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DECLARATION STATEMENT - RECORD OF DECISION

E.I. Du Pont de Nemours and Company
Niagara Falls, New York 14302
Site Code: 932013
Classification Code: 2

STATEMENT OF PURPOSE

This Record of Decision sets forth the selected Interim Remedial Action Plan for the Du Pont Site. This Interim Remedial Action Plan was developed in accordance with the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) of 1980, as amended by the Superfund Amendments and Reauthorization Act (SARA) of 1986, and the New York State Environmental Conservation Law (ECL). The selected interim remedial plan complies to the maximum extent practicable with the National Oil and Hazardous Substance Pollution Contingency Plan, 40 CFR Part 300, of 1985.

STATEMENT OF BASIS

This decision is based upon the Record of the NYSDEC for the Du Pont Niagara Plant site and upon public input to the Interim Remedial Action Plan proposed by Du Pont. A copy of the pertinent documents is available at the Niagara Falls Public Library, 1425 Main Street, Niagara Falls, New York and at the New York State Department of Environmental Conservation, 600 Delaware Avenue, Buffalo, New York. A bibliography of those documents included as part of the Record of the NYSDEC is contained in Appendix B.

DESCRIPTION OF THE SELECTED REMEDY

The selected remedial action plan will control the off-site migration of contaminants from the plant site and, consequently, will provide for protection of environment and of public health. It is technically feasible and it complies with statutory requirements. Briefly, the selected interim remedial action plan includes the following:

* Twenty-two pumping wells (5 have already been installed) will be installed along the east-west axis of the plant site. Each will pump groundwater at a rate of 1-5 gpm. Collected groundwater will be treated by a water treatment plant to be constructed on the plant grounds and the effluent will be discharged to the City of Niagara Falls Waste Water Treatment Plant.

* Plant bedrock zones (West Plant area) will continue to be controlled by the Olin pumping well. Pumped water, before use by Olin as non-contact cooling water at its production lines, is treated by carbon adsorption units and then discharged under SPDES permit.

* A monitoring plan has been established to assess the effectiveness of the interim remediation plan by 1) measuring the water levels in piezometers and selected plant site monitoring wells, 2) analyzing for the chemistry of groundwater in specified plant site monitoring wells.

* The effectiveness of the Interim Remediation Plan for the total plant site will be evaluated periodically by the NYSDEC to assess the success of the remediation plan. Adjustments and modifications to the rate of operations or modifications to the groundwater collection system (overburden and bedrock) shall be made as deemed necessary.

DECLARATION

The selected Interim Remedial Action Plan is protective of human health and the environment. The remedy selected will meet the substantive requirements of the Federal and State laws, regulations and standards that are applicable or relevant and appropriate to the remedial action. The remedy will satisfy, to the maximum extent practicable, the statutory preference for remedies that employ treatment that reduce toxicity, mobility or volume as a principal element. This statutory preference will be met by eliminating the mobility of contaminants with a direct pathway of migration to the Niagara River, by treatment of groundwater to reduce toxicity and by treating the organics that are stripped and condensed from groundwater.

JAN - 3 1990

Date

Edward O. Sullivan
Deputy Commissioner
Office of Environmental Remediation
New York State Department of Environmental Conservation

RECORD OF DECISION
Du Pont Niagara Plant
Interim Remedial Action Plan

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The E.I. Du Pont de Nemours and Company's Buffalo Avenue Site is located in Niagara Falls, bordered by Buffalo Avenue to the north and the Robert Moses Parkway (which runs adjacent to the Niagara River) to the south. Gill Creek divides the 52 acre site into approximately equal sections to the east and west of the stream channel. Figure 1 and 2 show the location of the Du Pont Plant Site.

The Niagara Plant is in a heavily industrialized area of Niagara Falls predominantly occupied by chemical industries. There are also residential areas north of Buffalo Avenue.

II. SITE HISTORY

The Du Pont Niagara Plant has been in operation since 1898, when the Niagara Electro Chemical Company began the manufacture of sodium. Du Pont acquired the plant in 1930 and since then, several products, both organic and inorganic chemicals, have been manufactured in continuous operation. Figure 3 shows the primary products and the times at which manufacture occurred.

From 1983 through 1988, extensive Remedial Investigations were carried out by Du Pont to determine the type and extent of contamination. To date, more than 60 integrated studies of the subsurface contamination or related conditions have been completed. The chronology of remedial investigation and reports are summarized in Table 1. All the reports listed in Table 1 are included as part of the Record of the NYSDEC for the Du Pont Plant site remediation plan.

III. PROBLEM IDENTIFICATION

A. Definition of Site and Operable Units

Numerous geologic, hydrogeologic and subsurface contamination investigations that have been conducted in the past have determined that the groundwater in both overburden and bedrock within the plant site is highly contaminated by past plant operations, disposal activities and spills (Table 3 and Figure 4). Identification of possible waste disposal areas within the plant was carried out in 1978 and remedial action was taken to remove or isolate sources of contamination. (See Section III-B) Figure 5 shows the location of historical processes and events, and Figure 6 identifies the area where Du Pont, in conjunction with the NYSDEC, has taken voluntary remedial action to mitigate the environmental impact of these areas.

As the Du Pont remedial program developed, two (2) separate operable units were developed. Although they are not completely independent, each unit requires different remedial efforts:

1. Overburden: Overburden groundwater in both parts of the plant site (West Plant and East Plant) is contaminated with Du Pont chemicals. Various historical locations of plant processes, as well as waste disposal locations, are identified on Figure 5.

2. Bedrock: Like overburden, bedrock groundwater in the entire plant site is contaminated with varying degrees of plant chemicals.

B. Problem Identification - Overburden

The plant is underlain by unconsolidated overburden material consisting of fill, glacial lake deposits, and glacial till. As a result of the regional glacial events, the overburden soils were found to vary widely in material type, density, thickness, and aerial extent. Figure 7 shows the combined fill and overburden thickness encountered throughout the plant area. Overburden groundwater movement and chemistry has been studied since 1983 (Figure 8 and Table 3). Since 1985, Du Pont has been submitting quarterly reports to DEC relative to hydrological data and groundwater chemistry.

Groundwater in overburden, as stated before, is highly contaminated by past plant operation, disposal activities and spills. Identification of possible waste disposal areas within the plant was carried out in 1978, and since then, several identified contamination sources were remediated. They are:

1. Building 107 Area

Contamination in the B-107 area consisted of chlorinated organics. The area was used as a tank heel cleanout for many years and a remediation which involved excavation and removal of chlorinated organic sludge from the area and from the adjacent copper disposal pit was performed between December 1980 and May 1981. With the approval of the NYSDEC, approximately 4300 cubic yards of potentially contaminated material was removed to a level of 500 ppm (total organics) which was considered to be an acceptable soil clean up guideline at that time.

2. Gill Creek and the Building 310 Area

PCB's contamination was found in Gill Creek sediments and in Building 310. Remediation of these two areas which consisted of removing PCB-contaminated soil and sediments to the top of bedrock was carried out between September 1980 and November 1981. A total of approximately 11,600 cubic yards of contaminated soil was removed. For this remediation, 50 ppm PCB's clean up level for soil was used, an acceptable soil clean up level at that time.

3. West Yard Maintenance Area

The remediation of the west yard maintenance area, primarily contaminated with barium and cyanide was performed during fall 1985 and spring 1986. The area was paved to minimize infiltration of precipitation. A perimeter cutoff wall was also installed to minimize lateral seepage of water.

4. Adams Avenue Sewer

The Adams Avenue Sewer, an abandoned sewer that extends from a location on plant and flows to the west property boundary, has been identified as a possible pathway for off-plant contamination migration. In June 1986, to mitigate this preferential migration pathway, this sewer was plugged and a cutoff wall was installed across the sewer bedding.

5. Outfall 006

This is one of the SPDES outfalls on the plant property that was determined to be infiltrated with volatile organics. An abandoned line 003 which has connections to 006 was plugged off at several locations in 1988 to mitigate the potential infiltration into 006.

