Chloride	mg/l	23	23	24	41
Sulfate	mg/l	47	43	42	795
Total Organic Carbon	mg/l	28	37	33	18
Total Cadmium	mg/l	0.011	0.012	<0.008	0.014
Total Chromium	mg/l	<0.005	<0.005	<0.005	<0.005
Hexavalent Chromium	mg/l	<0.005	<0.005	<0.005	<0.005
Total Copper	mg/l	<0.005	0.005	0.009	0.006
Total Iron	mg/l	0.63	1.14	0.40	0.36
Total Lead	mg/l	<0.005	<0.005	<0.005	<0.005
Total Mercury	mg/l	<0.0008	<0.0008	<0.0008	<0.0008
Total Nickel	mg/l	0.008	0.011	0.008	<0.005
Total Silver	mg/l	<0.008	<0.008	<0.008	<0.008
Total Zinc	mg/l	0.091	0.072	0.111	0.034

FOR RECRA ENVIRONMENTAL LABORATORIES

DATE


6/29/84

ANALYTICAL RESULTS

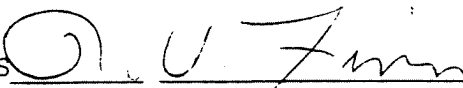
93rd STREET SCHOOL
NIAGARA FALLS, NY

Report Date: 6/29/84

PARAMETER	UNITS OF MEASURE	SAMPLE IDENTIFICATION (DATE)			
		MW-1 S-3 (5/9/84)	MW-1 S-7 (5/9/84)	MW-2 S-4 (5/14/84)	MW-2 S-6 (5/14/84)
Total Cadmium	µg/g dry	<0.6	<0.6	<0.7	<0.7
Total Chromium	µg/g dry	24.4	25.7	16.9	25.6
Hexavalent Chromium	µg/g dry	2.66	<2	<2	<2
Total Copper	µg/g dry	24.4	27.8	26.0	32.0
Total Iron	µg/g dry	13,500	16,300	4,870	252
Total Lead	µg/g dry	7.4	5.2	11	5.9
Total Mercury	µg/g dry	<0.08	<0.06	<0.07	<0.08
Total Nickel	µg/g dry	28.6	36.4	25.6	34.9
Total Silver	µg/g dry	0.88	<0.7	<0.7	<0.6
Total Zinc	µg/g dry	53.1	54.1	56.8	54.2

FOR RECRA ENVIRONMENTAL LABORATORIES

DATE


6/29/84

ANALYTICAL RESULTS

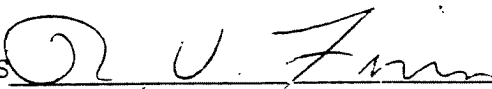
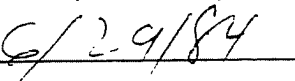
93rd STREET SCHOOL
NIAGARA FALLS, NY

Report Date: 6/29/84

PARAMETER	UNITS OF MEASURE	SAMPLE IDENTIFICATION (DATE)			
		MW-2 S-8 (5/14/84)	MW-3 S-3 (5/16/84)	MW-3 S-7 (5/16/84)	MW-4 S-3 (5/17/84)
Total Cadmium	µg/g dry	<0.6	<0.6	<0.6	<0.7
Total Chromium	µg/g dry	12.7	26.6	21.6	14.1
Hexavalent Chromium	µg/g dry	<2	<2	<2	<2
Total Copper	µg/g dry	17.2	20.9	18.5	18.2
Total Iron	µg/g dry	6,830	16,500	8,890	13,300
Total Lead	µg/g dry	17.4	12.4	12.5	6.67
Total Mercury	µg/g dry	<0.1	<0.1	<0.2	<0.2
Total Nickel	µg/g dry	13.9	40.9	32.6	12.3
Total Silver	µg/g dry	<0.6	<0.6	<0.7	<0.7
Total Zinc	µg/g dry	84.7	57.2	57.7	16.2

FOR RECRA ENVIRONMENTAL LABORATORIES

DATE

RECRA ENVIRONMENTAL LABORATORIES

I.D. #84-512

ANALYTICAL RESULTS

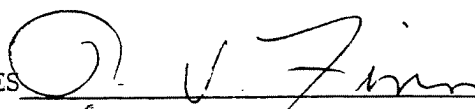
93rd STREET SCHOOL
NIAGARA FALLS, NY

Report Date: 6/29/84

PARAMETER	UNITS OF MEASURE	SAMPLE IDENTIFICATION (DATE)			
		MW-4 S-6 (5/17/84)	MW-4 S-8 (5/17/84)	6S (5/24/84)	7S (5/24/84)
Total Cadmium	µg/g dry	<0.7	<0.4	<0.7	<0.7
Total Chromium	µg/g dry	28.6	6.80	21.2	17.9
Hexavalent Chromium	µg/g dry	<2	<2	<2	<2
Total Copper	µg/g dry	30.8	17.8	26.7	8.76
Total Iron	µg/g dry	20,400	3,430	14,100	9,260
Total Lead	µg/g dry	23.2	13.1	22.8	16.6
Total Mercury	µg/g dry	<0.07	<0.07	0.37	<0.2
Total Nickel	µg/g dry	47.9	9.2	26.3	17.3
Total Silver	µg/g dry	<0.7	<0.6	<0.6	<0.7
Total Zinc	µg/g dry	76.0	72.0	45.9	58.5

FOR RECRA ENVIRONMENTAL LABORATORIES

DATE


6/29/84

RECRA ENVIRONMENTAL LABORATORIES

I.D. #84-512

ANALYTICAL RESULTS

93rd STREET SCHOOL
NIAGARA FALLS, NY
GAS CHROMATOGRAPHY
QUALITY CONTROL

Report Date: 6/29/84

PESTICIDE RECOVERY ANALYSIS OF
METHOD BLANK

COMPOUND IDENTIFICATION	ng OF SPIKE	ng RECOVERED	% RECOVERY
α -BHC	0.045	0.053	118
β -BHC	0.047	0.066	140
δ -BHC	0.052	0.039	75
γ -BHC	0.034	0.034	100

PESTICIDE RECOVERY ANALYSIS OF
METHOD BLANK

COMPOUND IDENTIFICATION	ng OF SPIKE	ng RECOVERED	% RECOVERY
Lindane	0.22	0.19	86

FOR RECRA ENVIRONMENTAL LABORATORIES Margaret D. Loch
DATE 6/29/84



RECRA ENVIRONMENTAL LABORATORIES

I.D. #84-512

ANALYTICAL RESULTS

93rd STREET SCHOOL
NIAGARA FALLS, NY
GAS CHROMATOGRAPHY
QUALITY CONTROL

Report Date: 6/29/84

PESTICIDE RECOVERY ANALYSIS OF
METHOD BLANK

COMPOUND IDENTIFICATION	ng OF SPIKE	ng RECOVERED	% RECOVERY
α -BHC	0.022	0.029	132
β -BHC	0.023	0.028	122
δ -BHC	0.026	0.023	88
γ -BHC	0.026	0.027	117

FOR RECRA ENVIRONMENTAL LABORATORIES: Margaret D. Lock
DATE 6/29/84



ANALYTICAL RESULTS

93rd STREET SCHOOL
NIAGARA FALLS, NY
GAS CHROMATOGRAPHY
QUALITY CONTROL

Report Date: 6/29/84

PCB RECOVERY ANALYSIS OF
METHOD BLANK

COMPOUND IDENTIFICATION	ng OF SPIKE	ng RECOVERED	% RECOVERY
Aroclor 1242	1.0	0.73	73

FOR RECRA ENVIRONMENTAL LABORATORIES Marquet D. Lock

DATE 6/29/84



RECRA ENVIRONMENTAL LABORATORIES

I.D. #84-512

ANALYTICAL RESULTS

93rd STREET SCHOOL
NIAGARA FALLS, NY
GAS CHROMATOGRAPHY
QUALITY CONTROL

Report Date: 6/29/84

RECOVERY ANALYSIS OF
SAMPLE MW-4

COMPOUND IDENTIFICATION	ng OF SPIKE	ng RECOVERED	% RECOVERY
Benzene	54	53	98

RECOVERY ANALYSIS OF
SAMPLE MW-3 S-3

COMPOUND IDENTIFICATION	ng OF SPIKE	ng RECOVERED	% RECOVERY
Benzene	54	41	76

FOR RECRA ENVIRONMENTAL LABORATORIES

Margaret D. Loch

DATE

6/29/84

RECRA ENVIRONMENTAL LABORATORIES

I.D. #84-512

ANALYTICAL RESULTS

93rd STREET SCHOOL
NIAGARA FALLS, NY
GAS CHROMATOGRAPHY
QUALITY CONTROL

Report Date: 6/29/84

REPLICATE ANALYSIS OF
SAMPLE MW-4

PARAMETER	UNITS OF MEASURE	VALUE 1	VALUE 2	MEAN	STANDARD DEVIATION	PERCENT COEFFICIENT OF VARIATION
Volatile Organic Scan (FID)	µg/l as Carbon; Benzene Standard	7.4	9.5	8.5	1.5	18

FOR RECRA ENVIRONMENTAL LABORATORIES

DATE

Margaret D. Lock
6/29/84



RECRA ENVIRONMENTAL LABORATORIES

I.D. #84-512

ANALYTICAL RESULTS

93rd STREET SCHOOL
NIAGARA FALLS, NY
QUALITY CONTROL

Report Date: 6/29/84

RECOVERY ANALYSIS
WATER ANALYSIS

PARAMETER	SAMPLE IDENTIFICATION	µg OF SPIKE	µg RECOVERED	% RECOVERY
Chloride	MW-4	2,500	2,515	100.6
Sulfate	2W	2,000	2,220	111
Total Organic Carbon	MW-4	200	211.4	105.7
Soluble Cadmium	MW-3	1,000	960	96
Soluble Chromium	1W	1,000	920	92
Soluble Hexavalent Chromium	1W	1,000	920	92
Soluble Copper	MW-3	1,000	1,120	112
Soluble Iron	5W	1,000	1,030	103
Soluble Lead	1W	100	78	78
Soluble Mercury	MW-3	0.4	0.384	96
Soluble Nickel	MW-3	100	100	100
Soluble Silver	MW-3	1,000	910	91
Soluble Zinc	1W	1,000	1010	101

FOR RECRA ENVIRONMENTAL LABORATORIES

DATE

D. V. Finner
6/29/84



ANALYTICAL RESULTS

93rd STREET SCHOOL
NIAGARA FALLS, NY
QUALITY CONTROL

Report Date: 6/29/84

REPLICATE ANALYSIS

PARAMETER	UNITS OF MEASURE	SAMPLE I.D.	VALUE 1	VALUE 2	MEAN	STANDARD DEVIATION	PERCENT COEFFICIENT OF VARIATION
Chloride	mg/l	MW-4	23.1	23.6	23.35	0.35	1.3
Sulfate	mg/l	2W	42	43	42.5	0.71	1.7
Total Organic Carbon	mg/l	MW-4	14	13	13.5	0.71	5.2
Soluble Cadmium	mg/l	3W	<0.008	<0.008	<0.008	-	-
Soluble Chromium	mg/l	3W	<0.005	<0.005	<0.005	-	-
Hexavalent Chromium	mg/l	3W	<0.005	<0.005	<0.005	-	-
Soluble Copper	mg/l	3W	0.007	0.011	0.009	0.0028	31
Soluble Iron	mg/l	3W	0.432	0.370	0.401	0.043	11
Soluble Lead	mg/l	3W	<0.005	<0.005	<0.005	-	-
Soluble Mercury	mg/l	3W	<0.0008	<0.0008	<0.0008	-	-
Soluble Nickel	mg/l	3W	<0.005	<0.005	<0.005	-	-
Soluble Silver	mg/l	3W	<0.008	<0.008	<0.008	-	-
Soluble Zinc	mg/l	5W	0.030	0.037	0.0335	0.0049	15

FOR RECRA ENVIRONMENTAL LABORATORIES

DATE

D. V. Finn
6/29/84



ANALYTICAL RESULTS

93rd STREET SCHOOL
NIAGARA FALLS, NY
QUALITY CONTROL

Report Date: 6/29/84

RECOVERY ANALYSIS
SOLID ANALYSES

PARAMETER	SAMPLE IDENTIFICATION	µg OF SPIKE	µg RECOVERED	% RECOVERY
Total Cadmium	MW-3 S-3	1,000	920	92
Total Chromium	MW-3 S-3	1,000	980	98
Hexavalent Chromium	7S	12,000	11,200	93
Total Copper	MW-3 S-3	1,000	1,080	108
Total Iron	MW-3 S-3	1,000	1,030	103
Total Lead	MW-3 S-3	100	110	110
Total Mercury	7S	0.4	0.4	100
Total Nickel	MW-3 S-3	100	111	111
Total Silver	MW-3 S-3	1,000	910	91
Total Zinc	MW-3 S-3	1,000	1,010	101

FOR RECRA ENVIRONMENTAL LABORATORIES

DATE

Q. V. F. [Signature]
6/29/84



RECRA ENVIRONMENTAL LABORATORIES

I.D. #84-512

ANALYTICAL RESULTS

93rd STREET SCHOOL
NIAGARA FALL, NY

Report Date: 6/29/84

REPLICATE ANALYSES
SOLID ANALYSES

PARAMETER	SAMPLE I.D.	UNITS OF MEASURE	VALUE 1	VALUE 2	MEAN	STANDARD DEVIATION	PERCENT COEFFICIENT OF VARIATION
Total Cadmium	MW-3 S-3	ug/g dry	<0.6	<0.6	<0.6	-	-
Total Chromium	MW-3 S-3	ug/g dry	25.8	27.29	26.5	1.05	3.9
Hexavalent Chromium	MW-3 S-3	ug/g dry	<2	<2	<2	-	-
Total Copper	MW-3 S-3	ug/g dry	19.6	22.2	20.9	1.82	8.8
Total Iron	7S	ug/g dry	9236	9289	9262	38	0.4
Total Lead	7S	ug/g dry	17.47	15.6	16.55	1.3	7.9
Total Mercury	7S	ug/g dry	<0.2	<0.2	<0.2	-	-
Total Nickel	MW-3 S-3	ug/g dry	40.1	41.77	40.9	1.17	2.9
Total Silver	7S	ug/g dry	<0.7	<0.7	<0.7	-	-
Total Zinc	MW-3 S-3	ug/g dry	55.2	59.16	57.2	2.8	4.9

FOR RECRA ENVIRONMENTAL LABORATORIES

DATE



RECRA ENVIRONMENTAL LABORATORIES

I.D. #84-512

PROJECT #: 2EM84001.4000 PROJECT NAME: DEC Superfund
STUDY AREA: 93rd street school SAMPLERS SIGNATURE: Robert D. Boney

Date of Disposal: _____

PROJECT #: 26M84001, 4000 PROJECT NAME: DELSUPERFUND
STUDY AREA: 93rd. street school SAMPLERS SIGNATURE: Rakot P. Tsamir

Received for Laboratory: new

Job #: 84-512A

Date/Time: 5-25-84 400 PM

Authorization for Disposal _____

Type of Disposal: _____

Date of Disposal: _____

PROJECT #: 2EM84001.4006 PROJECT NAME: DEC SUPERFUND
STUDY AREA: 93rd street school SAMPLERS SIGNATURE: Robert P. Bauer

Received for Laboratory: Law

Job #: 84-512B

Date/Time: 5-29-84 3:30 PM

Authorization
for Disposal _____

Type of Disposal: _____

Date of Disposal: _____

**RECRA RESEARCH, INC.
CHAIN OF CUSTODY RECORD**

PROJECT #: 2EM5401.420 PROJECT NAME: NYSDEC Superfund, Phase II
 STUDY AREA: 93rd Street School SAMPLERS SIGNATURE: James K. Stachewski

STATION #		DATE	TIME	SUBSAMPLE CODES	TOTAL # OF SAMPLES	REMARKS
MW-1	S-2	5/7/84		2-4 ft.	2	16 oz jar
MW-1	S-3	5/7/84		4-6 ft.	2	" "
MW-1	S-7	5/7/84		12-14 ft.	2	" "
MW-1	S-13	5/7/84		24-26 ft.	2	" "
MW-2	S-4	5/14/84		6-7 ft.	1	" "
MW-2	S-5	5/14/84		8-9 ft.	1	" "
MW-2	S-6	5/14/84		11-12 ft.	1	" "
MW-2	S-3	5/14/84		20.5-21.5 ft.	1	" "
Relinquished By: <u>James K. Stachewski</u>		Date/Time: <u>5-14-84 12:00 pm</u>		Received By: <u>J. J. Hoxie</u>	Comments:	
Relinquished By:		Date/Time:		Received By:	Comments:	
Method of Shipment:		Shipped By:		Received By:	Comments:	

Received for Laboratory: Law

Job #: 84-512C

Date/Time: 5-31-84

Authorization for Disposal _____

Type of Disposal: _____

Date of Disposal: _____

**RECRA RESEARCH, INC.
CHAIN OF CUSTODY RECORD**

PROJECT #: 2EM84001.4000 PROJECT NAME: NYSDEC Superfund Phase II
 STUDY AREA: 93rd Street School SAMPLERS SIGNATURE: James K. Stachowski

STATION #		DATE	TIME	SUBSAMPLE CODES	TOTAL # OF SAMPLES	REMARKS
MW-3	S-1	5/16/84		0-2 ft.	1	16 oz. jar
MW-3	S-3	5/16/84		5-6 ft.	1	" "
MW-3	S-7	5/16/84		15-17 ft.	1	" "
MW-3	S-9	5/16/84		25.0 - 26.5 ft.	1	" "
MW-4	S-1	5/17/84		0-2 ft.	1	" "
MW-4	S-3	5/17/84		4-6 ft.	1	" "
MW-4	S-6	5/17/84		15-17 ft.	1	" "
MW-4	S-8	5/17/84		23.5 - 25.5 ft.	1	" "
Relinquished By: <u>James K. Stachowski</u>		Date/Time: <u>5-17-84 10:00 AM</u>	Received By: <u>A. J. Frost</u>		Comments:	
Relinquished By: <u> </u>		Date/Time: <u> </u>	Received By: <u> </u>		Comments:	
Method of Shipment: <u> </u>		Shipped By: <u> </u>	Received By: <u> </u>		Comments:	

Received for Laboratory: James K. Stachowski
 Job #: 84-512C
 Date/Time: 5-31-84

Authorization for Disposal:
 Type of Disposal:
 Date of Disposal:

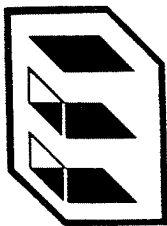
RECRA RESEARCH, INC.
CHAIN OF CUSTODY RECORD

PROJECT #: 2EM 84001.4000 PROJECT NAME: DEL SUPERFUND
STUDY AREA: 93RD street school SAMPLERS SIGNATURE: Robert P. Baur

STATION #	DATE	TIME	SUBSAMPLE CODES	TOTAL # OF SAMPLES	REMARKS
1C	5-24-84	1045		3	1-16079/100's
2C	}	1115		3	}
3C		1200		3	
4C		1330		3	
6S		1400		3	
7S		1430		3	
8S	↓	1445		3	↓
9S		1500		3	
Relinquished By: <u>Robert P. Baur</u>		Date/Time: <u>5-24-84/1600</u>	Received By: <u>[Signature]</u>	Comments:	
Relinquished By:		Date/Time:	Received By:	Comments:	
Method of Shipment:		Shipped By:	Received By:	Comments:	

Received for Laboratory: [Signature]
Job #: ~~84-4730~~ 84-512C
Date/Time: 5-31-84

Authorization for Disposal: _____
Type of Disposal: _____
Date of Disposal: _____



ENVIRODYNE ENGINEERS

2023-00302
August 17, 1984
2023-00302

August 17, 1984
2023-00302

Mr. Steven Frost
RECRA Research
4248 Ridge Lea Road
Amherst, NY

Dear Mr. Frost:

Enclosed are the results of analysis of four water samples and two soil samples for 2,3,7,8-TCDD. The contents of this report are listed on the following page.