C. Problem Identification - Bedrock

Beneath the overburden soils of the plant is the Lockport Dolomite Formation, a fractured dolomite averaging approximately 153 feet thick and divided into five members (Figure 9). Several fracture zones that were identified during the plant monitoring well installation are continuously monitored for bedrock groundwater chemistry and for groundwater flow direction (Figure 8 and Table 3). This information is forwarded to DEC via the Quarterly reports noted in III, B.

The Rochester Shale Formation, directly beneath the Lockport Dolomite, was investigated and found to be relatively impermeable. Further studies to evaluate the integrity of four Rochester zone monitoring wells concluded that the minor contamination found in these wells was from leakage through the grout seal around the wells. Therefore, it was decided that all Rochester zone wells be monitored for groundwater water levels only.

Groundwater in bedrock is similarly contaminated with plant related chemicals (Figure 4 and Table 3). It is believed that the migration of contaminants into the bedrock has occurred through existing vertical fractures which hydraulically connect the horizontal fracture zones and can act as pathways for contaminant migration.

Groundwater flow in the bedrock is influenced by many factors, the most important ones are as follows:

1. Niagara River

   The Niagara River fluctuates depending on the time of the year and in response to the removal of water by the New York Power Authority. The effect of the river fluctuation can be observed in the bedrock in the B through F fracture zones and laterally for a limited portion of the plant site.

2. Olin Production Well

   Olin Chemical, Inc. maintains cooling water production wells immediately northwest of the Du Pont Plant Site. Pumping over the years has resulted in an area of influence which extends under the western portion of the Du Pont Plant Site approximately to Gill Creek. The eastern portion of the plant site is not affected.

3. New York Power Authority (NYPA) Conduits

   As seen on Figure 1, the water conduits for the Robert Moses Niagara Power System are located approximately 0.2 miles up river of the Dupont Plant Site. NYPA drawings show

   the presence of drains surrounding the tunnels which appear to act as a drain (sink), thereby, creating a local depression in the groundwater. This depression may account for flow from the plant toward the northeast.

4. Man-made Passageways

   The Adams Avenue sewer was identified as a possible pathway for off-plant contamination migration. The sewer and its bedding were plugged off with a cement-bentonite wall in June of 1986.

In summary, groundwater flow in bedrock in the western portion of the plant is influenced by the Olin production wells; in the eastern portion, the groundwater flow is influenced by the NYPA water conduits toward the north/northeast.

IV. ENFORCEMENT STATUS

The Du Pont Niagara Plant site RI/FS activities have been proceeding under a voluntary program since 1983. Implementation of the Interim Remedial Action Program discussed herein will enable the company to create a hydraulic barrier in the overburden (A-zone) that will reduce lateral off-plant contaminant migration and, over time, will minimize the potential for contamination within the bedrock zones. During the initial operating period (ten years), Du Pont and the Department may mutually agree to adjustment and modifications to the rate of operations or modification to the Interim Remediation Program based upon the results of the assessment reports which will be submitted to the Department after the end of the first three years of operation and annually thereafter. After reviewing the plant remediation performance data over the ten (10) year period, the Department shall determine whether the Interim Remedial Program is to be continued for an additional ten (10) years, or for a different period, and whether the program should be modified or adjusted during such continued operation, or whether the program may be discontinued.

V. GOALS AND OBJECTIVES FOR REMEDIATION

A. Overall Goals

The overall goal of the Interim Remediation plan for the Du Pont Niagara Plant site is to effectively control the off-site migration of contaminants from the plant site. Presently, pumping of the Olin production wells is controlling off-plant migration of contaminants within the bedrock zones of the western portion of the plant site. Once the overburden remediation system is in operation, over time, the potential for bedrock contamination from the overburden will be reduced. The specific objectives of remedial efforts for each operable unit are described in V B and C.

B. Plant Site Overburden

The objectives of the interim remediation system are:

* To create a hydraulic barrier in the overburden (A-zone) that will reduce lateral off-plant contaminant migration by pumping groundwater from a line of 22 collection wells to a new water treatment facility. Treated water will be discharged to the City of Niagara Falls Waste Water Treatment Plant.

* To install and operate a new water treatment facility to strip and condense contaminants present in groundwater. Periodically, condensed organics will be shipped off-plant as hazardous waste.

C. Plant Site Bedrock

Off-site migration of contaminants from bedrock zones in the western plant area will continue to be controlled by pumping the Olin production wells. The effectiveness of this system has been consistent over the years, and the contaminant off-plant loading rate calculations since 1984 indicate that 75-85 percent non-point source containment is being achieved. Water from the production wells is treated by carbon adsorption units prior to use by Olin as non-contact cooling water, and it is then discharged to a SPDES permitted outfall.

Du Pont has entered into an agreement with Olin to use the production wells for an indefinite period of time for bedrock remediation. The success of the in-place bedrock remediation will be assessed during the initial operating period (ten years) and thereafter (see Section IV: Enforcement Status).

VI. SUMMARY, EVALUATION AND SELECTION OF ALTERNATIVES

This section outlines the alternatives considered, the evaluation of these alternatives, and the final selection to be included in the Interim Remediation Plan.

A. The Evaluation Process

No new remedial alternatives were evaluated for the bedrock due to the control by the Olin well water production system.

Considering that less than a pound per day of contaminants which have no negative health impact on populations (R.44 in Table 1), are leaving the East Plant area bedrock, it was concluded at this time that no remediation would be required. However, the effectiveness of the Interim Remediation plan for the bedrock shall be evaluated periodically by the Department to assess the success of the remediation plan, and adjustments and modifications to the rate of operation or modification to the bedrock groundwater collection system shall be made as deemed necessary.

A number of alternatives were evaluated for remediation of the plant overburden. The criteria used to evaluate these remedial alternatives were:

a) overall protection of human health and the environment
b) reduction of toxicity, mobility and volume of contaminants
c) environmental effectiveness (short and long term)
d) technical feasibility and reliability
e) compliance with applicable or relevant and appropriate requirements
f) cost
g) community acceptance

Alternatives were evaluated for the overburden remediation included:

1. no action
2. excavation
3. bioreclamation
4. solidification
5. flushing
6. passive containment (horizontal and/or vertical grouting)
7. active containment with conventional treatment of groundwater

A Phase I Remediation Study was conducted to identify and evaluate available remediation alternatives. Out of this study, three general areas of the Niagara Plant site were identified and were recommended to be included in the remediation program. They are:

* West Yard
* West Plant Site
* East Plant Site

Specific conclusions regarding remediation of these three areas were developed based on results of the evaluation of the remedial alternatives as presented in Table 2.

A Phase II Remediation Study further refined the remedial action alternative that would be most cost effective and appropriate for application at the three plant locations.

The West Yard area was considered separate from the East and West Plant sites because of its location and the nature of contamination. The NYSDEC agreed that barrier walls and capping of the West Yard was most acceptable in terms of its environmental effectiveness. This was completed between the fall of 1985 and spring of 1986.

The selected remediation alternatives for both the East and West Plant Sites were evaluated and are described below. A more detailed description of each alternative can be found in R.8 and R.11 (Table 1).

Alternative 1: No Action

Under this alternative, the plant site contaminants would continue to migrate from overburden and bedrock as presented in Table 4. This alternative would not protect the environment, nor would it provide overall protection of human health. Furthermore, it would not reduce the toxicity, mobility, or volume of contaminants in groundwater, nor would it comply with Applicable or Relevant and Appropriate Requirements (ARARs).

Alternative 2: Excavation

This alternative consists of excavation, transportation and disposal of meterials. This alternative was not considered because mass excavation is not possible due to plant operation, buildings and utility line congestion.

Alternative 3: Bioreclamation

Bioreclamation techniques for remediation of contaminated groundwater contained in the overburden material (A-zone) has been considered. The feasibility of bioreclamation in groundwater is determined by the presence of:

1. Biodegradable organic compounds to sustain bacterial growth;

2. Sufficient nitrogen, phosphorus, and sulfur; and

3. Trace metals (potassium, iron, molybdenum, zinc, etc.

Additionally, maintaining the proper pH and temperature, providing sufficient contact time for bacteria to act on the contaminated groundwater, and having low levels of toxic materials in groundwater will determine the success of the bioreclamation.

Considering the concentration and the type of specific compounds present in the Buffalo Avenue plant site groundwater, and the degree of treatment needed to meet the Best Available Technology (BAT) target levels for volatile compounds, the bioreclamation technique was found to be inappropriate.