Sample Preparation/Analysis - The water samples were prepared and analyzed using the procedures described in Method 613 ("Test Methods for Organic Chemical Analysis of Municipal and Industrial Wastewater," USEPA, EMSL-Cincinnati, July 1982) with one modification. A surrogate (^{37}Cl -2,3,7,8-TCDD) is added to the aqueous sample prior to extraction. Surrogate recoveries in each sample were listed in the data summary.

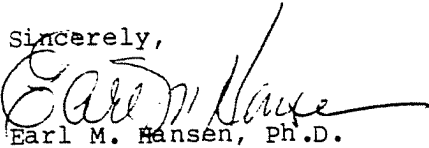
The soil samples were prepared and analyzed according to the procedures in "Determination of 2,3,7,8-TCDD in Soil and Sediment Using HRGC/LRMS," (USEPA, Washington, DC, December 1982).

For each type of sample (soil and water), one sample was analyzed in duplicate. For the water, we have included a method blank spiked at 10 ppt with native 2,3,7,8-TCDD. The chain of custody information in Attachment 5 gives EEI sample numbers assigned to RECRA site identification.

Results - Two of the water sample (62682, 62683) contain native 2,3,7,8-TCDD. One other sample (62681) and duplicate show response at m/z 320, 322 and 257 which are indicative of 2,3,7,8-TCDD. However, in one case (FRN 11154), the response at m/z 257 is not 2.5 times noise (as required by the method). In the other case (FRN 11155), the ratio of m/z 320/322 is outside acceptable criteria and the response at m/z 257 is also not 2.5 times noise.

If you have any questions regarding this data, please contact me.

Sincerely,


Earl M. Hansen, Ph.D.
Senior Associate

EMH/csg
Enclosures

TABLE OF CONTENTS

Table No.

1	Data Summary
2	Continuing Calibration Summary
3	Quality Control
4	GC Operating Conditions

Attachment No.

1	Mass Chromatograms, Column Performance Check
2	Mass Chromatograms Standards
3	Mass Chromatograms Samples
4	GC/MS Calculation Notebook Pages
5	Chain of Custody/Packing List

Lab: Envirodyne Engineers, Inc.

Case No.: 2023-302

Batch/ Shipment No.:

TABLE 1. TCDD DATA REPORT FORM

Report Date: 8/17/84

Column: SP-2330

Batch/Shipment No.:										Relative Ion		Surrogate		Relative Ion Abundance				FRN	
Sample Number	EDb	ECb (liters)	Volume	TCDD (ppb) Meas.	D.L.	Instr. I.D.	Date	Time	Abundance		Meas. %	Accy	Abundance				No.		
									320/322	332/334			320	322	257	328a		332	334
Water:																			
MB	7/30	Y	1.0	-	0.001	2	8/3	1840	0.66	0.78	9.51	95	29	44	-	1581	3575	4574	11151
MR spike	7/30	Y	1.0	0.012	-	2	8/3	1910	0.82	0.79	10.7	107	2969	3626	1137	6480	13058	16530	11152
62680 (MW-1)	7/30	Y	1.0	-	0.001	2	8/3	1941	1.18	0.79	9.79	98	67	57	-	3449	7623	9649	11153
62681 (MW-3)	7/30	Y	1.0	-	0.003	2	8/3	2012	0.82	0.77	9.93	99	150	182	78	1389	2991	3864	11154
62681 Dup.	7/30	Y	1.0	-	0.001	2	8/3	2044	0.92	0.77	10.2	102	93	101	99	1998	4183	5424	11155
62682 (1W)	7/30	Y	1.0	0.004	-	2	8/3	2115	0.78	0.79	10.3	103	462	53	217	3277	6902	8698	11156
62683 (2W)	7/30	Y	0.95	0.007	-	2	8/3	2145	0.82	0.80	9.80	98	947	1158	400	3769	8349	10494	11157
Soil:																			
Wet Weight (grams)																			
62684 (MW-2)	8/1	Y	10.1	-	0.17	2	8/3	2220	1.06	0.80	9.29	93	160	151	125	1829	4273	5375	11158
62685 (MW-4)	8/1	Y	10.0	0.96	-	2	8/3	2323	0.86	0.76	9.64	96	239	278	135	584	1284	1687	11160
62685 Dup.	8/1	Y	10.1	2.3	-	2	8/3	2354	0.79	0.79	9.37	94	1882	2392	809	1940	4489	5657	11161
MR	8/1	Y	10.0	-	0.24	2	8/4	1800	0.95	0.79	9.34	93	63	66	-	1422	3288	4177	11174

Notes: RB = Reagent Blank P = Partial Scan/Confirmatory Analysis D = Duplicate/Portified Field Blank N = Native TCDD Spike
 FB = Field Blank FRN = File Reference Number D.L. = Detection Limit ND = Not Detected

aCorrected for contribution by native TCDD; 0.9% of m/z 322 subtracted.
 bED = Extraction Date; EC = Extra Cleanup.

TABLE 2. INITIAL CALIBRATION SUMMARY
Case: 2023-302

Instr. I.D.	FRN Number	Date (1984)	Time	Solution I.D.	Peak Area (or Height)						Native RF		Surrogate RF		Isomer Resolution	TCDD
					320	322	323	328	332	334	Measured	Mean	Measured	Mean		
2	11149	8/3	1715	PC	36720	46258	6571	-	8494	10748						5
2	11150	8/3	1755	CC1	17923	22481	-	12887	91172	115504	0.98	0.91	1.02	1.02		
2	11162	8/4	0025	CC1	9008	11339	-	6885	46168	58309	0.97	0.91	1.08	1.02	6	
2	11163	8/4	0100	PC	15187	19361	2625	-	3452	4303					9	
2	11165	8/4	1304	PC	15205	19409	2512	-	3623	4685						
2	11166	8/4	1345	CC1	8093	10123	-	6818	45493	58137	0.88	0.91	1.08	1.02		

Solution ID Codes:

PC = Performance check solution

CC1 = Concentration calibration solution No. 1 = 0.2 ug/ml

CC2 = Concentration calibration solution No. 2 = 1.0 ug/ml

CC3 = Concentration calibration solution No. 3 = 5.0 ug/ml

CC4 = Concentration calibration solution No. 4 = 20.0 ug/ml

CC5 = Concentration calibration solution No. 5 = 40.0 ug/ml

TABLE 3
QUALITY CONTROL SUMMARY

<u>Item</u>	<u>No. of Data Points</u>	<u>Mean $\pm$ SD (%)</u>
Water:		
Surrogate Recovery	6	101 $\pm$ 3.5
Method Blank	1	95
Duplicate Samples	2	NA ^a
Native 2,3,7,8-TCDD	1	120
Soil:		
Surrogate Recovery	3	94.3 $\pm$ 1.5
Method Blank	1	93
Duplicate Samples	2	82

NOTES: ^aBoth values are below the detection limit, so no relative mean difference is calculated.

TABLE 4. GC OPERATING CONDITIONS

Conditions B

Case 2023-302

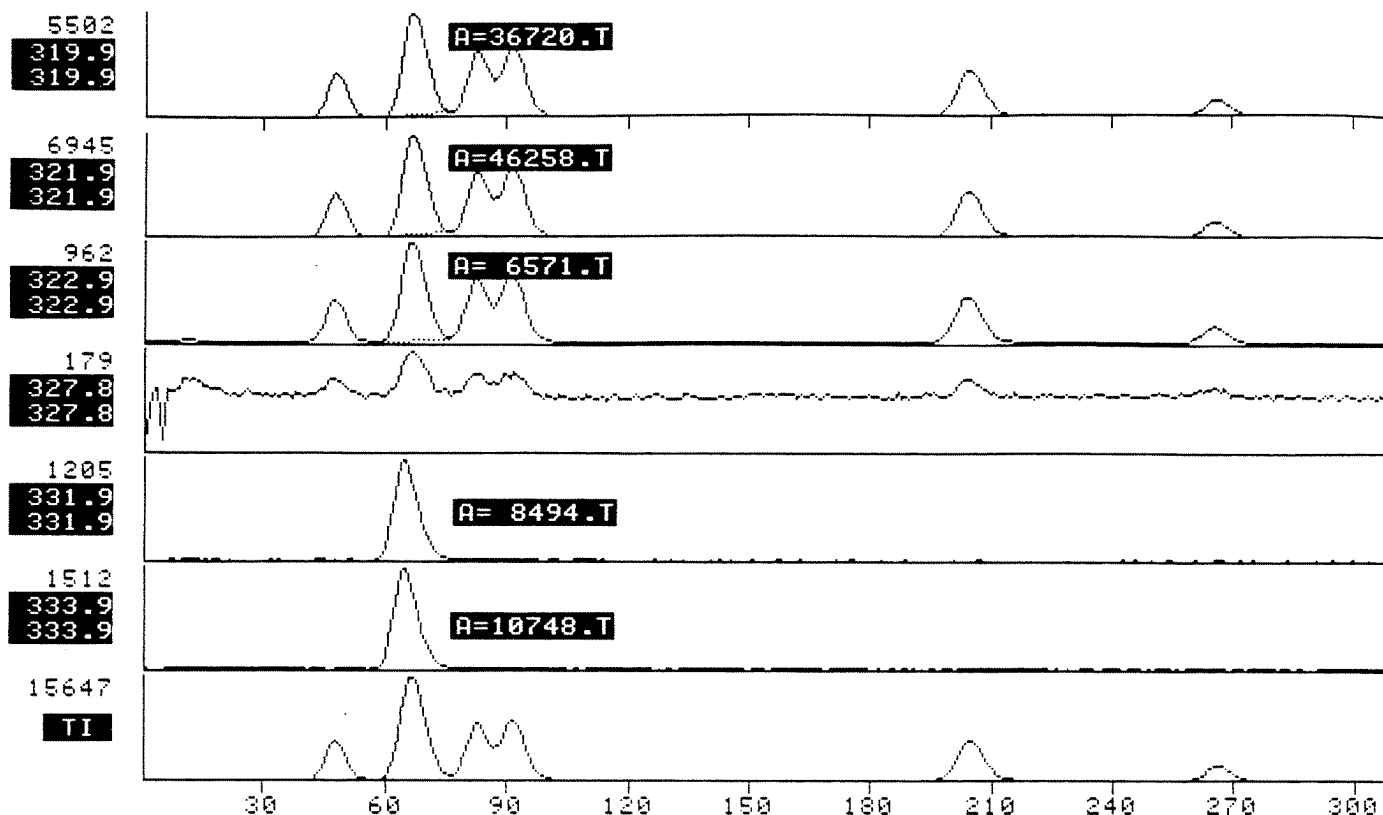
Column Coating	SP-2330
Film Thickness	0.20 μ m
Column Dimensions	60 m x 0.25 mm
Helium	26 psi
Initial Temperature	160°C
Initial Time	3 minutes
Temperature Program	25°/min to 240°C and hold
2,3,7,8-TCDD Retention Time	20.3 minutes

ATTACHMENT 1

MASS CHROMATOGRAM, COLUMN PERFORMANCE CHECK

NAME DIOXIN COL PERF CKECK MIX#2 "COND B" 2UL
 MISC 8-3-84 17:15 J0#

FRN 11149



AREA TABLE ENTRIES: FRN 11149

Entry	Time	Mass	Area	%
1	20.2	319.9	36720.	79.4
2	20.2	321.9	46258.	100.0
3	20.2	322.9	6571.	14.2
4	20.2	331.9	8494.	18.4
5	20.2	333.9	10748.	23.2

CALCULATE % ON ENTRY #:

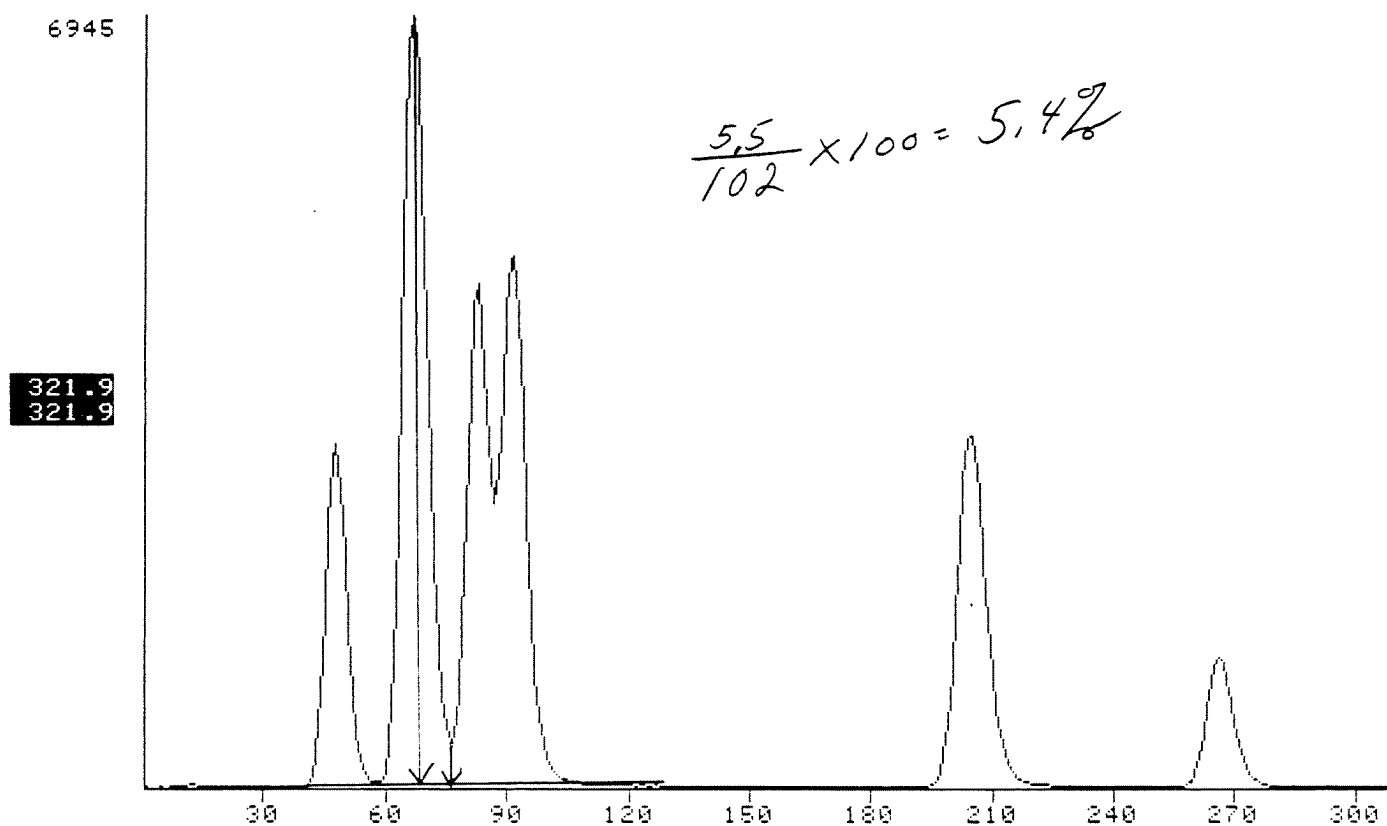
AREA TABLE ENTRIES: FRN 11149

Entry	Time	Mass	Area	%
1	20.2	319.9	36720.	341.7
2	20.2	321.9	46258.	430.4
3	20.2	322.9	6571.	61.1
4	20.2	331.9	8494.	79.0
5	20.2	333.9	10748.	100.0

CALCULATE % ON ENTRY #:

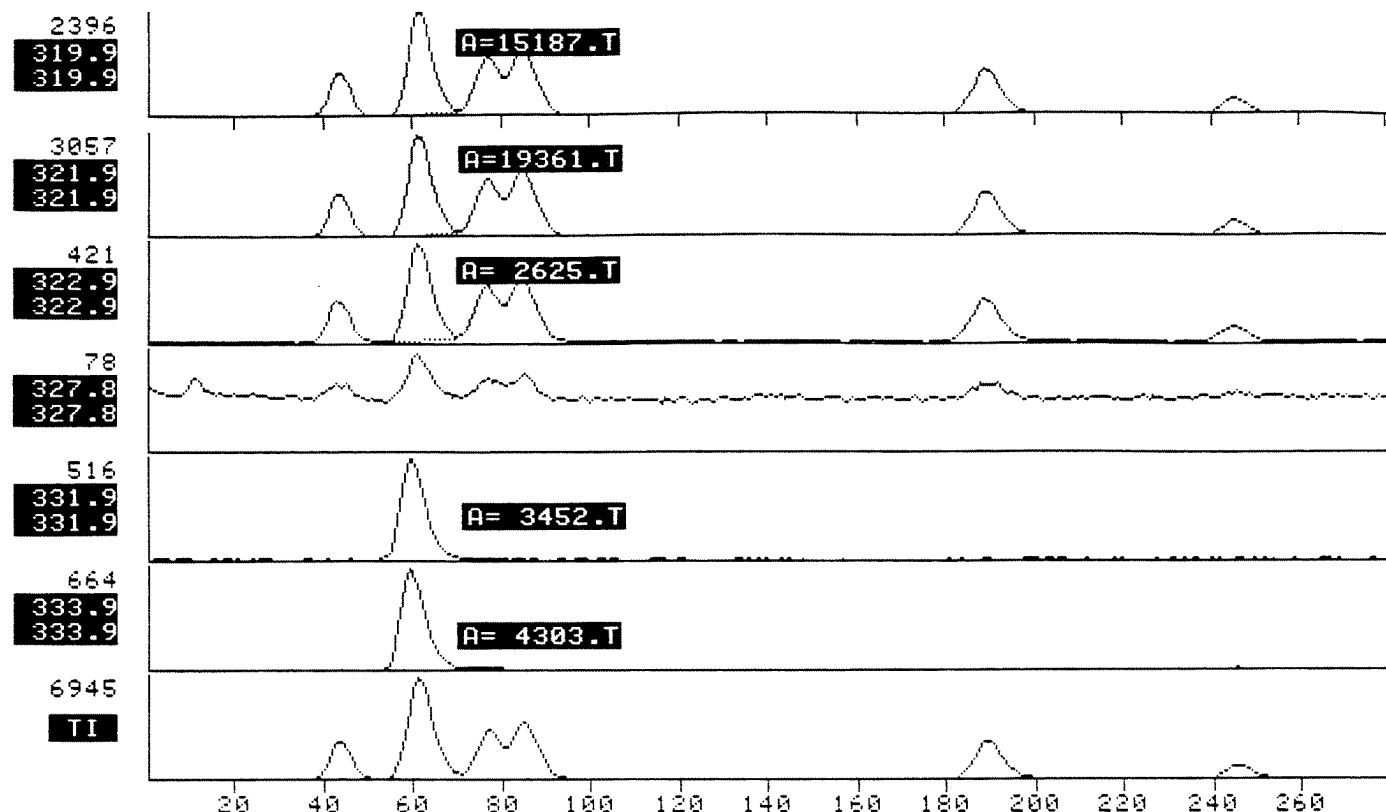
NAME DIOXIN COL PERF CKECK MIX#2 "COND B" 2UL
MISC 8-3-84 17:15 J0\$

FRN 11149



NAME DIOXIN COL PERF CHECK MIX#2 2UL
 MISC 8-4-84 01:00 JCS

FRN 11163



AREA TABLE ENTRIES: FRN 11163

Entry	Time	Mass	Area	%
1	20.2	319.9	15187.	78.4
2	20.2	321.9	19361.	100.0
3	20.2	322.9	2625.	13.6
4	20.2	331.9	3452.	17.8
5	20.2	333.9	4303.	22.2

CALCULATE % ON ENTRY #:

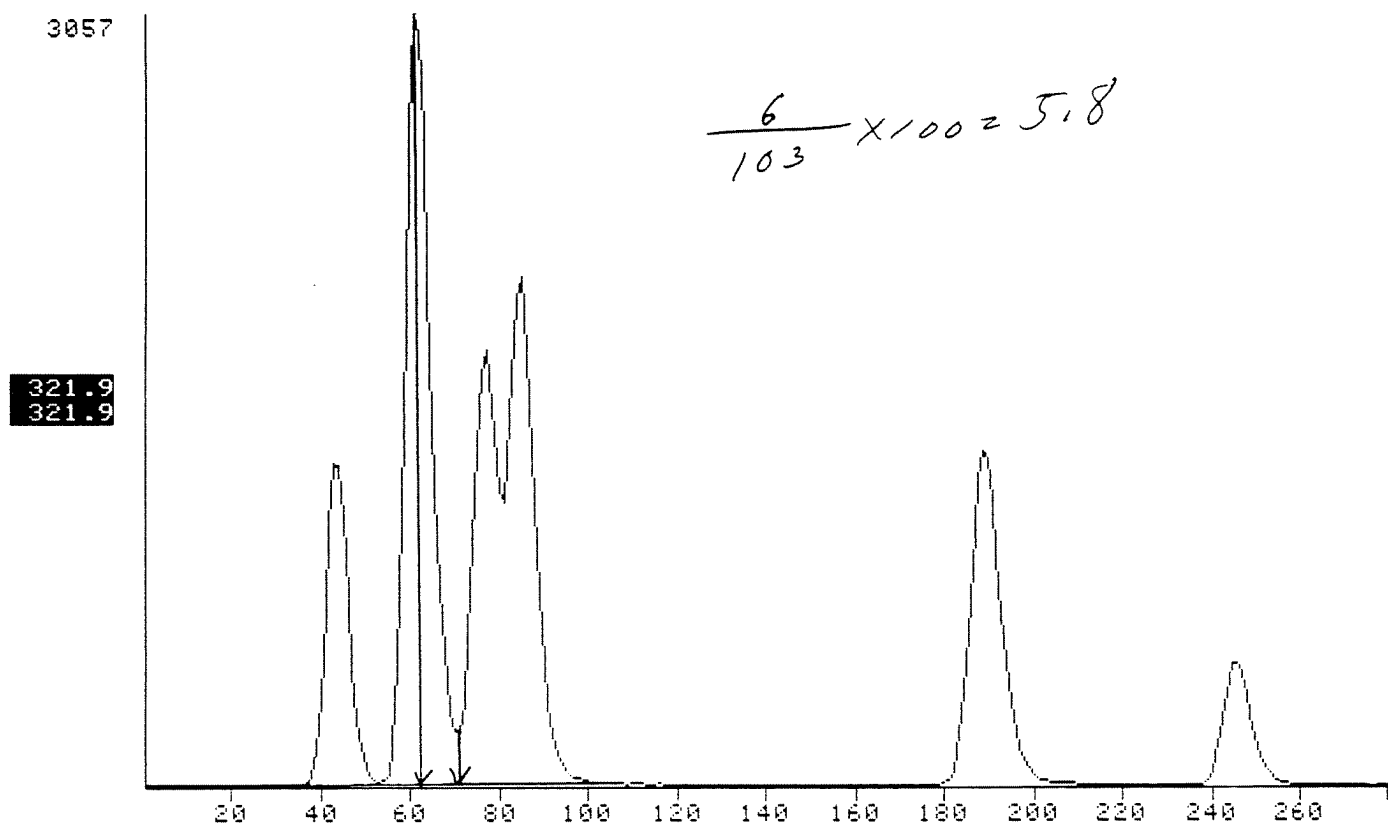
AREA TABLE ENTRIES: FRN 11163

Entry	Time	Mass	Area	%
1	20.2	319.9	15187.	352.9
2	20.2	321.9	19361.	449.9
3	20.2	322.9	2625.	61.0
4	20.2	331.9	3452.	80.2
5	20.2	333.9	4303.	100.0

CALCULATE % ON ENTRY #:

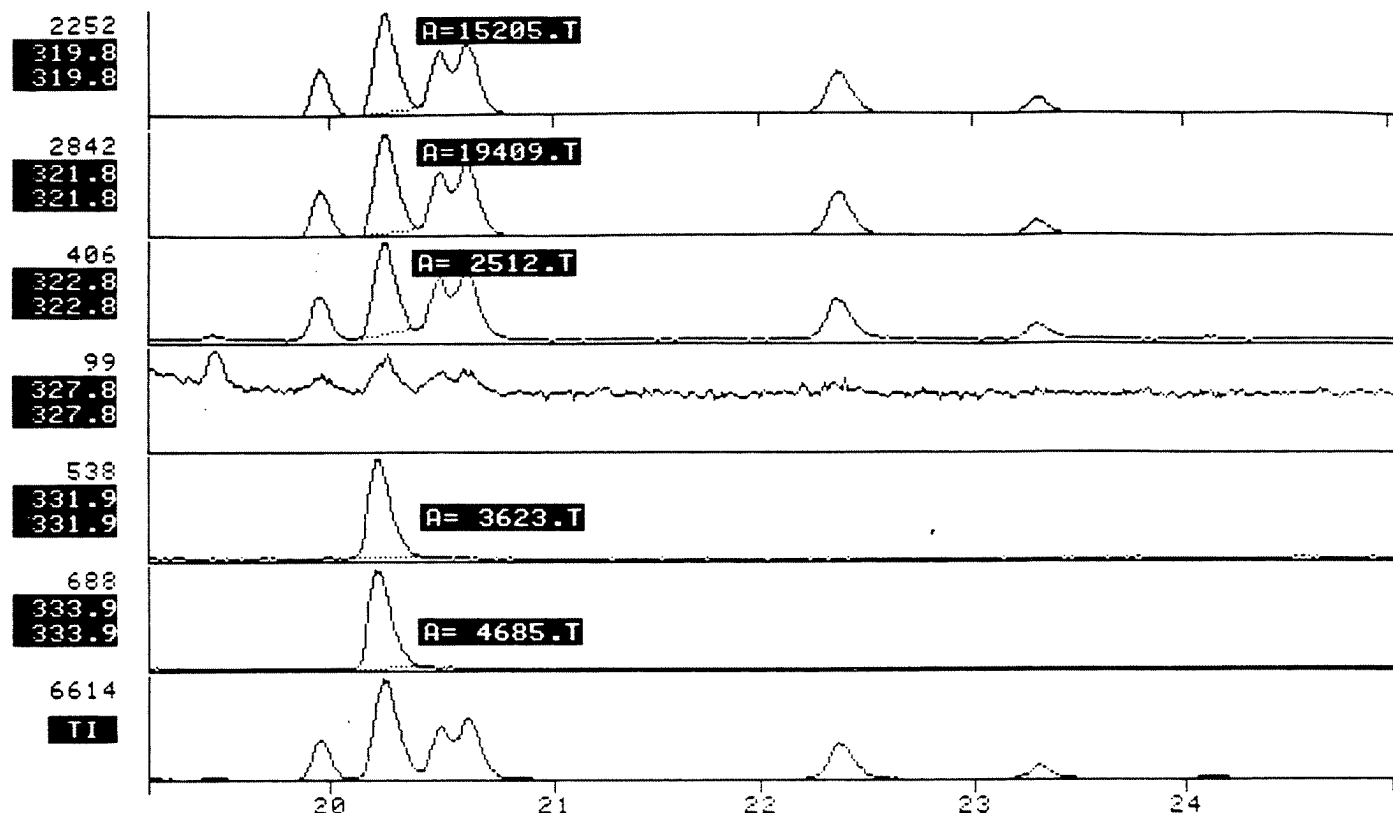
NAME DIOXIN COL PERF CHECK MIX#2 2UL
MISC 8-4-84 01:00 JCS

FRN 11163



NAME 2023 COLUMN PERF. SET COND B 2UL
MISC 8-4-84 1304 JJ0\$

FRN 11165



AREA TABLE ENTRIES: FRN 11165

Entry	Time	Mass	Area	%
1	20.3	319.8	15205.	78.3
2	20.3	321.8	19409.	100.0
3	20.2	322.8	2512.	12.9
4	20.2	331.9	3623.	18.7
5	20.2	333.9	4685.	24.1

CALCULATE % ON ENTRY #:

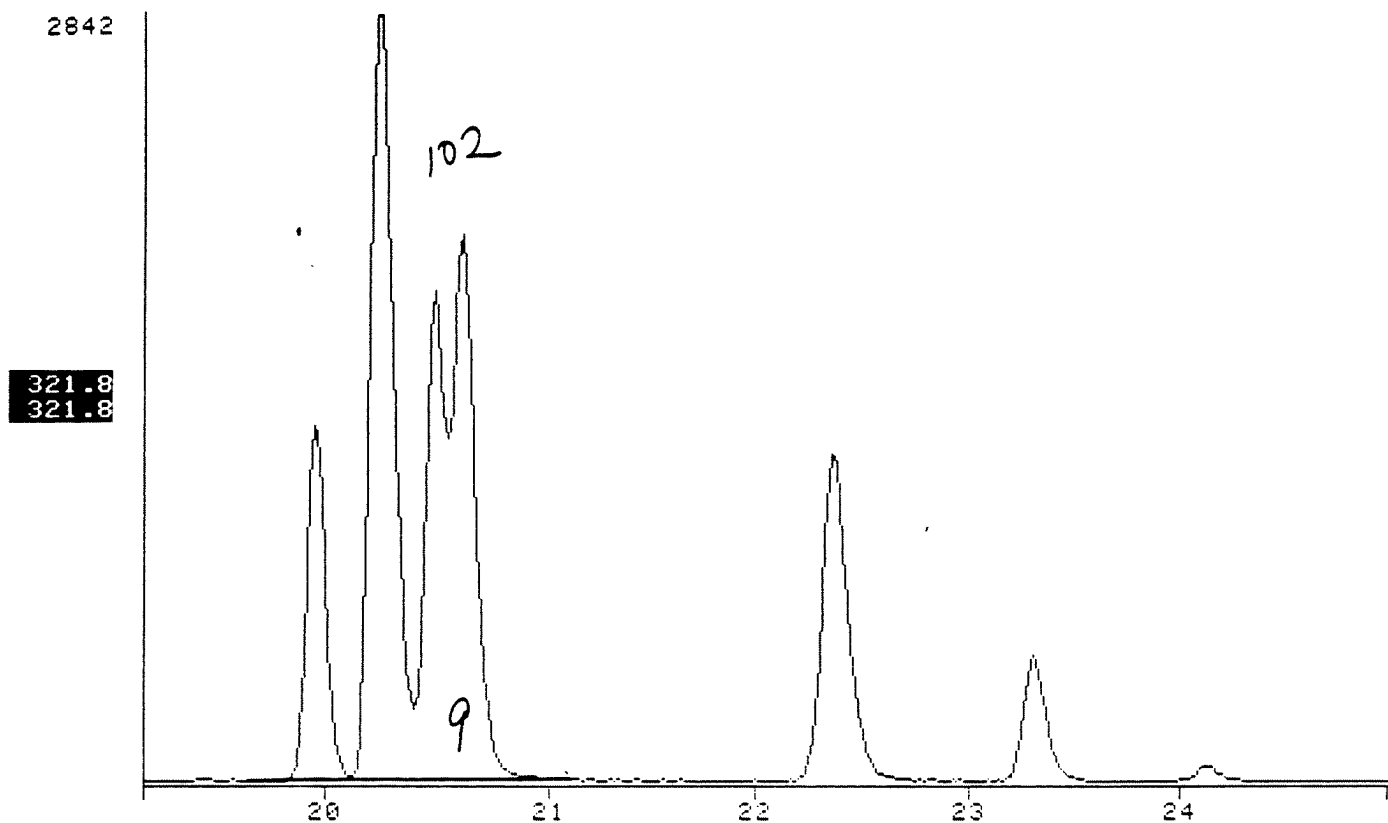
AREA TABLE ENTRIES: FRN 11165

Entry	Time	Mass	Area	%
1	20.3	319.8	15205.	324.6
2	20.3	321.8	19409.	414.3
3	20.2	322.8	2512.	53.6
4	20.2	331.9	3623.	77.3
5	20.2	333.9	4685.	100.0

CALCULATE % ON ENTRY #:

NAME 3023 COLUMN PERF. SET COND B 2UL
MISC 3-4-84 1304 JJ@

FRN 11165



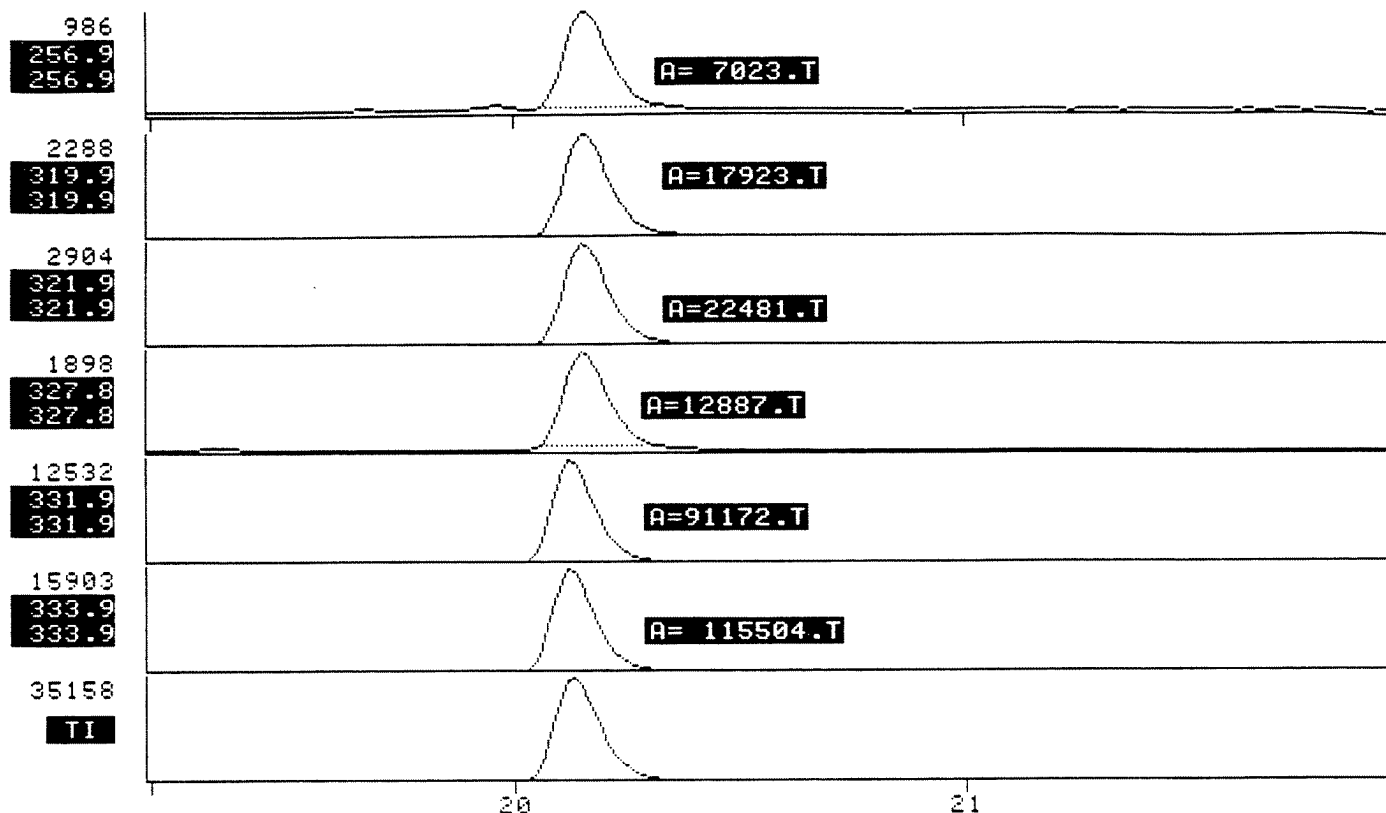
$$\frac{9}{102} \times 100\% = 8.8$$

ATTACHMENT 2

MASS CHROMATOGRAMS STANDARDS

NAME TCDD STD#1 "COND B" 2UL
MISC 8-3-84 17:55 J0\$

FRN 11150



AREA TABLE ENTRIES: FRN 11150

Entry	Time	Mass	Area	%
1	20.2	256.9	7023.	31.2
2	20.2	319.9	17923.	79.7
3	20.2	321.9	22481.	100.0
4	20.2	327.8	12887.	57.3
5	20.2	331.9	91172.	405.6
6	20.2	333.9	115504.	513.8