Treatment of the overburden groundwater with "biologically active granular activated carbon column" was also considered but was found to be unsuitable for the treatment of water containing higher concentration of organic materials where uncontrolled biological activity may occur. The result can be the development of anaerobic conditions, seriously upsetting the process performance and creating odor and corrosion problems.

Alternative 4: Solidification

The wastes which are the best candidate for solidification are wastes that contain high concentrations of heavy metals or inorganic salts. In general, these wastes do not exist at the Niagara Plant site, therefore, it has little applicability.

Alternative 5: Flushing

By this technique, contaminants in soil medium are solubilized, the ensuing leachate is collected and treated. This alternative is impractical at the Buffalo Avenue Plant site for the following reasons:

1. The plant site is non-homogeneous, which limits the hydraulic effectiveness of the system.

2. The presence of buildings and underground utility lines significantly reduces the environmental effectiveness of a flushing system.

3. Non-soluble compounds will not be flushed away.

4. The positive head may cause a vertical migration of contaminants into bedrock zones.

Alternative 6: Passive Containment with Collection of Groundwater

As a passive containment, horizontal and/or vertical grouting of the Buffalo Avenue Plant site was considered along with the operation of an active groundwater collection system. This alternative was found to be impractical for the following reasons:

1. The presence of buildings and the nature of the fill (shotrocks) along the Robert Moses Parkway, would make it difficult to construct a uniform grout curtain and verify its continuity.

2. By constructing a grout curtain along the perimeter of the plant site, the possibility of bringing back the off-plant contaminants into the groundwater collection system and treating them would have been impossible.

3. It was determined that a circumscribing slurry wall would have an insignificant impact on the total hydraulic load of the groundwater collection system in the plant site.

Alternative 7: Active Containment

This is the preferred alternative, which consists of a network of pumping wells as seen on Figure 10. Based on current information and analysis of the site investigation, Risk Assessment and Feasibility Study, the NYSDEC believes that this alternative for the overburden remediation is consistent with the requirements of both Federal and State laws, regulations and standards that are applicable or relevant and appropriate to the remedial action.

This alternative will mitigate contamination leaving the site through the overburden. This, as seen in Table 4, will amount to a 2-3 pound/day contaminant flux reduction which otherwise is discharged into the Niagara River. In addition, the preferred alternative will, over time, clean up the Buffalo Avenue plant site's contaminated groundwater, thereby reducing the potential vertical migration of plant's contaminants into bedrock zones. This, in turn, should reduce the off-site contaminant flux through bedrock zones.

Several groundwater modelling/simulations were conducted to estimate the groundwater withdrawal rate necessary to adequately prevent contamination from leaving the site through the overburden and to assist in designing a system (Figure 11, 12). An overburden remediation system consisting of a line of 22 pumping wells along the east-west axis of the plant was designed.

The proposed groundwater treatment system (Figure 14) is a process whereby contaminated groundwater is collected from the 22 pumping wells along the axis of the Niagara Plant. A schematic for a typical pumping well is shown in Figure 13. It is anticipated that each pumping well will yield approximately 1-5 gpm, for a maximum combined yield of 110 gpm. Collected water will be processed at the treatment plant with steam and the stripped organics will be condensed, stored and periodically shipped off site as hazardous waste. This technology will meet all indicated BAT target levels for volatile compounds.

Effluent from the treatment plant will be monitored and discharged to the City of Niagara Falls Waste Water Treatment Plant which will further remove any remaining organics and inorganics from the effluent.

A monitoring program will be in place to evaluate and confirm that the remediation system is performing properly and is meeting the specified performance criteria. Periodically, quality of effluent from the water treatment plant will be analyzed to ensure it meets the discharge criteria. No groundwater discharges will be permitted until the discharge criteria for effluent is satisfied. In addition, selected monitoring wells at the plant site will be monitored periodically to determine the long term effect of pumping on the plant site groundwater quality. Furthermore, the establishment of a hydraulic barrier in both the overburden and bedrock zones will be monitored by measuring water elevations in existing utility and monitoring wells and in new piezometers placed throughout the plant site.

In summary, the Interim Remedial Action plan for the Niagara Plant overburden groundwater has been assessed to be the most appropriate plan and includes the following features:

1. This alternative provides a high level of protection to the environment by mitigating the migration of contaminants and by removing contaminated groundwater from the Du Pont plant site.

2. This alternative provides for permanent reduction in the toxicity, mobility and volume of contaminants found in overburden and bedrock groundwater.

3. This alternative is implemented using conventional construction methods and is technically the most reliable alternative considered.

4. This alternative is flexible enough to meet the performance objective of the Interim Remedial Action Plan by 1) adjusting the pumping rate of individual wells, and or 2) optimizing the total number of pumping wells at a given period.

VII. SUMMARY OF THE STATE DECISION

A. Public Participation

Citizen Participation activities for the Du Pont Niagara Plant site began in September 1989 with the establishment of a local document repository at the Niagara Falls Public Library. A citizen participation plan was finalized in October 1989.

A public meeting was held on October 19, 1989, to present the proposed site remedial action plan and to receive public input. A 30-day comment period was held for additional public input. Despite notice to local citizens, only one citizen attended the meeting. No input was received at the meeting. No technical comments were received during the 30-day comment period, although several verbal comments were received from the Erie and Niagara Counties Regional Planning Board (ENCRPB). These comments basically requested that plant site groundwater quality data be shared with other on-going projects in Niagara County.

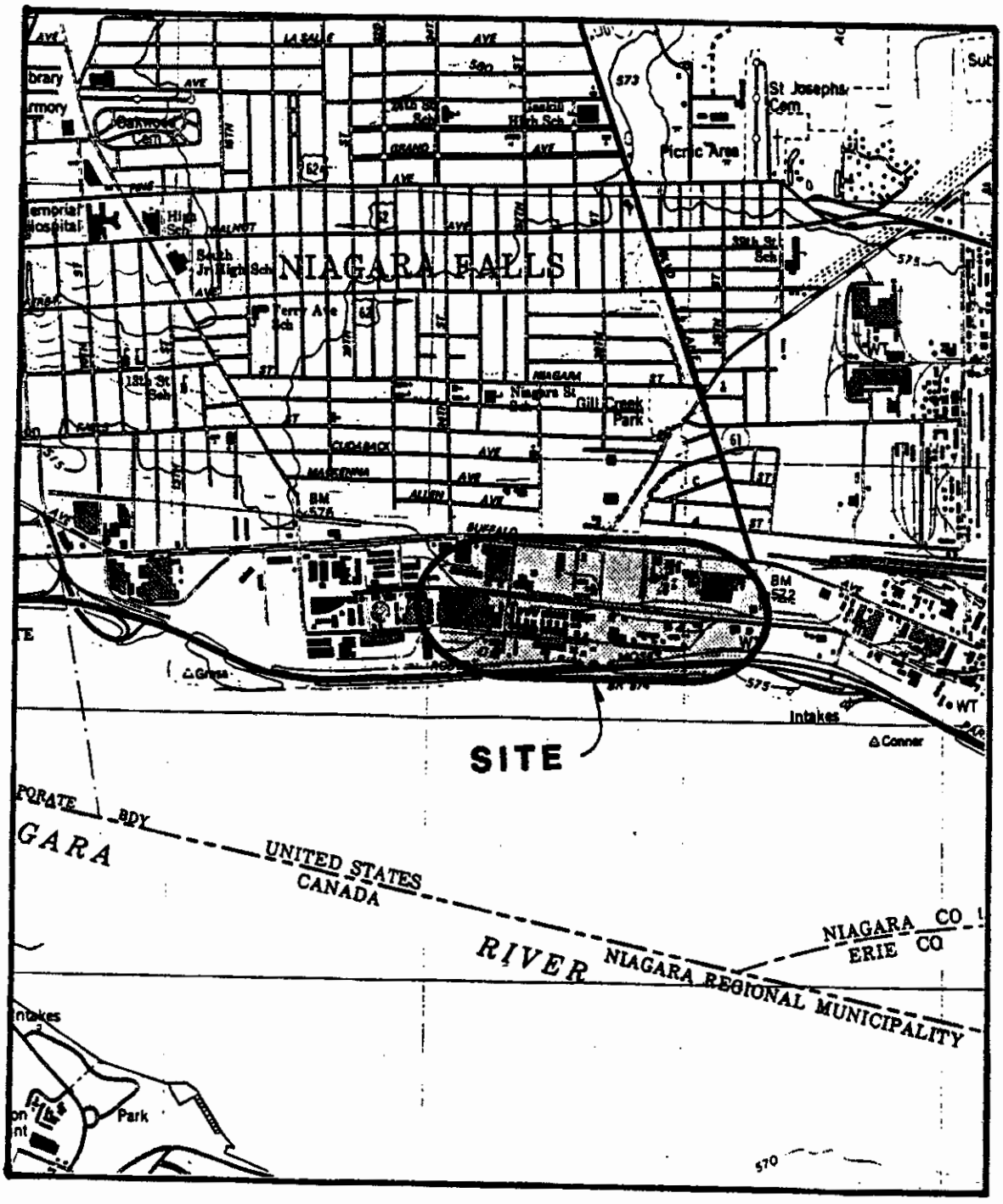
A transcript of the public meeting has been made part of the Administrative Record and is available to the public at the document repositories. No responsiveness summary was prepared due to lack of technical questions and comments from the public. Following the public meeting, a brief meeting summary was sent to the site contact list. However, no additional public inquiries were received.

B. Summary of Selected Remedial Action

The Interim Remedial Action Plan for the Du Pont Niagara Plant has been selected to mitigate the migration of contaminants from the plant's overburden and bedrock zones. The remedial plan includes provision for the collection and treatment of contaminated groundwater. Effluent from the overburden treatment system will be further treated at the City of Niagara Falls Wastewater Treatment Plant. The bedrock groundwater will continue to be treated at the Olin's carbon adsorption units and discharged under a SPDES permit. Long term monitoring, and the annual assessment of the program are also important elements included in the remedial plan.

DU PONT RECORD OF DECISION
APPENDIX A

FIGURES AND TABLES



NIAGARA PLANT
REGIONAL LOCATION PLAN
NIAGARA PLANT
E.I.du PONT de NEMOURS AND COMPANY

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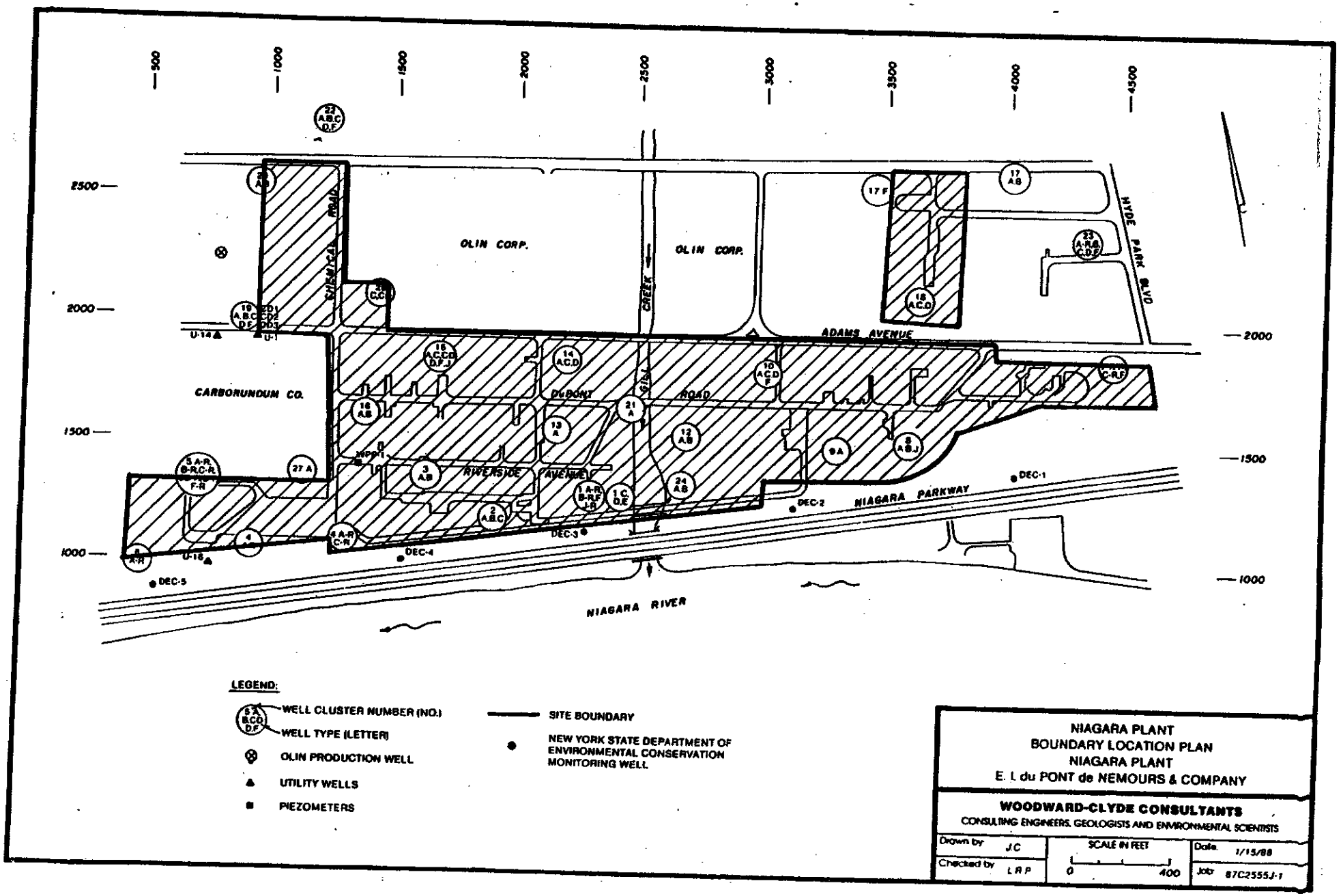
Checked by L.R.P.		Job 88C2075B-5