CALCULATE % ON ENTRY #:

AREA TABLE ENTRIES: FRN 11150

Entry	Time	Mass	Area	%
1	20.2	256.9	7023.	6.1
2	20.2	319.9	17923.	15.5
3	20.2	321.9	22481.	19.5
4	20.2	327.8	12887.	11.2
5	20.2	331.9	91172.	78.9
6	20.2	333.9	115504.	100.0

CALCULATE % ON ENTRY #:

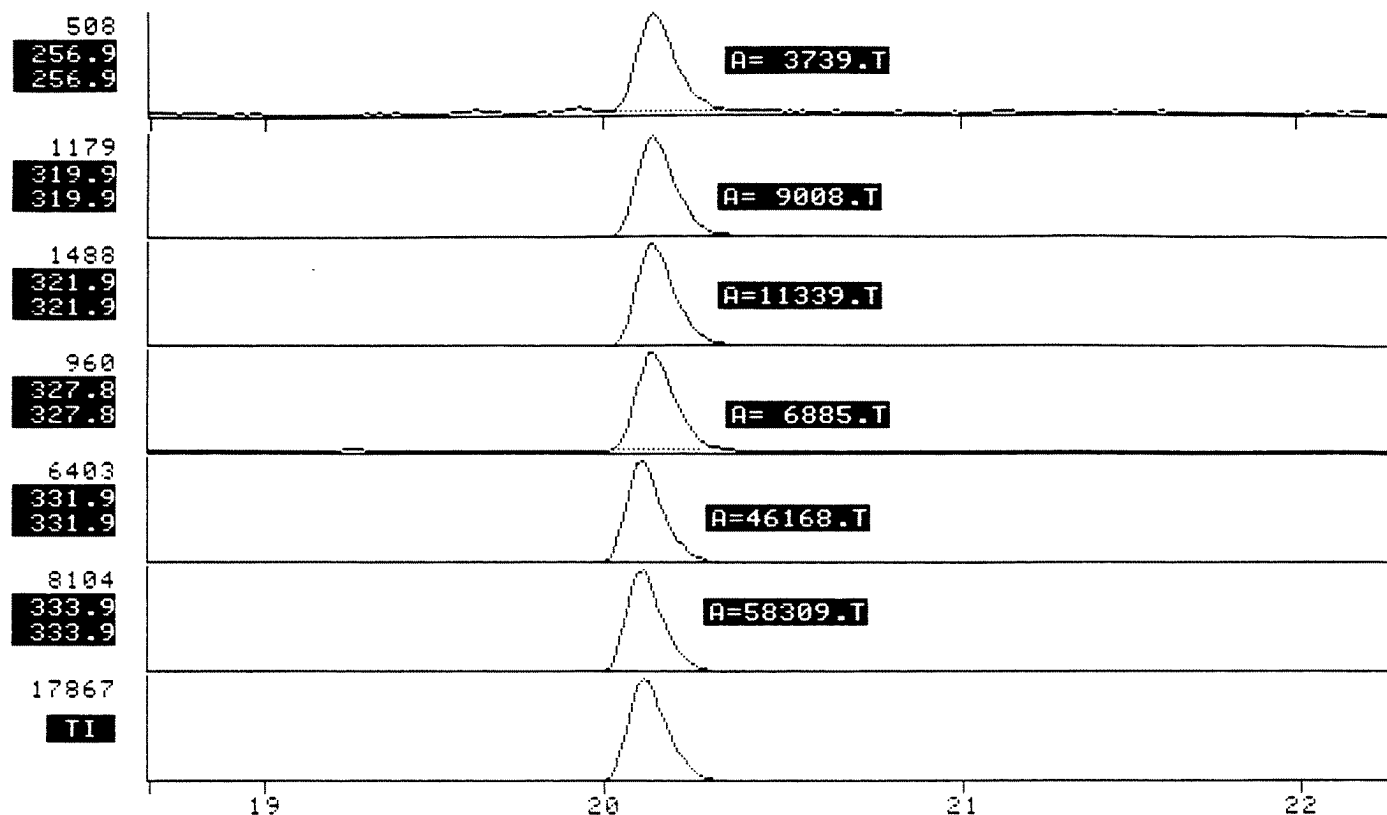
22481
12887 x 0.09 = 202
JCS
8-3-84

$$STD RF = (17923 + 22481) / (91172 + 115504) 0.2 = 0.98$$

$$SGL RF = (12887 - 202) / (91172 + 115504) 0.06 = 1.02$$

NAME TCDD STD#1 "COND B" 2UL
 MISC 8-4-84 00:25 JCS

FRN 11162



AREA TABLE ENTRIES: FRN 11162

Entry	Time	Mass	Area	%
1	20.2	256.9	3739.	33.0
2	20.2	319.9	9008.	79.4
3	20.2	321.9	11339.	100.0
4	20.1	327.8	6885.	60.7
5	20.1	331.9	46168.	407.2
6	20.1	333.9	58309.	514.2

CALCULATE % ON ENTRY #:

AREA TABLE ENTRIES: FRN 11162

Entry	Time	Mass	Area	%
1	20.2	256.9	3739.	6.4
2	20.2	319.9	9008.	15.4
3	20.2	321.9	11339.	19.4
4	20.1	327.8	6885.	11.8
5	20.1	331.9	46168.	79.2
6	20.1	333.9	58309.	100.0

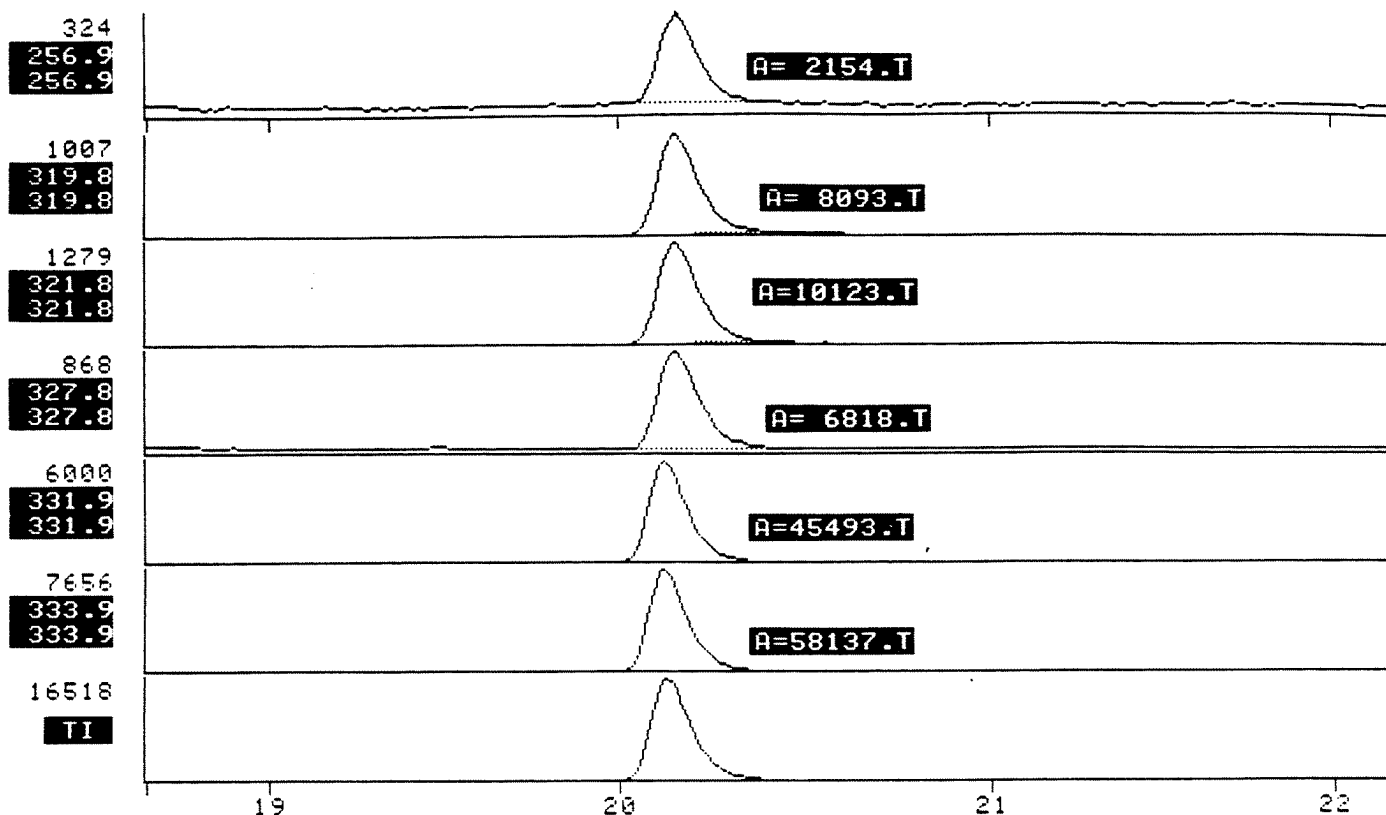
CALCULATE % ON ENTRY #:

$$STD \text{ RF} = (9008 + 11339) / (46168 + 58309) \cdot 0.2 = 0.97$$

$$SURF \text{ RF} = (6885 - 102) / (46168 + 58309) \cdot 0.06 = 1.08$$

NAME TCDD STD #1 COND B 2UL
MISC 8-4-84 1345 JJ0\$

FRN 11166



AREA TABLE ENTRIES: FRN 11166

Entry	Time	Mass	Area	%
1	20.2	256.9	2154.	21.3
2	20.2	319.8	8093.	80.0
3	20.2	321.8	10123.	100.0
4	20.2	327.8	6818.	67.4
5	20.2	331.9	45493.	449.4
6	20.2	333.9	58137.	574.3

CALCULATE % ON ENTRY #:

AREA TABLE ENTRIES: FRN 11166

Entry	Time	Mass	Area	%
1	20.2	256.9	2154.	3.7
2	20.2	319.8	8093.	13.9
3	20.2	321.8	10123.	17.4
4	20.2	327.8	6818.	11.7
5	20.2	331.9	45493.	78.3
6	20.2	333.9	58137.	100.0

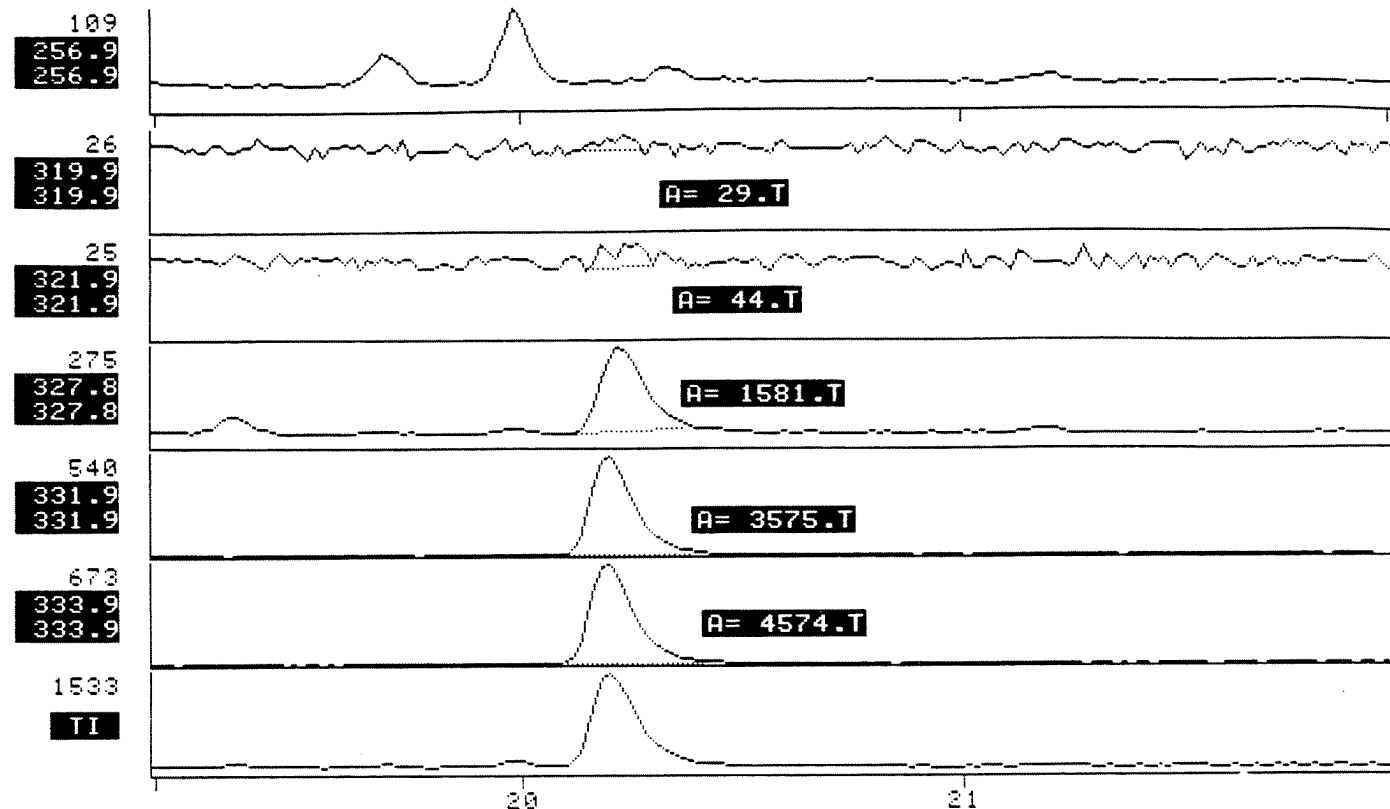
CALCULATE % ON ENTRY #:

ATTACHMENT 3

MASS CHROMATOGRAMS SAMPLES

NAME 2023-302:METHOD BLANK "COND B" 2UL
MISC 8-3-84 18:40 JCS

FRN 11151



AREA TABLE ENTRIES: FRN 11151

Entry	Time	Mass	Area	%
1	20.2	319.9	29.	66.0
2	20.2	321.9	44.	100.0
3	20.2	327.8	1581.	3604.9
4	20.2	331.9	3575.	8152.7
5	20.2	333.9	4574.	10431.1

CALCULATE % ON ENTRY #:

AREA TABLE ENTRIES: FRN 11151

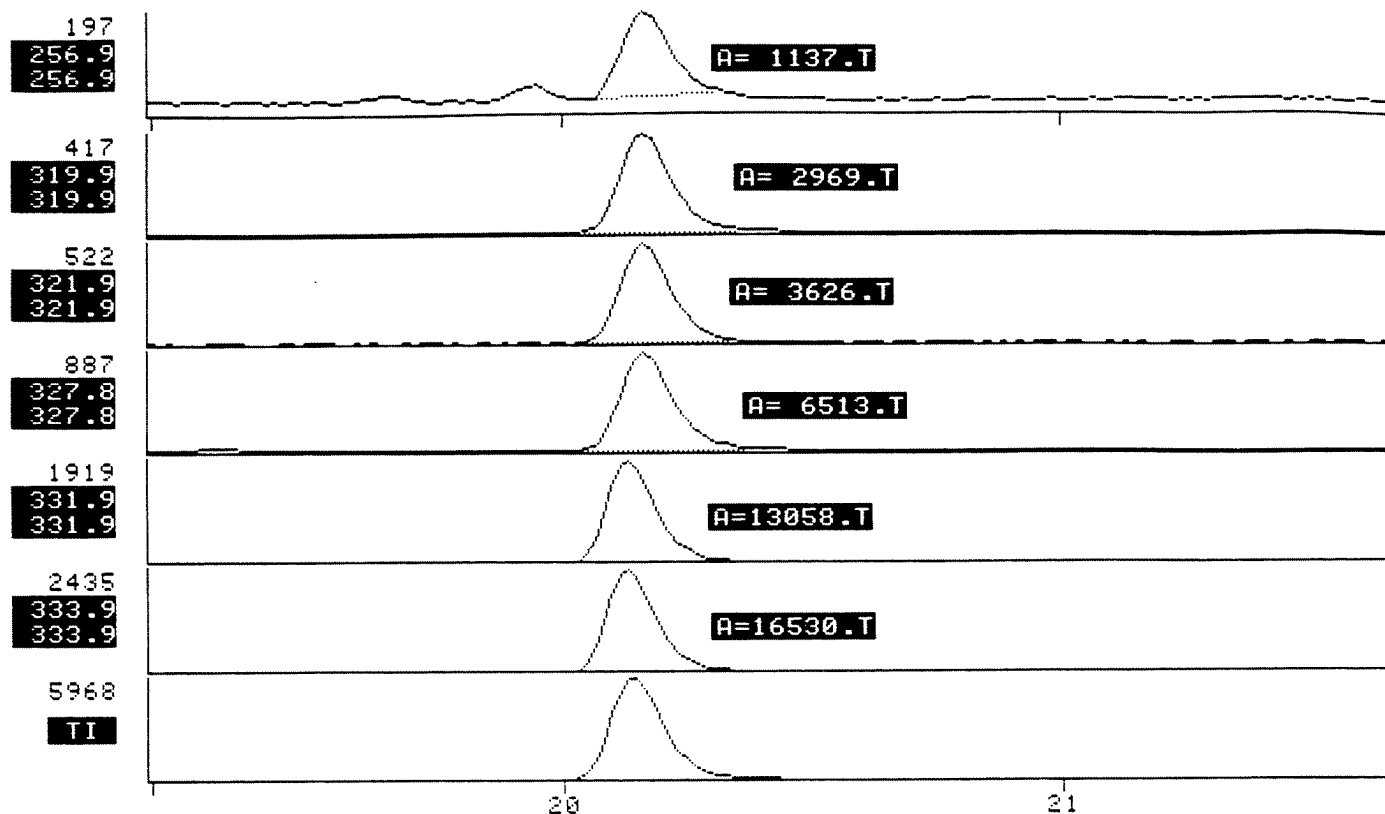
Entry	Time	Mass	Area	%
1	20.2	319.9	29.	.6
2	20.2	321.9	44.	1.0
3	20.2	327.8	1581.	34.6
4	20.2	331.9	3575.	78.2
5	20.2	333.9	4574.	100.0

CALCULATE % ON ENTRY #:



NAME 2023-302:METHOD BLANK SPIKE "COND B" 2UL
 MISC 8-3-84 19:10 JCS

FRN 11152



AREA TABLE ENTRIES: FRN 11152

Entry	Time	Mass	Area	%
1	20.2	256.9	1137.	31.4
2	20.2	319.9	2969.	81.9
3	20.2	321.9	3626.	100.0
4	20.2	327.8	6513.	179.6
5	20.2	331.9	13058.	360.1
6	20.2	333.9	16530.	455.9

CALCULATE % ON ENTRY #:

AREA TABLE ENTRIES: FRN 11152

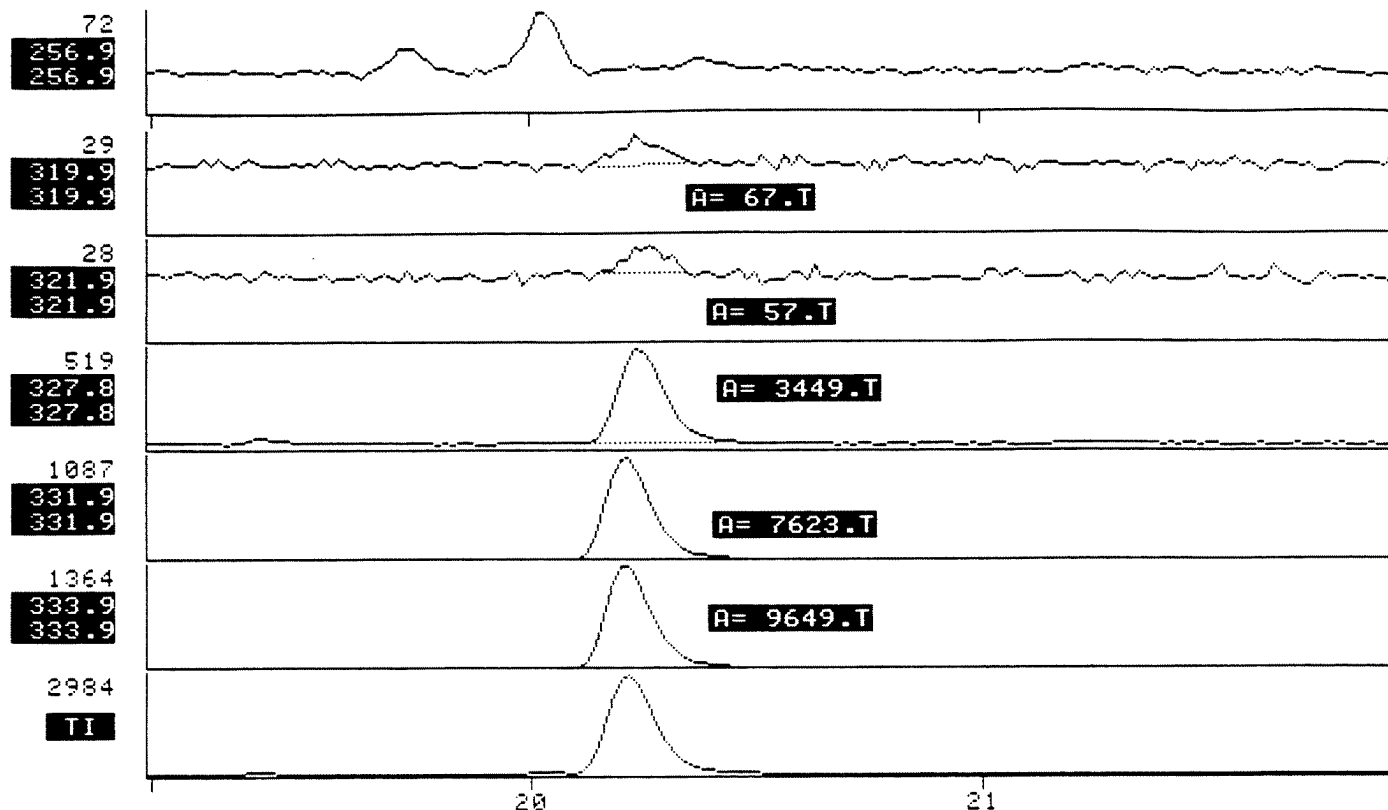
Entry	Time	Mass	Area	%
1	20.2	256.9	1137.	6.9
2	20.2	319.9	2969.	18.0
3	20.2	321.9	3626.	21.9
4	20.2	327.8	6513.	39.4
5	20.2	331.9	13058.	79.0
6	20.2	333.9	16530.	100.0

CALCULATE % ON ENTRY #:

✓

NAME 2023-302:62680 "COND B" 2UL
 MISC 8-3-84 19:41 JCS

FRN 11153



AREA TABLE ENTRIES: FRN 11153

Entry	Time	Mass	Area	%
1	20.2	319.9	67.	116.1
2	20.2	321.9	57.	100.0
3	20.2	327.8	3449.	6000.2
4	20.2	331.9	7623.	13261.4
5	20.2	333.9	9649.	16786.4

CALCULATE % ON ENTRY #:

AREA TABLE ENTRIES: FRN 11153

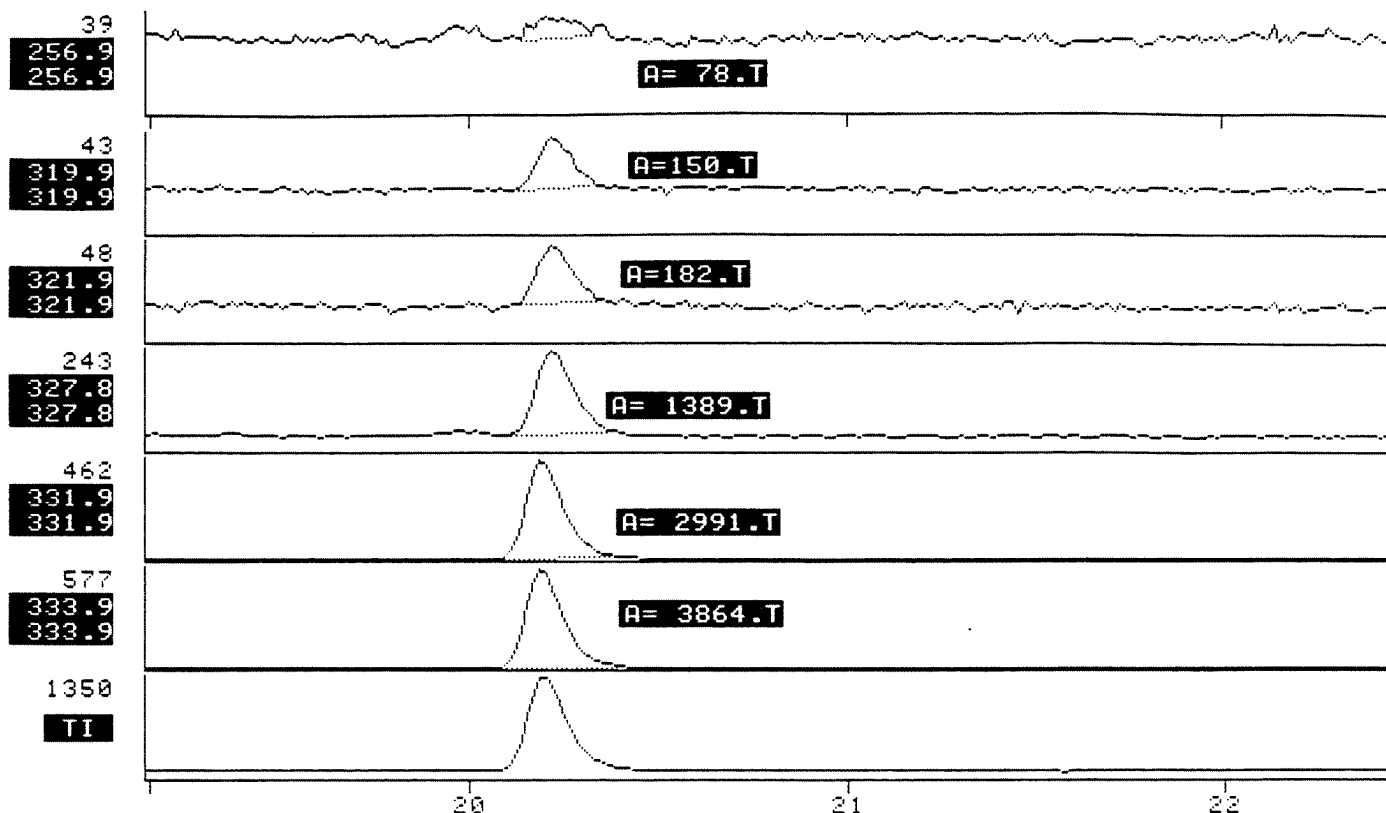
Entry	Time	Mass	Area	%
1	20.2	319.9	67.	.7
2	20.2	321.9	57.	.6
3	20.2	327.8	3449.	35.7
4	20.2	331.9	7623.	79.0
5	20.2	333.9	9649.	100.0

CALCULATE % ON ENTRY #:

✓

NAME 2023-302:62681 "COND B" 2UL
 MISC 8-3-84 20:12 JCS

FRN 11154



AREA TABLE ENTRIES: FRN 11154

Entry	Time	Mass	Area	%
1	20.2	256.9	78.	42.9
2	20.2	319.9	150.	82.4
3	20.2	321.9	182.	100.0
4	20.2	327.8	1389.	761.8
5	20.2	331.9	2991.	1640.4
6	20.2	333.9	3864.	2119.1

CALCULATE % ON ENTRY #:

AREA TABLE ENTRIES: FRN 11154

Entry	Time	Mass	Area	%
1	20.2	256.9	78.	2.0
2	20.2	319.9	150.	3.9
3	20.2	321.9	182.	4.7
4	20.2	327.8	1389.	35.9
5	20.2	331.9	2991.	77.4
6	20.2	333.9	3864.	100.0

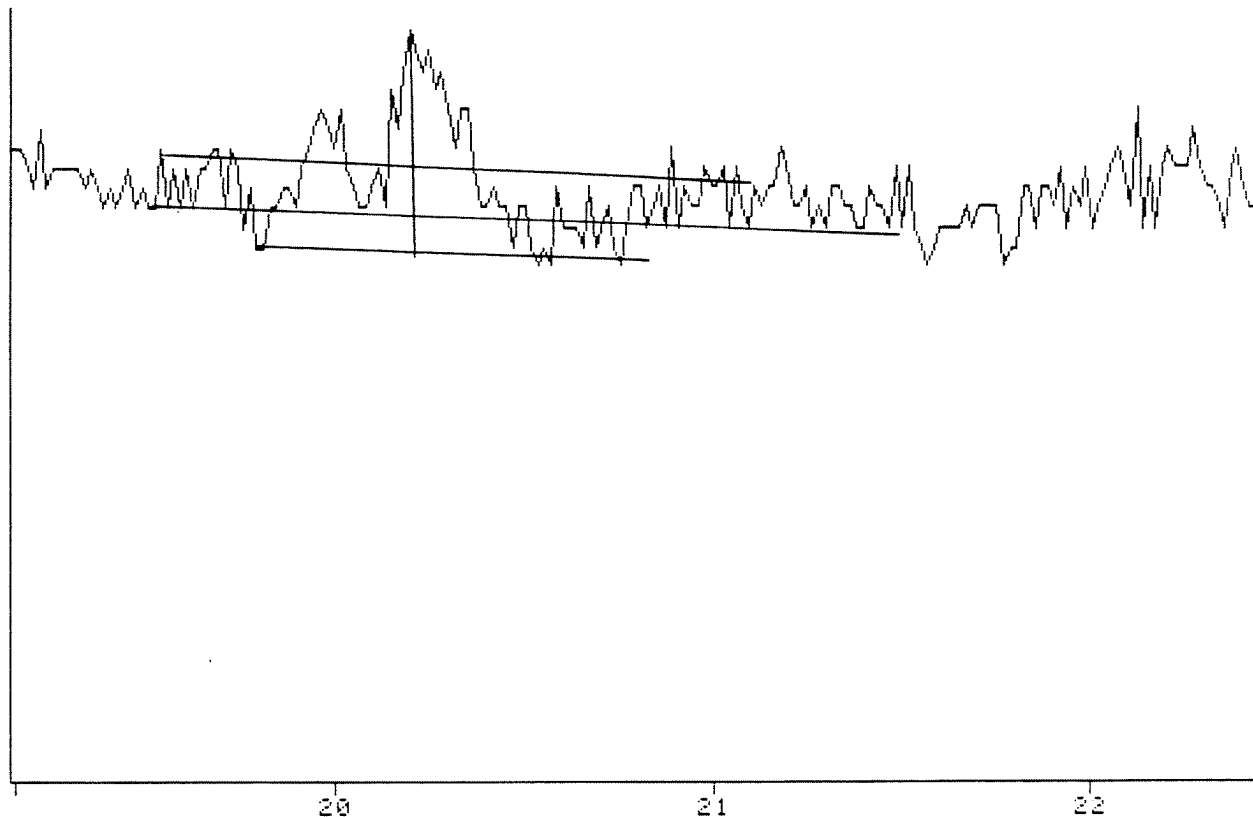
CALCULATE % ON ENTRY #:



NAME 2023-302:62681 "COND B" 2UL
MISC 8-3-84 20:12 JCS

FRN 11154

39



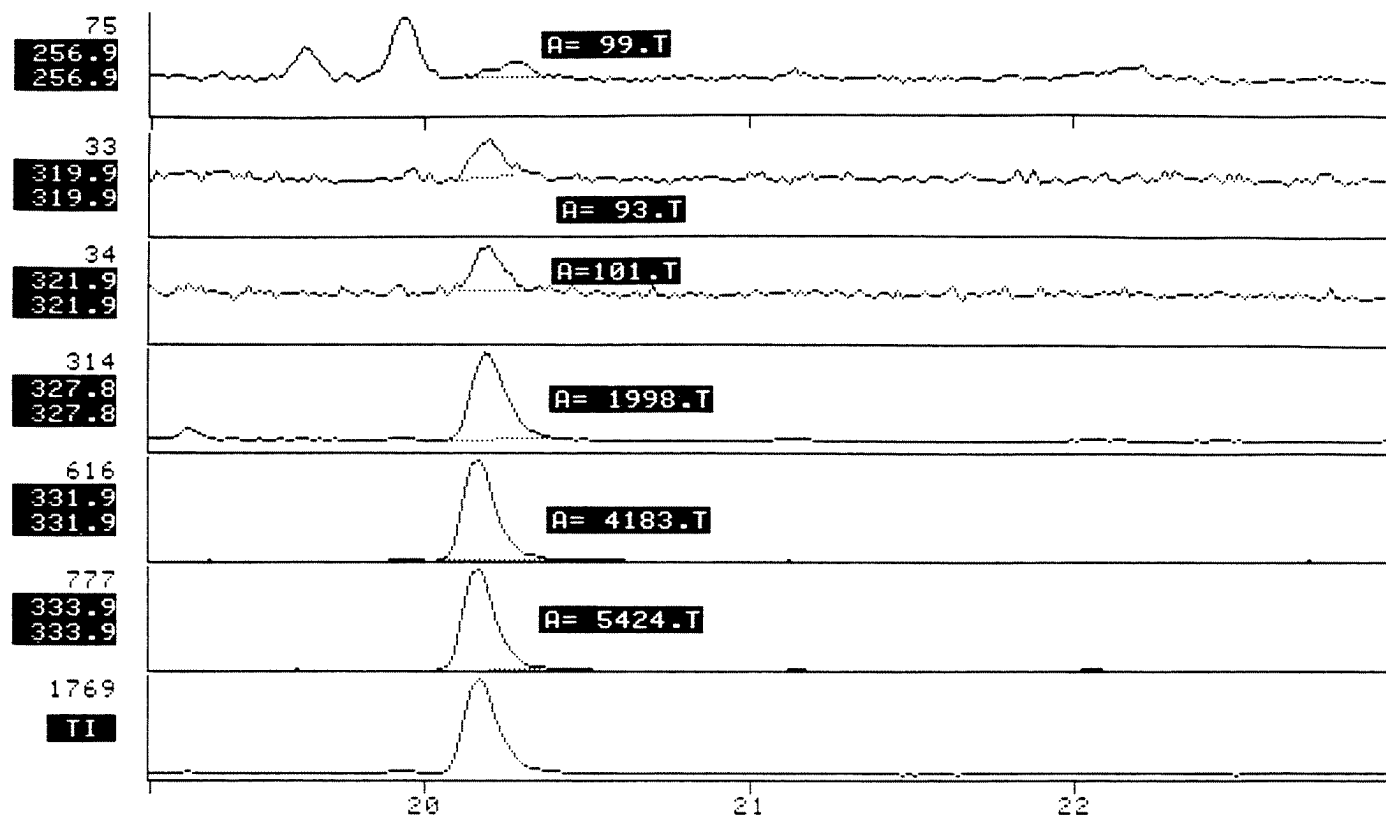
256.9
256.9

peak not $2.5 \times$ noise

✓

NAME 2023-302:62681 DUP "COND B" 2UL
 MISC 8-3-84 20:44 JCS

FRN 11155



AREA TABLE ENTRIES: FRN 11155

Entry	Time	Mass	Area	%
1	20.2	256.9	99.	98.3
2	20.2	319.9	93.	91.7
3	20.2	321.9	101.	100.0
4	20.2	327.8	1998.	1978.0
5	20.2	331.9	4183.	4140.6
6	20.2	333.9	5424.	5369.1