FIGURE 1



NIAGARA PLANT
BOUNDARY LOCATION PLAN
NIAGARA PLANT
E. I. du PONT de NEMOURS & COMPANY

WOODWARD-CLYDE CONSULTANTS
CONSULTING ENGINEERS, GEOLOGISTS AND ENVIRONMENTAL SCIENTISTS

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FIGURE 2

HISTORY OF CHEMICAL PROCESSES (1900's)
REMEDIAL ACTION PROGRAM
DUPONT NIAGARA FALLS PLANT
NIAGARA FALLS, NEW YORK

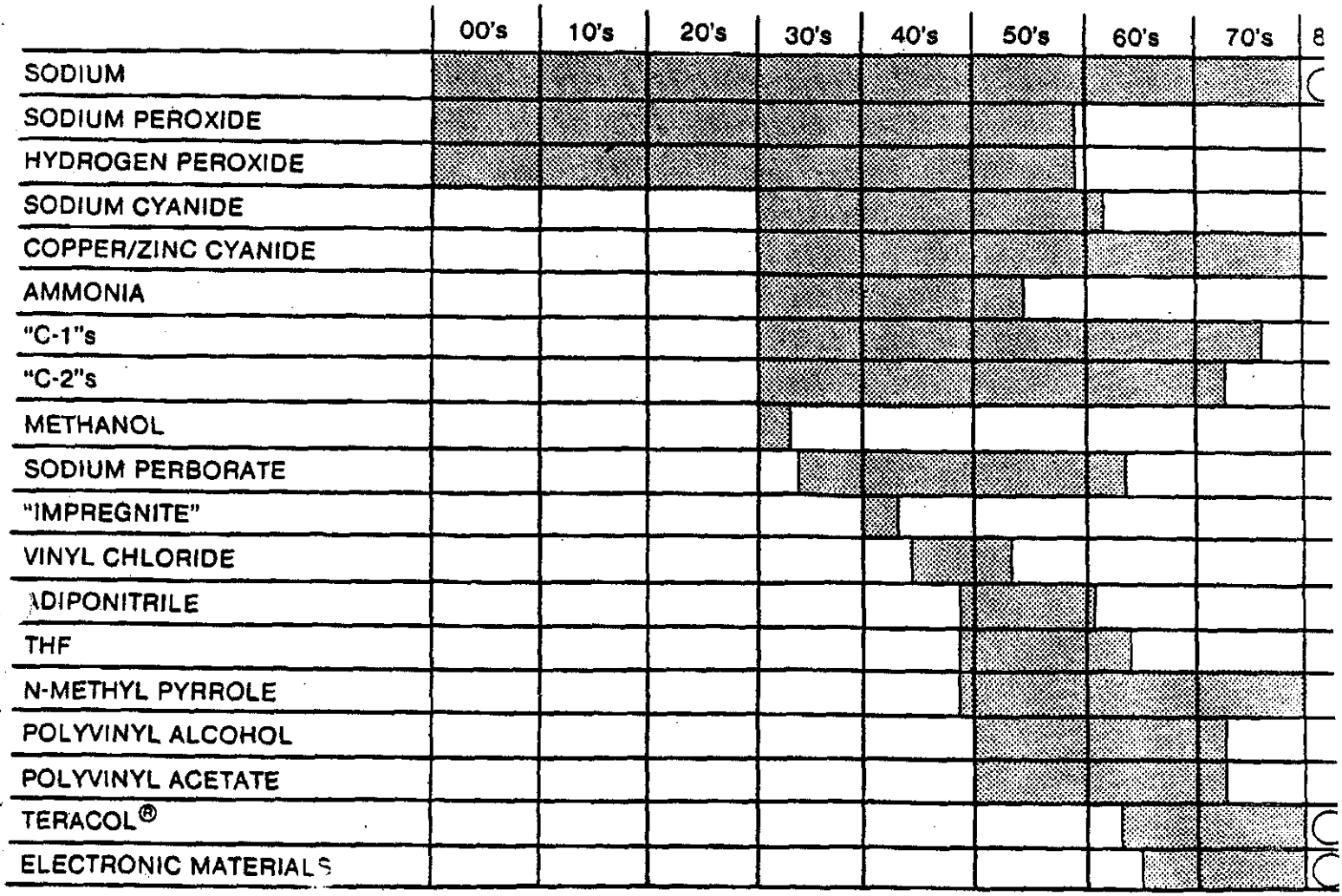
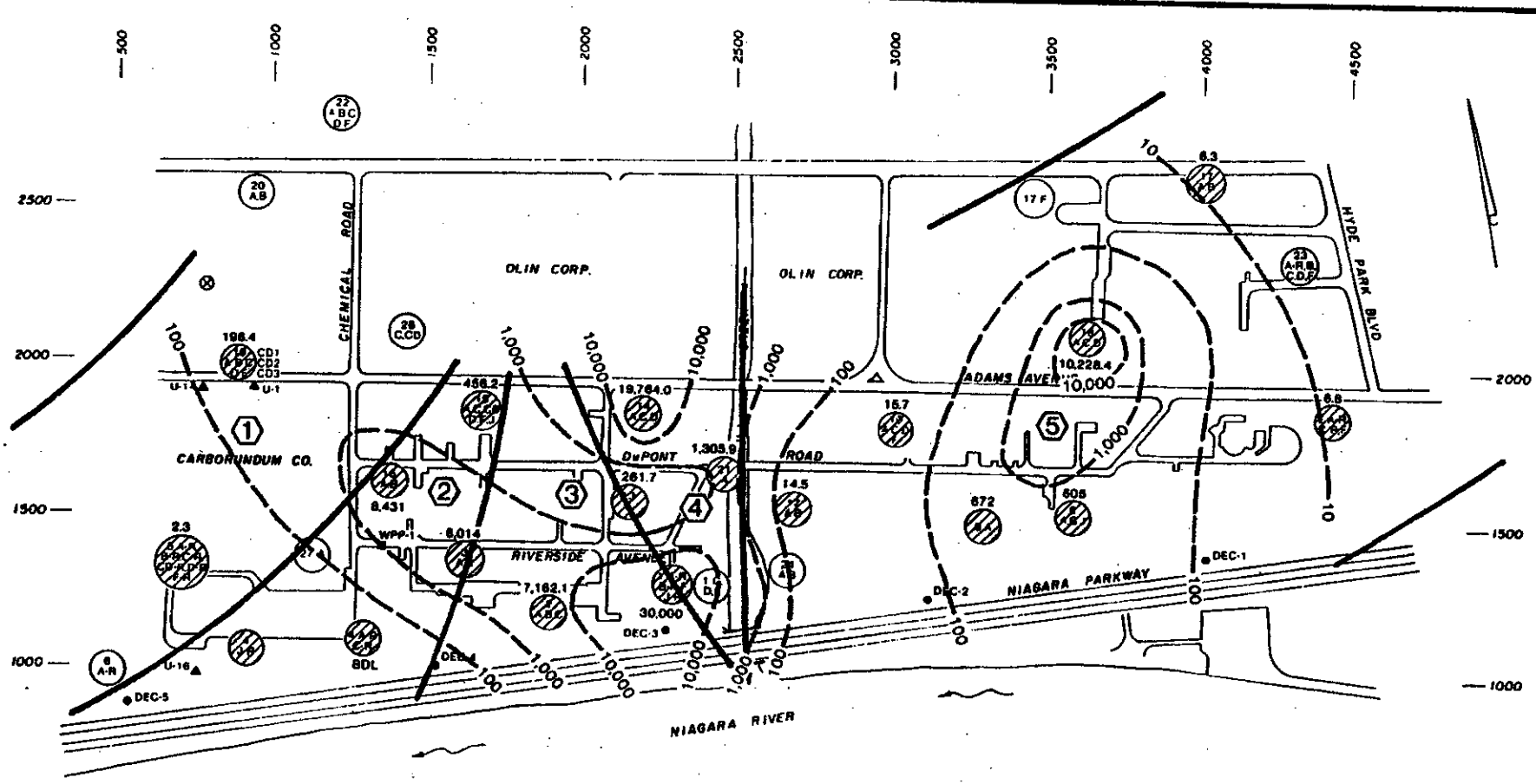