CALCULATE % ON ENTRY #:

AREA TABLE ENTRIES: FRN 11155

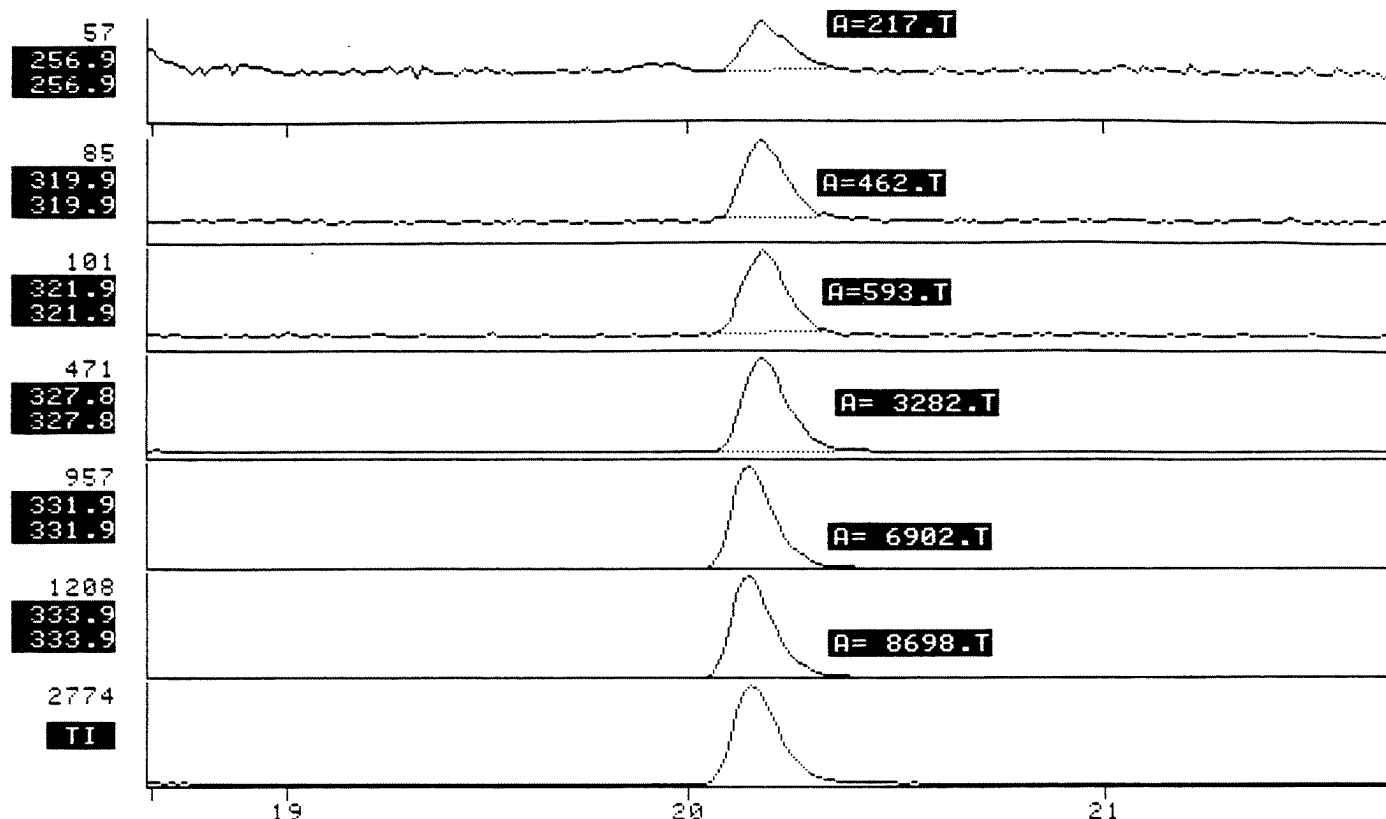
Entry	Time	Mass	Area	%
1	20.2	256.9	99.	1.8
2	20.2	319.9	93.	1.7
3	20.2	321.9	101.	1.9
4	20.2	327.8	1998.	36.8
5	20.2	331.9	4183.	77.1
6	20.2	333.9	5424.	100.0

CALCULATE % ON ENTRY #:



NAME 2023-302:62682 "COND B" 2UL
 MISC 8-3-84 21:15 J@S

FRN 11156



AREA TABLE ENTRIES: FRN 11156

Entry	Time	Mass	Area	%
1	20.2	256.9	217.	36.7
2	20.2	319.9	462.	77.8
3	20.2	321.9	593.	100.0
4	20.2	327.8	3282.	553.3
5	20.2	331.9	6902.	1163.7
6	20.2	333.9	8698.	1466.5

CALCULATE % ON ENTRY #:

AREA TABLE ENTRIES: FRN 11156

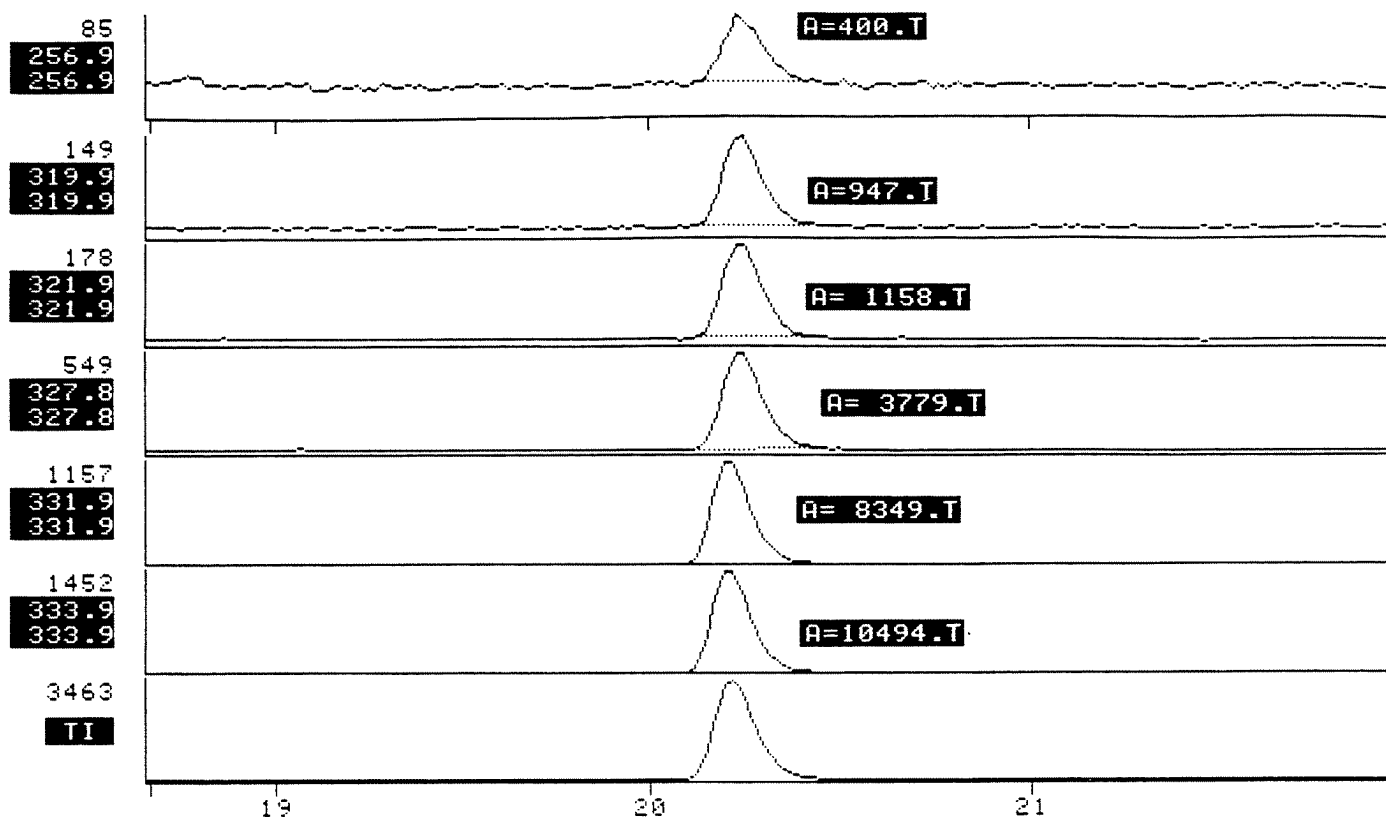
Entry	Time	Mass	Area	%
1	20.2	256.9	217.	2.5
2	20.2	319.9	462.	5.3
3	20.2	321.9	593.	6.8
4	20.2	327.8	3282.	37.7
5	20.2	331.9	6902.	79.4
6	20.2	333.9	8698.	100.0

CALCULATE % ON ENTRY #:



NAME 2023-302:62683 "COND B" 2UL
 MISC 8-3-84 21:45 JCS

FRN 11157



AREA TABLE ENTRIES: FRN 11157

Entry	Time	Mass	Area	%
1	20.2	256.9	400.	34.5
2	20.3	319.9	947.	81.8
3	20.3	321.9	1158.	100.0
4	20.3	327.8	3779.	326.4
5	20.2	331.9	8349.	721.0
6	20.2	333.9	10494.	906.3

CALCULATE % ON ENTRY #:

AREA TABLE ENTRIES: FRN 11157

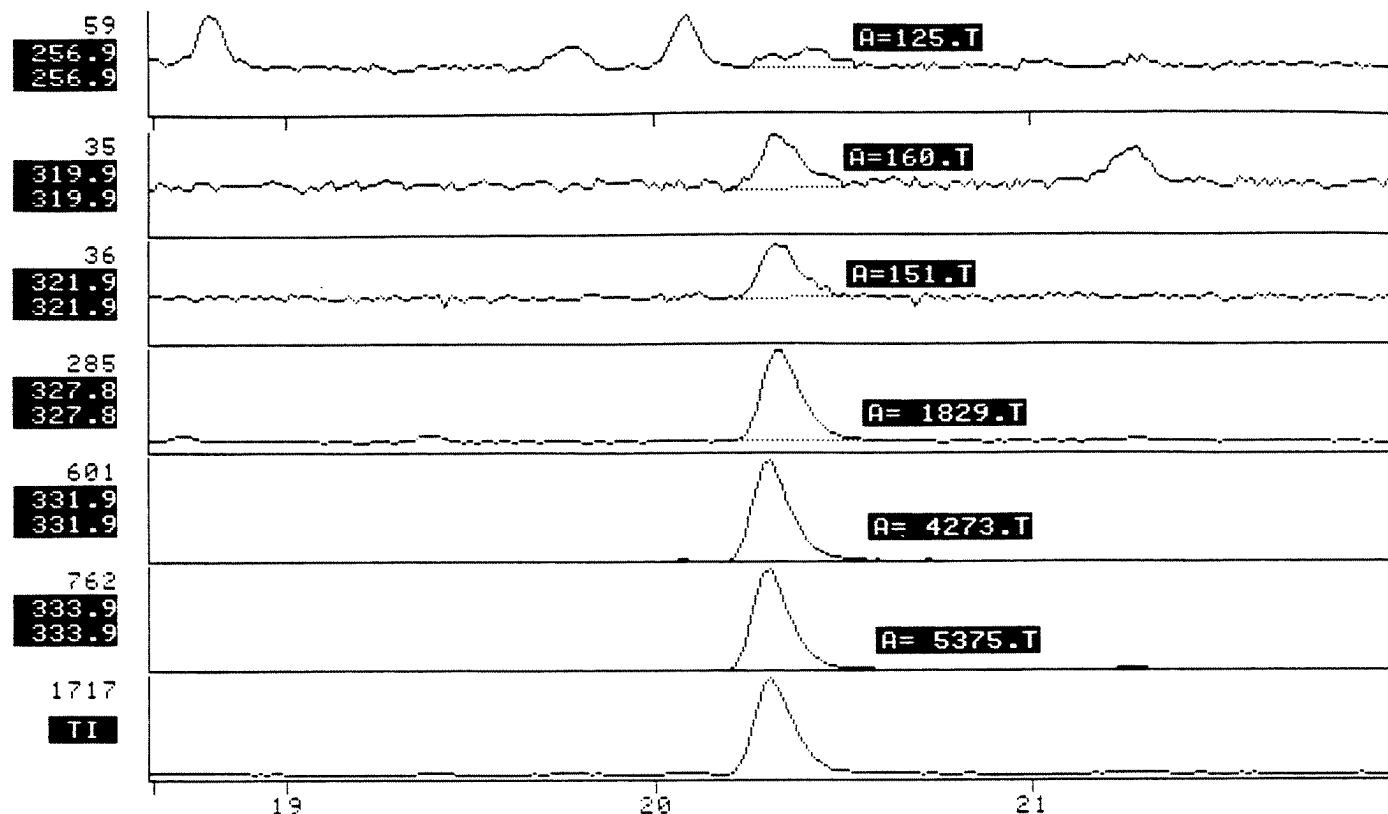
Entry	Time	Mass	Area	%
1	20.2	256.9	400.	3.8
2	20.3	319.9	947.	9.0
3	20.3	321.9	1158.	11.0
4	20.3	327.8	3779.	36.0
5	20.2	331.9	8349.	79.6
6	20.2	333.9	10494.	100.0

CALCULATE % ON ENTRY #:

✓

NAME 2023-302:62684 "COND B" 2UL
 MISC 8-3-84 22:20 JCS

FRN 11158



AREA TABLE ENTRIES: FRN 11158

Entry	Time	Mass	Area	%
1	20.4	256.9	125.	2.3
2	20.3	319.9	160.	3.0
3	20.4	321.9	151.	2.8
4	20.4	327.8	1829.	34.0
5	20.4	331.9	4273.	79.5
6	20.4	333.9	5375.	100.0

CALCULATE % ON ENTRY #:

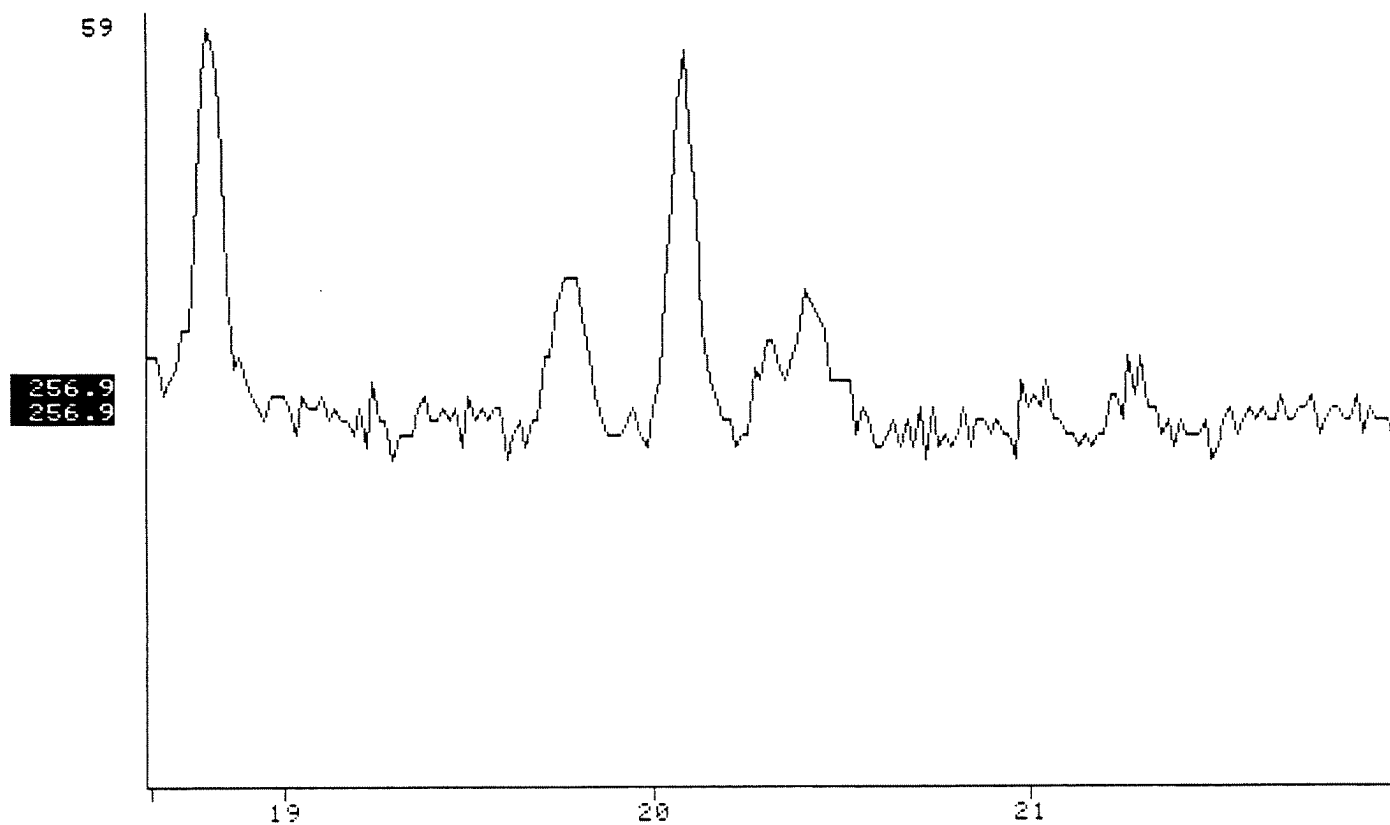
Entry	Time	Mass	Area	%
1	20.4	256.9	125.	82.4
2	20.3	319.9	160.	105.6
3	20.4	321.9	151.	100.0
4	20.4	327.8	1829.	1209.9
5	20.4	331.9	4273.	2826.5
6	20.4	333.9	5375.	3556.1