FIGURE 3

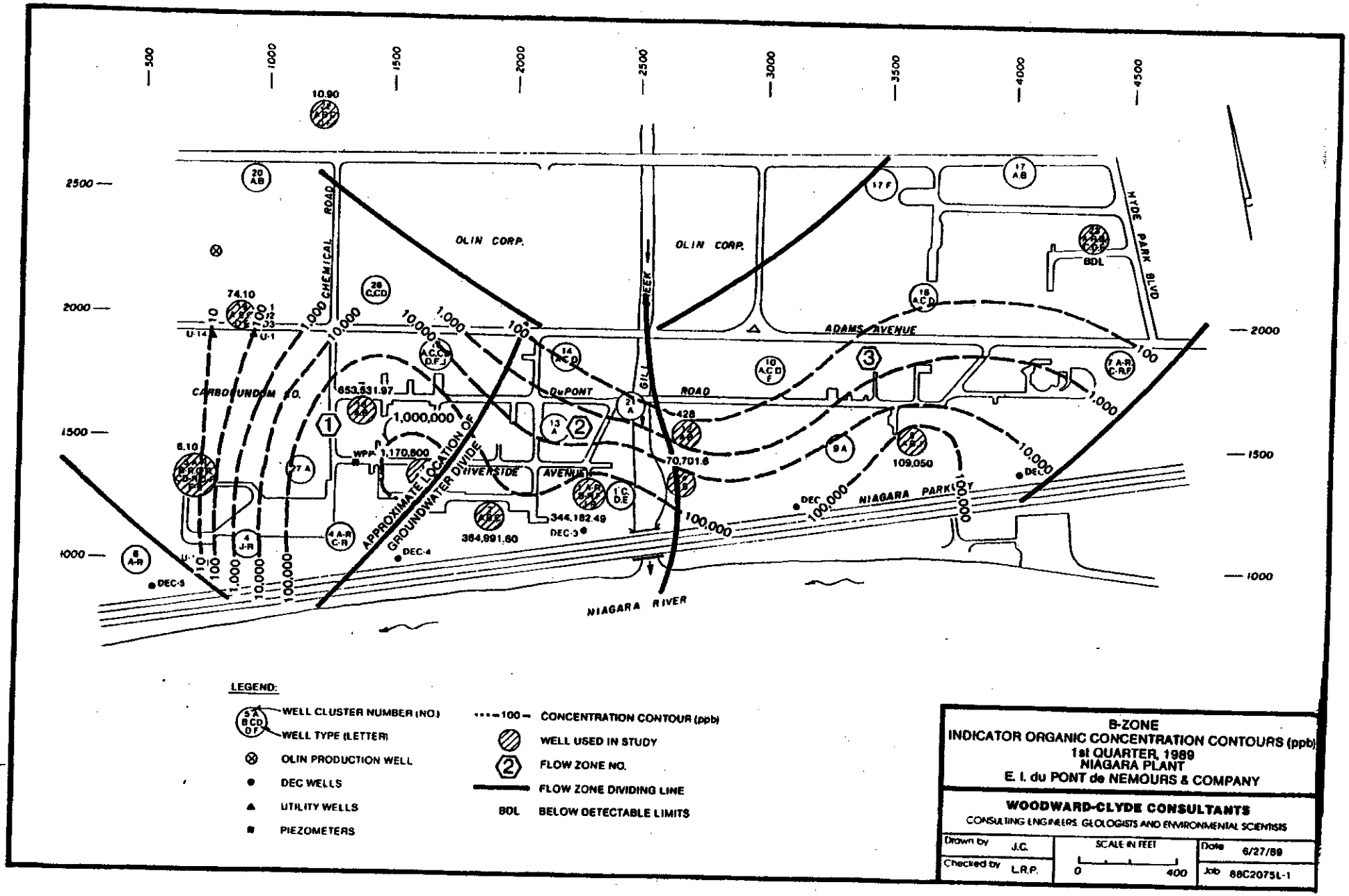


A-ZONE
INDICATOR ORGANIC CONCENTRATION CONTOURS (ppb)
1st QUARTER, 1989
NIAGARA PLANT
E. I. du PONT de NEMOURS & COMPANY

WOODWARD-CLYDE CONSULTANTS
CONSULTING ENGINEERS, GEOLOGISTS AND ENVIRONMENTAL SCIENTISTS

Drawn by J.C.	SCALE IN FEET 0 400	Date 6/27/89
Checked by L.R.P.		Job 88C2075L-1

FIGURE 4



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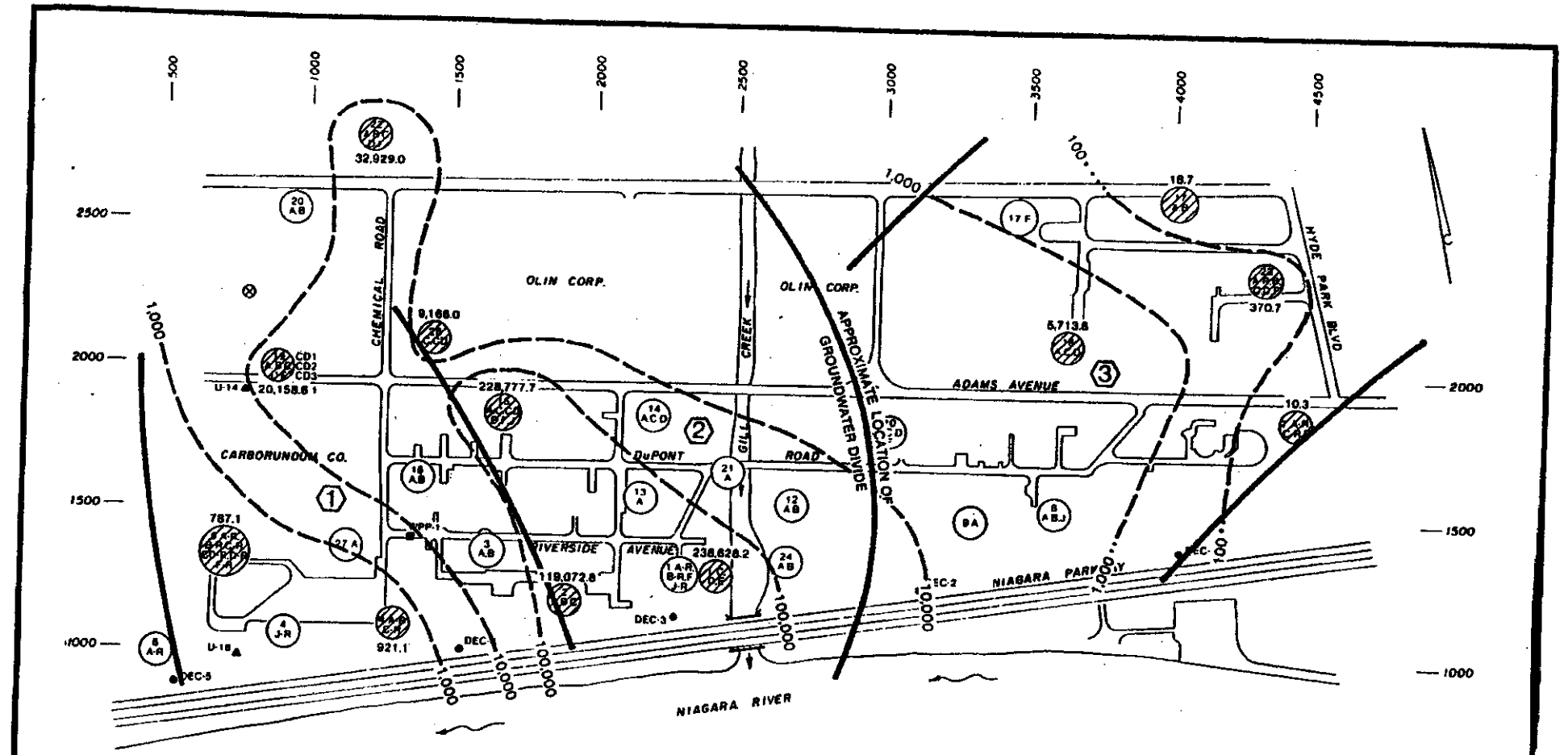

LEGEND:

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- WELL TYPE (LETTER)
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- DEC WELLS
- UTILITY WELLS
- PIEZOMETERS
- 100 — CONCENTRATION CONTOUR (ppb)
- WELL USED IN STUDY
- 2 — FLOW ZONE NO.
- FLOW ZONE DIVIDING LINE
- BDL — BELOW DETECTABLE LIMITS

CD-ZONE
INDICATOR ORGANIC CONCENTRATION CONTOURS (ppb)
1st QUARTER, 1989
NIAGARA PLANT
E. I. du PONT de NEMOURS & COMPANY