CALCULATE % ON ENTRY #:



NAME 2023-302:62684 "COND B" 2UL
MISC 8-3-84 22:20 JCS

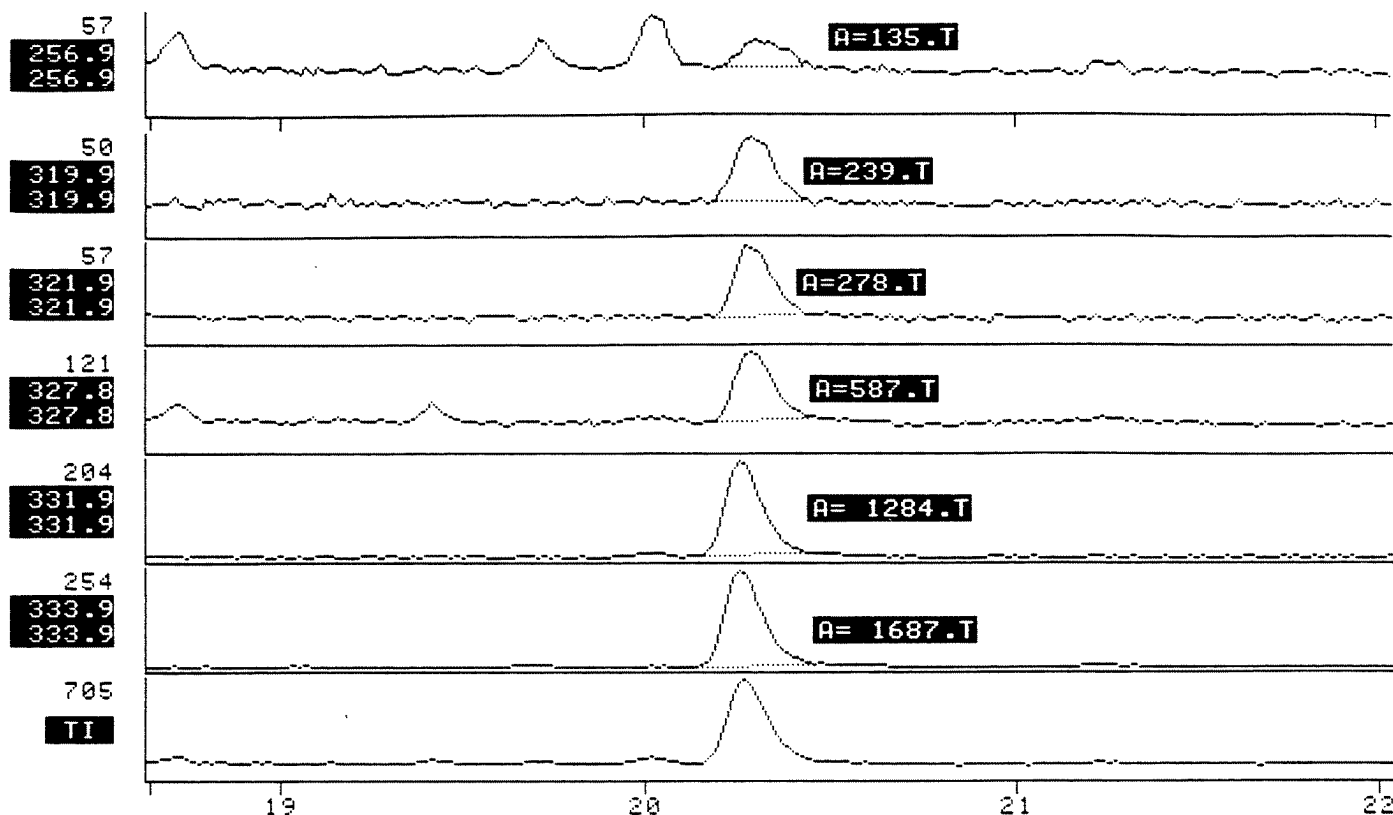
FRN 11158



✓

NAME 2023-302:62685 "COND B" 2UL
MISC 8-3-84 23:23 JCS

FRN 11160



AREA TABLE ENTRIES: FRN 11160

Entry	Time	Mass	Area	%
1	20.3	256.9	135.	48.5
2	20.3	319.9	239.	86.0
3	20.3	321.9	278.	100.0
4	20.3	327.8	587.	210.6
5	20.3	331.9	1284.	461.1
6	20.3	333.9	1687.	605.7

CALCULATE % ON ENTRY #:

AREA TABLE ENTRIES: FRN 11160

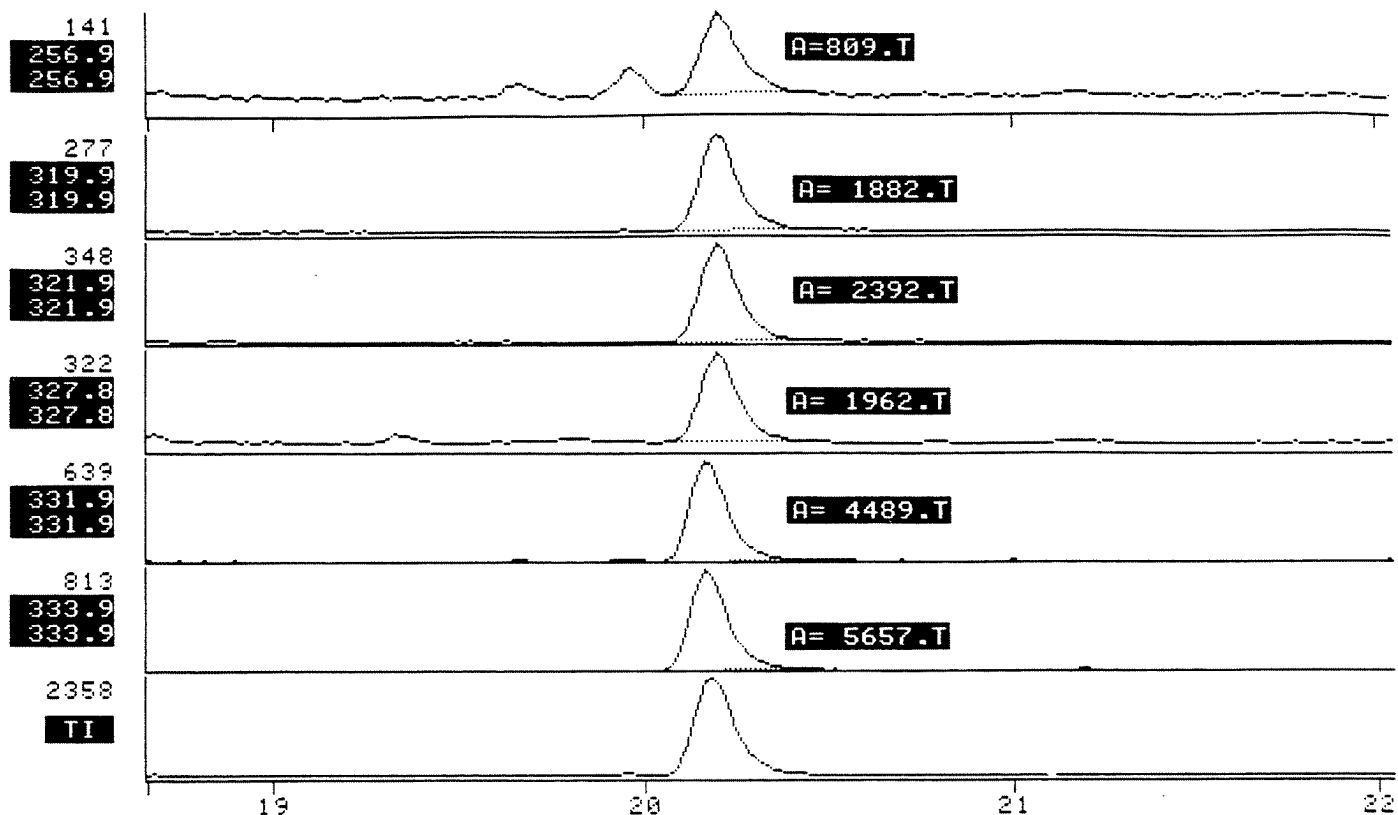
Entry	Time	Mass	Area	%
1	20.3	256.9	135.	8.0
2	20.3	319.9	239.	14.2
3	20.3	321.9	278.	16.5
4	20.3	327.8	587.	34.8
5	20.3	331.9	1284.	76.1
6	20.3	333.9	1687.	100.0

CALCULATE % ON ENTRY #:

✓

NAME 2023-302:62685 DUP "COND B" 2UL
 MISC 8-3-84 23:54 JCS

FRN 11161



AREA TABLE ENTRIES: FRN 11161

Entry	Time	Mass	Area	%
1	20.2	256.9	809.	33.8
2	20.2	319.9	1882.	78.7
3	20.2	321.9	2392.	100.0
4	20.2	327.8	1962.	82.0
5	20.2	331.9	4489.	187.7
6	20.2	333.9	5657.	236.5

CALCULATE % ON ENTRY #:

AREA TABLE ENTRIES: FRN 11161

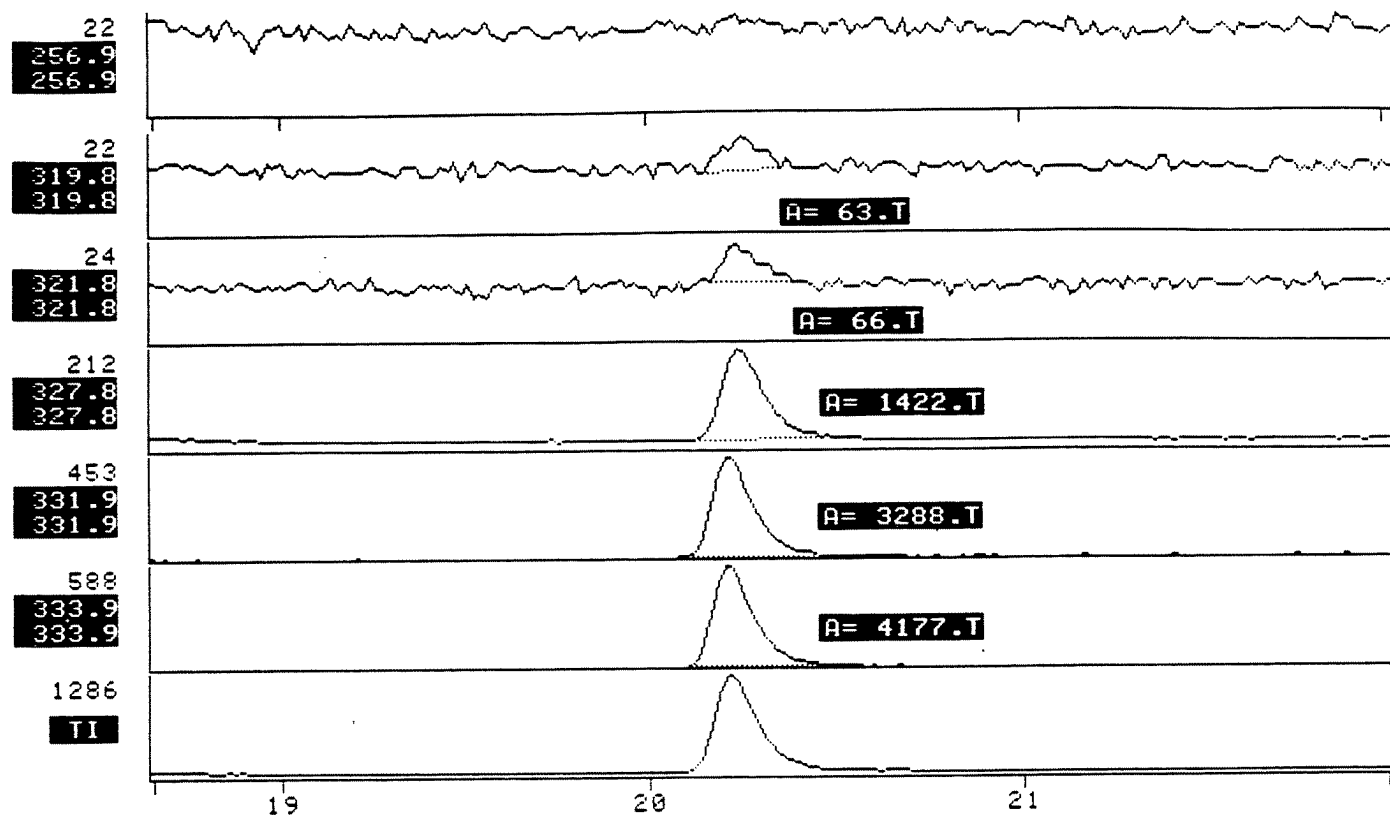
Entry	Time	Mass	Area	%
1	20.2	256.9	809.	14.3
2	20.2	319.9	1882.	33.3
3	20.2	321.9	2392.	42.3
4	20.2	327.8	1962.	34.7
5	20.2	331.9	4489.	79.4
6	20.2	333.9	5657.	100.0

CALCULATE % ON ENTRY #:



NAME 2023-15173:METHOD BLK C COND B OPTD 2UL
MISC 8-4-84 1800 JJC

FRN 11174



AREA TABLE ENTRIES: FRN 11174

Entry	Time	Mass	Area	%
1	20.2	319.8	63.	95.5
2	20.3	321.8	66.	100.0
3	20.3	327.8	1422.	2159.0
4	20.3	331.9	3288.	4990.9
5	20.3	333.9	4177.	6340.0

CALCULATE % ON ENTRY #:

AREA TABLE ENTRIES: FRN 11174

Entry	Time	Mass	Area	%
1	20.2	319.8	63.	1.5
2	20.3	321.8	66.	1.6
3	20.3	327.8	1422.	34.1
4	20.3	331.9	3288.	78.7
5	20.3	333.9	4177.	100.0

CALCULATE % ON ENTRY #:

ATTACHMENT 4

GC/MS CALCULATION NOTEBOOK PAGES

PN 11147
Retuned

TCDD STD #1

Mass Check "Cond B"

PN 11148

TCDD STD #

Mass Check "Cond B"

PN 11149

Dioxin Cal Ref Check Mix #2 "Cond B"

$323/322 = 147\%$, $320/322 = 79\%$, $332/334 = 79\%$, Resolution = 5.4

Recs. 2.84

PN 11150

TCDD STD #1 "Cond B"

257	7023	31
20	17923	80
322	22481	100
328	12887	41
332	91172	79
334	115504	100

$22481 \times 0.009 = 202 \checkmark$

$STD\ RF = (17923 + 22481) / (91172 + 115504) \times 0.2 = 0.98 \checkmark$

$Spike\ RF = (12887 - 202) / (91172 + 115504) \times 0.06 = 1.02 \checkmark$

Both are $\pm 10\%$ of Original Calibration for on log 2 Notebook 2043

PN 11151

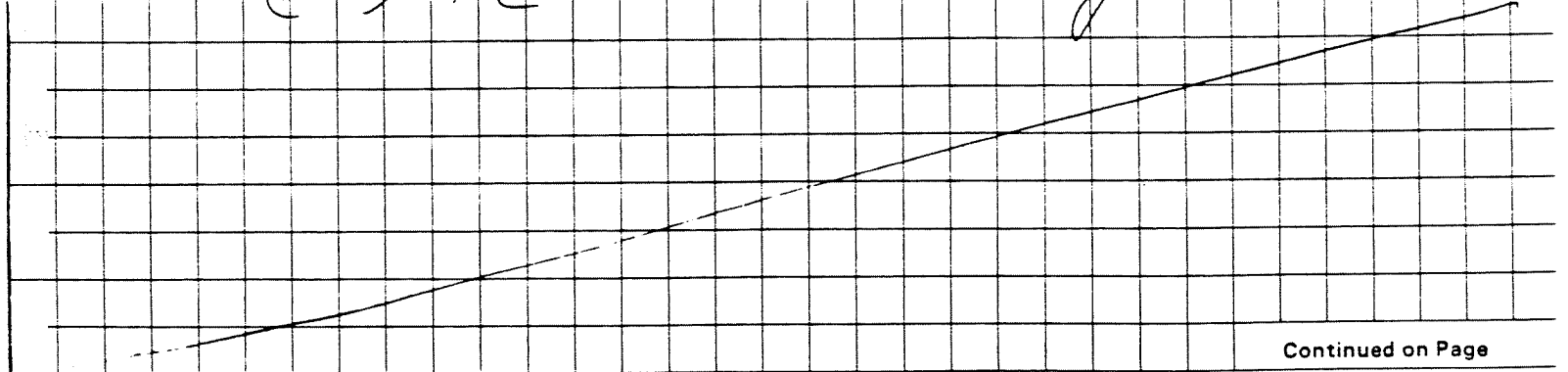
2023-302: Method Blank "Cond B"

1 liter extracted

320	29 $\checkmark$	66
320	44 $\checkmark$	100
328	1581 $\checkmark$	35
332	3575 $\checkmark$	78
334	4574 $\checkmark$	100

$LOD = (29 + 44) 50 \times 2.5 / (3575 + 4574) 0.91 = \frac{1.23\text{ ng}}{1000\text{ ml}} = 0.001\text{ ng/ml} \checkmark \checkmark$

$Spike\ Rec = (1581) 50 / (3575 + 4574) 1.02 = 9.51\text{ ng} = 95\% \checkmark \checkmark$



ECT 2023-302 Dioxin

Continued From Page _____

N 11152	2023-2021 Method Blank spike "Cond B"
7	1137 ✓ 31
0	2969 ✓ 82
2	3626 ✓ 100 $3626 \times 0.09 = 33 \checkmark$
28	6513 ✓ 39
2	13058 ✓ 79
34	16530 ✓ 100

$$L.D. = (2969 + 3626) 50 / (13058 + 16530) 0.91 = 12.2 \text{ ng} = 0.012 \frac{\text{ng}}{\text{ml}} \checkmark$$

$$Rec = (6513 - 33) 50 / (13058 + 16530) 1.02 = 10.7 \text{ ng} = 107\% \checkmark$$