WOODWARD-CLYDE CONSULTANTS
CONSULTING ENGINEERS, GEOLOGISTS AND ENVIRONMENTAL SCIENTISTS

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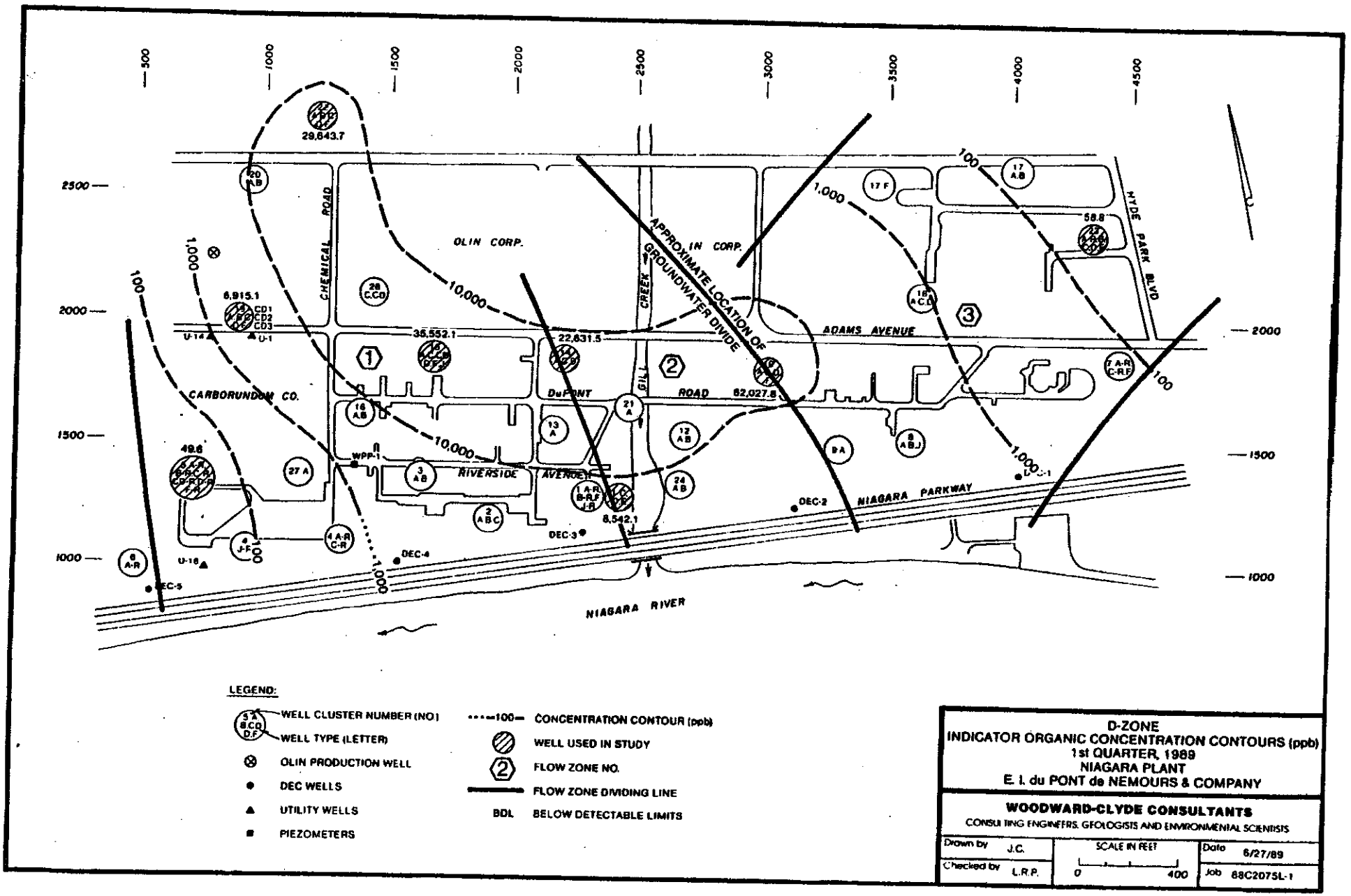
FIGURE 4 (continued)



LEGEND:

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- WELL TYPE (LETTER)
- OLIN PRODUCTION WELL
- DEC WELLS
- UTILITY WELLS
- PIEZOMETERS
- 100 CONCENTRATION CONTOUR (ppb)
- WELL USED IN STUDY
- FLOW ZONE NO.
- FLOW ZONE DIVIDING LINE
- BDL BELOW DETECTABLE LIMITS

D-ZONE
INDICATOR ORGANIC CONCENTRATION CONTOURS (ppb)
1st QUARTER, 1989
NIAGARA PLANT
E. I. du PONT de NEMOURS & COMPANY

WOODWARD-CLYDE CONSULTANTS
CONSULTING ENGINEERS, GEOLOGISTS AND ENVIRONMENTAL SCIENTISTS

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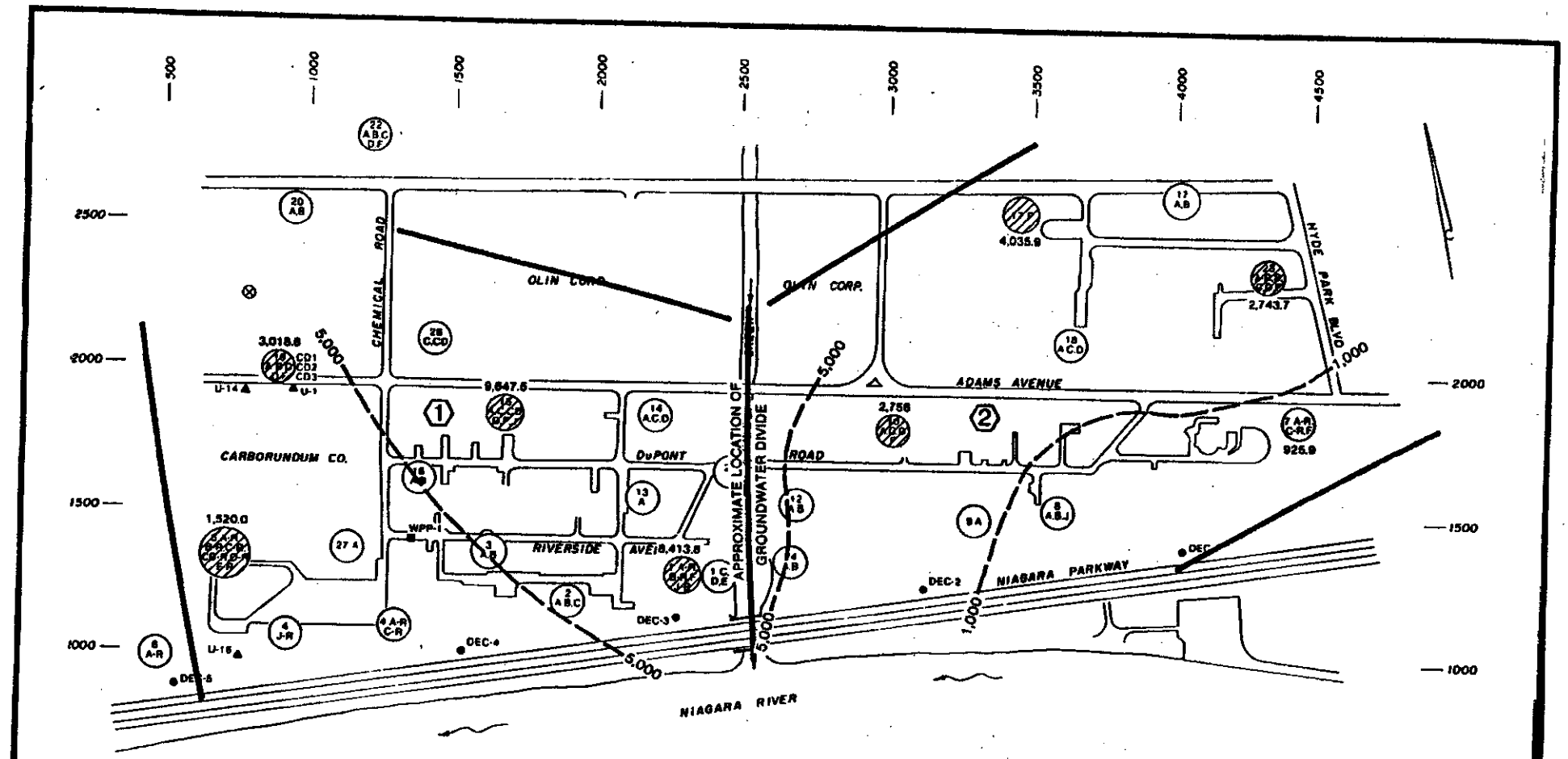
FIGURE 4 (continued)



LEGEND:

- WELL CLUSTER NUMBER (NO.)
- WELL TYPE (LETTER)
- OLIN PRODUCTION WELL
- DEC WELLS
- UTILITY WELLS
- PIEZOMETERS
- ----100---- CONCENTRATION CONTOUR (ppb)
- WELL USED IN STUDY
- (2) FLOW ZONE NO.
- FLOW ZONE DIVIDING LINE
- BDL BELOW DETECTABLE LIMITS