N 11153	2023-302: 62680 "Cond B"
7	67 ✓ 116 1 L extracted
0	57 ✓ 100
28	3449 ✓ 36
2	7623 ✓ 79
34	9649 ✓ 100

$$L.D. = (67 + 57) 50 \times 2.5 / (7623 + 9649) 0.91 = 0.99 \text{ ng} = 0.001 \frac{\text{ng}}{\text{ml}} \checkmark$$

$$Rec = (3449) 50 / (7623 + 9649) 1.02 = 9.79 \text{ ng} = 98\% \checkmark$$

N 11154	2023-2021: 62681 "Cond B"
57	78 ✓ 43 not 2.5 x noise
0	150 ✓ 82 1 liter extracted
22	182 ✓ 100
8	1389 ✓ 36
2	2991 ✓ 77
4	3864 ✓ 100

$$L.D. = (150 + 182) 50 \times 2.5 / (2991 + 3864) 0.91 = 0.003 \frac{\text{ng}}{\text{ml}} = 0.003 \frac{\text{ng}}{\text{ml}} \checkmark$$

$$Rec = (1389) 50 / (2991 + 3864) 1.02 = 9.93 \text{ ng} = 99\% \checkmark$$

Continued on Page _____

Read and Understood By

1. C. Swine
Signed

8-3-84
Date

M. Winters
Signed
Earl M. Hense

8-13-84
8-16-84
Day

PROJECT 2023-302 Dioxin

Continued From Page _____

FRN 11155 2023-302: 62681 Dup "Cond B"

57	99 ✓	98
20	93 ✓	92
22	101 ✓	100
28	1998 ✓	37
32	4183 ✓	77
34	5424 ✓	100

1.0 liter extracted

$$CD = (93 + 101) 50 / (4183 + 5424) 0.91 = 0.001 \text{ ng/ml} \quad \text{8/16/84}$$

$$\text{Sat Rec} = (1998) 50 / (4183 + 5424) 1.02 = 10.2 \text{ ng} = 102\% \checkmark$$

FRN 11156 2023-302: 62682 "Cond B"

57	217 ✓	37
20	462 ✓	78
22	593 ✓	106
28	3282 ✓	38
32	6902 ✓	79
34	8698 ✓	100

1.0 liter extracted

$$CD = (462 + 593) 50 / (6902 + 8698) 0.91 = 3.72 \text{ ng} = .004 \text{ ng/ml}$$

$$\text{Sat Rec} = (3282 - 5) 50 / (6902 + 8698) 1.02 = 10.3 \text{ ng} = 103\% \checkmark$$

FRN 11157 2023-302: 62683 "Cond B"

57	400 ✓	35
20	947 ✓	82
22	1158 ✓	100
28	3779 ✓	36
32	8349 ✓	80
34	10494 ✓	100

950 ml extracted

$$CD = (947 + 1158) 50 / (8349 + 10494) 0.91 = 0.007 \text{ ng/ml}$$

$$\text{Sat Rec} = (3779 - 10) 50 / (8349 + 10494) 1.02 = 9.80 \text{ ng} = 98\% \checkmark$$

Continued on Page _____

Read and Understood By

J.C. Swinn
Signed

8-3-84
Date

M. Winter
Signed
Earl M. Hender

8-13-84
8-16-84

PROJECT 2023-302 *Dioxin*

Continued From Page _____

11/158 2023-302: 62684 "Cond B"
 57 88185 78 82 10.1 g. extracted
 3 2 144 160 98 106
 3K 125 151 100
 2 8 1756 1829 27 34 measured 8-13-84 mcw
 3 2 4256 4273 80
 3 2 5310 5375 100

AD = $\frac{(160 + 151) 50}{(144 + 125)} \cdot \frac{4273 + 5375}{(4256 + 5310)} \cdot 0.91 \times 10.19 = 0.14 \text{ g/g}$ ~~0.44 g/g~~ ~~0.17 g/g~~
 Rec = $\frac{(1829) 50}{(1756)} \cdot \frac{4273 + 5375}{(4256 + 5310)} \cdot 1.02 = 95\%$ ~~9.29~~ ~~9.00 g/g~~ = 96% 93% ✓

11/159 2023-302: 62684 Spike "Cond B"

No ISTD or Surrogates found

11/160 2023-302: 62685 "Cond B"
 4 7 135 ✓ 49 10.0 g extracted
 2 2 239 ✓ 86
 3 2 278 ✓ 100 $278 \times .009 = 3 \checkmark$
 2 2 587 ✓ 35
 2 2 1284 ✓ 76
 3 3 1687 ✓ 100

AD = $\frac{(239 + 278) 50}{(1284 + 1687)} \cdot 0.91 \times 10.0 = 0.96 \text{ g/g} \checkmark$

Rec = $\frac{(587 - 3) 50}{(1284 + 1687)} \cdot 1.02 = 9.64\% = 96\% \checkmark$

Continued on Page _____

Read and Understood By

J. C. Swinn
 Signed

8-3-84
 Date

M. Winter
 Signed

8-13-84
 Date

FRN 11161 2023-302: 62685 Dup "Cond B"

57	809 ✓	34	10.1 g extracted
20	1882 ✓	79	
22	2392 ✓	100	2392 X .009 = 22 MCW 8/13-84
128	1962 ✓	35	
32	4489 ✓	79	
34	5657 ✓	100	

$$CBD = (1882 + 2392) 50 / (4489 + 5657) 0.91 \times 10.19 = 2.34 \text{ ng/g} \checkmark$$

MCW 8-13-84

$$Calc Rec = (1962 - \frac{23}{2}) 50 / (4489 + 5657) 1.02 = 9.47 \text{ ng/g} = 952 \text{ } 9490 \checkmark$$

MCW 8-13-84

FRN 11162 TCDD STD #1 "Cond B"

57	3739 ✓	33	
20	9008 ✓	79	
12	11339 ✓	100	11339 X .009 = 102 ✓
328	6885 ✓	12	
32	46168 ✓	79	
334	58309 ✓	100	

STD RFE $(9008 + 11339) 1 / (46168 + 58309) 0.2 = 0.97$ both $\pm 10\%$ of target

Calc RFE $(6885 \pm 102) 1 / (46168 + 58309) 0.06 = 1.08$ calibration focus on page 6 of Notebook 2044 #1

MCW 8-13-84

FRN 11163 Dioxin Cal Ref Check Mix #2 "Cond B"

323/322 = 142%, 320/322 = 78%, 332/334 = 80%, Resolution = 5.8 ✓

Continued on Page

Read and Understood By

J.C. Swinn
Signed

8-4-84
Date

M. Winter
Signed
Earl M. Hunter

8-13-84
Date
8-16-84

ATTACHMENT 5

CHAIN OF CUSTODY/PACKING LIST



ENVIRONMENTAL
ENGINEERS

157 100-0000000000
158 100-0000000000
159 100-0000000000

CONTROL: IR: 3.0 μ (broad), 2.9 μ (broad), 2.8 μ (broad), 2.7 μ (broad), 2.6 μ (broad), 2.5 μ (broad), 2.4 μ (broad), 2.3 μ (broad), 2.2 μ (broad), 2.1 μ (broad), 2.0 μ (broad), 1.9 μ (broad), 1.8 μ (broad), 1.7 μ (broad), 1.6 μ (broad), 1.5 μ (broad), 1.4 μ (broad), 1.3 μ (broad), 1.2 μ (broad), 1.1 μ (broad), 1.0 μ (broad), 0.9 μ (broad), 0.8 μ (broad), 0.7 μ (broad), 0.6 μ (broad), 0.5 μ (broad), 0.4 μ (broad), 0.3 μ (broad), 0.2 μ (broad), 0.1 μ (broad), 0.0 μ (broad).

Page : 01

REPORT TO: H.H. 57

175/0

DATE WORK IN:

2021.5.24

ENGINEERS

RECEIVED BY:

REQUESTED BY: BECKA

1977-1980

ANALYSES REQUESTED

SAMPLE IDENTIFICATION

LAB NO.	SITE CODE/ SAMPLE DESCRIPTION	DATE COLLECTED	PRESERV.	CONTAINER	SEF
6268C	MW 1	7-23-84	COLD	2L glass	✓
81	MW 3			2L glass	✓
83	1W				✓
83	3W				✓
84	MW 2			1x 5L glass	✓
85	MW 4			1x 5L glass	✓
7					
8					
9					
10					
11					
12					
13					
14					
15					
16					

SPECIAL INSTRUCTIONS:

Are there any "Hazardous" compounds in samples? (Initial)	Yes ☒ No ☐	UNKNOWN	REASON FOR TRA

ITEMS TRANSFERRED

RELINQUISHED BY

Date	Time

RECEIVED BY

Date	Time

REASON FOR FINANCIAL

RECRA RESEARCH, INC.
CHAIN OF CUSTODY RECORD

PROJECT #:

PROJECT NAME

STUDY AREA:

SAMPLERS SIGNATURE

STATION #	DATE	TIME	SUBSAMPLE CODES	TOTAL # OF SAMPLES	REMARKS
MW-1	7-23-84	13:20		2	
MW-3	7-23-84	12:50		2	
T65	7-23-84	2:00		2	
MW	7-23-84	1:35		2	
MW-2	5-4 15-24			1	sed
MW-4	5-3 4-56			1	
Relinquished By:	Date/Time:	Received By:	Comments:		
<i>J. J. Frost</i>	7-26-84 3:00 PM	<i>J. J. Frost</i>			
Relinquished By:	Date/Time:	Received By:	Comments:		
Method of Shipment:	Shipped By:	Received By:	Comments:		

Received for Laboratory:

Authorization
for Disposal

Job #

Type of Disposal

Date/Time:

Date of Disposal:

Appendix 5



RECRA RESEARCH, INC.

Hazardous Waste And Toxic Substance Control

FIELD REPORT
FOR
SAMPLING ACTIVITIES AT
THE 93rd STREET SCHOOL FOR
NEW YORK STATE
DEPARTMENT OF ENVIRONMENTAL CONSERVATION

MAY 17, 21, 24, 1984

Prepared For:

New York State Department of
Environmental Conservation

Prepared By:

Recra Reserach, Inc.
4248 Ridge Lea Road
Amherst, NY 14226

Written By: Robert P. Bauer

Reviewed By: George C. Moretti

Date: 7-24-84

1.0 INTRODUCTION

This field report describes the field sampling activities at the 93rd Street School located in Niagara Falls, New York.

All field tasks were performed by Recra personnel Robert P. Bauer and Dennis Malucci on May 17, 21, 24, 1984. The weather conditions during this period were dry and clear; however, the ground was saturated due to heavy rains the previous week.

2.0 FIELD METHODOLOGY

2.1 Measurements

The depth of water in each well was measured using an electronic water level indicator which was rinsed with deionized water between wells. Water levels were recorded to the nearest hundredth inch (Table I). Measurements of temperature, specific conductance, and pH were made in the field using appropriate calibrated instrumentation.

2.2 Well Development

All four wells were developed prior to purging and sampling. Using an ISCO Model 1580 peristaltic pump, a minimum of three volumes were removed from the well or until the water cleared. Periodic specific conductance and temperature measurements were recorded and presented in Table II. All spent water was placed in the waste drums for drill cuttings and fluids.

2.3 Well Purging

All four wells were purged prior to sampling. The recharge rate was greater than the evacuation rate (0.75 gal/min). Purging and sampling was done through polyethylene and silicon rubber tubing that was dedicated to that well eliminating the possibility of cross-contamination. Teflon tubing was not used due to the agreed scope of Phase II efforts. As the water level did not drop, the sampling line was raised to the top of the water column to insure a complete turnover of water within the well. At least three volumes of standing water were removed prior to sampling the well.

2.4 Groundwater Sampling

Upon completion of purging, the sampling hose was lowered to approximately five feet from the bottom. Samples were then collected in appropriate precleaned bottles. The volatile analysis samples were collected using a dedicated galvanized steel bailer with nylon line. The samples were then placed on ice in insulated coolers until delivery to the laboratory for analysis.

2.5 Sample Containers - Wells

- 3 - 1 liter glass with Teflon lined cap
- 1 - 32 oz. plastic
- 5 - 40 ml. vials with Teflon septa

2.6 Variable Head Test

Upon completion of sampling the wells, variable head testing was attempted on all four wells. Because of extremely permeable conditions, the use of a PVC slug was unsuitable for producing representative data. Variable head testing was discontinued due to rapid recharge rates. Pump testing was then attempted as described in Section 3.0.

2.7 Surface Water Sampling

Five surface water points were sampled. Three were located along Bergholtz Creek (upstream of Site 3-W, at mouth of gully [2-W] and downstream of Site 1-W). The fourth point (4-W), located in the swale near the center of the site, did not have sufficient water standing in it to sample. The fifth sample (5-W) was collected from the storm sewer. All surface waters were collected as grabs using a pond sampler except for that portion of samples collected for volatile organic analysis. Those samples were poured directly into 40 milliliter vial, to prevent excessive spillage and exposure created when sampling directly from the sampling vessel. The samples were then placed on ice in insulated coolers until delivery to the laboratory for analysis.

2.8 Sample Containers - Surface Water Samples

At each surface station the following was used for collection:

- 3 - 1 liter glass with Teflon lined cap
- 1 - 32 oz. plastic
- 4 - 40 ml. vials with Teflon septa

2.9 Sediment Sampling

Five sediment samples were collected. Sample points one through three (1-W through 3-W) were located in Bergholtz Creek. The fourth sample was located in the swale near the center of the site. The fifth sample was collected from the storm sewer collector box. The sediment samples were collected using a KB gravity type corer or a Ponar Dredge. The core barrel was rinsed with water between sampling points and separate core tube liners and core catchers were used for each point, thus preventing cross-contamination. The core barrel was advanced two feet into the sediment with a sledge hammer. The fourth sample (4-W) was sampled in the same manner except that there was no standing water. The fifth sample (5-W) was collected using a Ponar Dredge. This clam shell like device was lowered into the sewer several times to insure a representative sample.

2.10 Sample Containers - Sediment Samples

At each sample location the following was used for collection:

1 - 16 oz. glass with Teflon lined cap

2 - 240 ml. vials with Teflon septa

2.11 Soil Sampling

Four soil samples were collected using a hand driven bucket auger. These samples were located around the probable fill area between the swale and the school. The bucket auger produced a disturbed sample down to one foot. Sample locations are labeled 6S, 7S, 8S, and 9S (Appendix 1, Plate

A). A black fly ash type material was found in all soil samples. The ground (fill and topsoil) was saturated from recent heavy rain. All soil samples were then placed on ice in insulated coolers until delivery to the laboratory.

2.12 Sample Containers - Soil Samples

At each soil sampling point the following was used for collection:

- 1 - 16 oz. glass with Teflon lined cap
- 2 - 40 ml. vials with Teflon septa

3.0 FIELD OBSERVATIONS

3.1 MW-1

Prior to purging, a "water to top of casing" measurement of 9.94 feet was obtained. Using a peristaltic pump and dedicated tubing, approximately 11.0 gallons (3 x the volume) were removed. Since there was not significant drawdown, the water was removed from the top of the water column to insure a complete turnover of water in the well casing. The tubing was then lowered to within five feet of the bottom where a sample was collected. The sample was clear to light tan in color. The samples were placed in ice chests.

3.2 MW-2

Prior to purging a "water to top of casing" measurement of 9.08 feet was obtained. Using a peristaltic pump and dedicated tubing, approximately 10.5 gallons (3 x the volume) were removed. Since there was no signifi-

cant drawdown, the water was removed from the top of the water column to insure a complete turnover of water in the well casing. The tubing was then lowered to within five feet of the bottom where a sample was collected. The sample was clear to light tan in color. The samples were placed in ice chests.

3.3 MW-3

Prior to purging a "water to top of casing" measurement of 9.58 feet was obtained. Using a peristaltic pump and dedicated tubing, approximately 11.0 gallons (3 x the volume) were removed. Since there was no significant drawdown, the water was removed from the top of the water column to insure a complete turnover of water in the well casing. The tubing was then lowered to within five feet of the bottom where a sample was collected. The sample was clear to light tan in color. The samples were placed in ice chests.

3.4 MW-4

Prior to purging, a "water to top of casing" measurement of 10.00 feet was obtained. Using a peristaltic pump and dedicated tubing, approximately 10.3 gallons were removed. Since there was not significant drawdown, the water was removed from the top of the water column to insure a complete turnover of water in the well casing. The tubing was then lowered to within five feet of the bottom where a sample was collected. The sample was clear to light tan in color. The samples were placed in ice chests.

3.5 1-W

Located downstream of the site in Bergholtz Creek two feet from south bank. Surface water, followed by sediment grab samples, were collected and placed on ice (Plate A, Appendix 1).

3.6 2-W

Located in Bergholtz Creek at the downstream edge of confluence with gully (see Figure 2). The creek was approximately twenty feet wide at this point. The sample was collected two feet from the south bank. Surface water and sediment grab samples were collected and placed on ice.

3.7 3-W

This sampling point was located upstream of the site in Bergholtz Creek, two feet from the south bank. Surface water and sediment grab samples were collected and placed on ice.

3.8 4-W

This sampling point was located in the swale that runs through the site approximately 100 feet south of the gully. Only a sediment sample was collected at this point. There was no standing or running water; therefore no surface water sample was collected. The sediment sample was placed on ice.

3.9 5-W

This sampling point was located in the storm sewer junction box located just south of the baseball diamond. Surface water, followed by sediment grab samples, were collected and placed on ice.

3.10 6S

This sampling point was located approximately 50 feet east of the baseball diamond. Soil was sampled to a depth of one foot with a bucket auger. The sample contained sand, topsoil, and also fly ash fill material. The samples were placed on ice.

3.11 7S

This sampling point was located approximately 130 feet north of MW-4. Soil was sampled to a depth of one foot with a bucket auger. The sample contained topsoil, clay, and also fly ash fill material. The samples were placed on ice.

3.12 8S

This sampling point was located approximately 50 feet east of the parking lot near MW-4. Soil was sampled to a depth of one foot with a bucket auger. The sample contained topsoil, clay, and also fly ash fill material. The samples were placed on ice.

3.13 9S

This sampling point was located approximately 50 feet west of the swale. Midway between 4CW and the opening of the gully. Soil was sampled to a depth of one foot with a bucket auger. The sample contained topsoil, clay, and also a small amount of fly ash fill material. The samples were placed on ice.

4.0 CHAIN OF CUSTODY

Samples were always in the custody of Recra's field technicians until delivery by truck to Recra's Tonawanda, New York, Laboratory.

APPENDIX A

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