F-ZONE
INDICATOR ORGANIC CONCENTRATION CONTOURS (ppb)
1st QUARTER, 1989
NIAGARA PLANT
E. I. du PONT de NEMOURS & COMPANY

WOODWARD-CLYDE CONSULTANTS
CONSULTING ENGINEERS, GEOLOGISTS AND ENVIRONMENTAL SCIENTISTS

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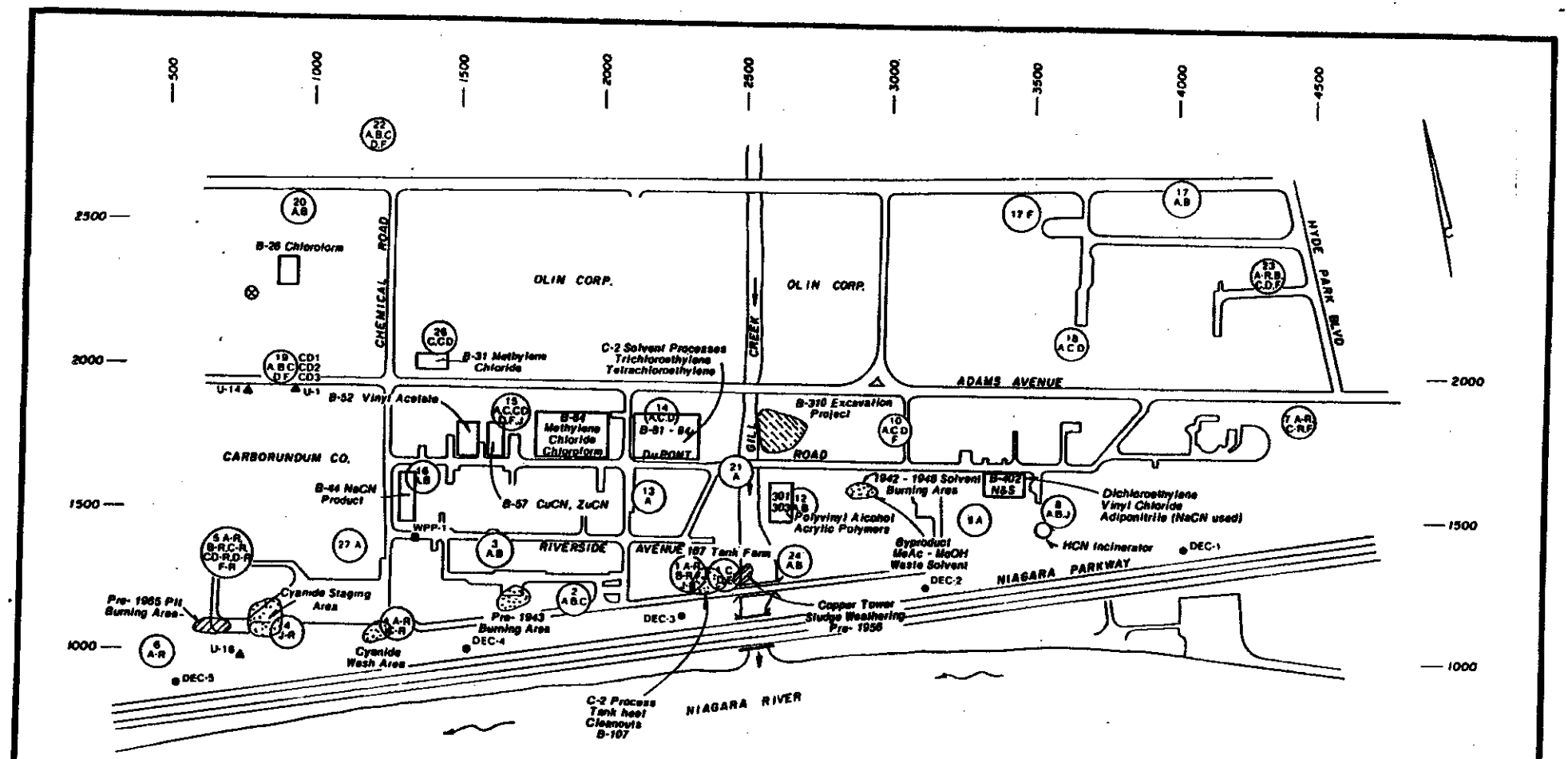
Checked by: L.R.P.		Job: 88C2075L-1

FIGURE 4 (continued)



LOCATIONS OF HISTORICAL PROCESSES AND EVENTS
NIAGARA PLANT
E. I. DuPONT DE NEMOURS & CO.

WOODWARD-CLYDE CONSULTANTS
CONSULTING ENGINEERS, GEOLOGISTS AND ENVIRONMENTAL SCIENTISTS

Drawn by T. P.	SCALE IN FEET 0 400	Date 1/15/88
Checked by L.R.P.		Job 87C2555 J1

FIGURE 5

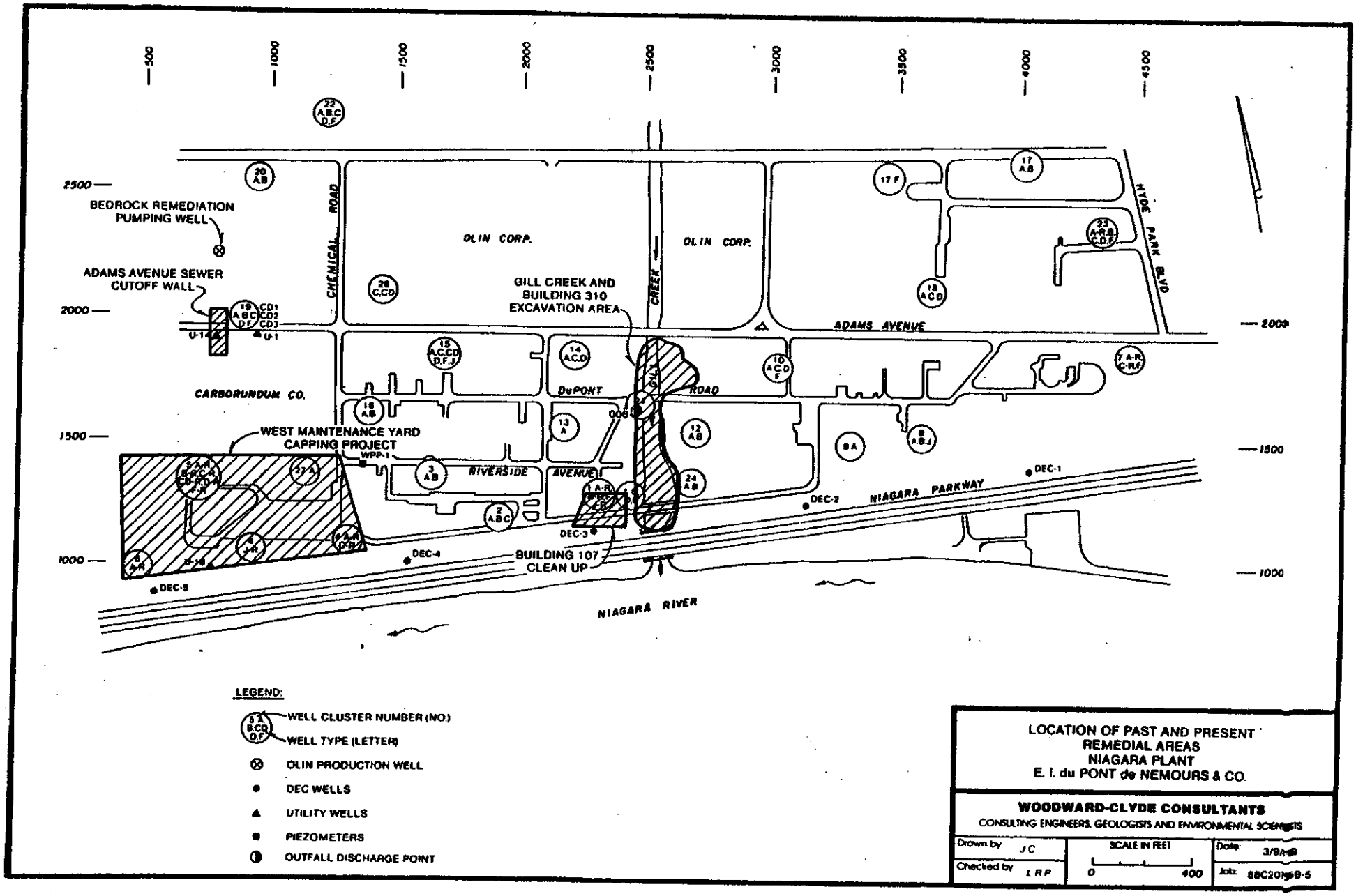
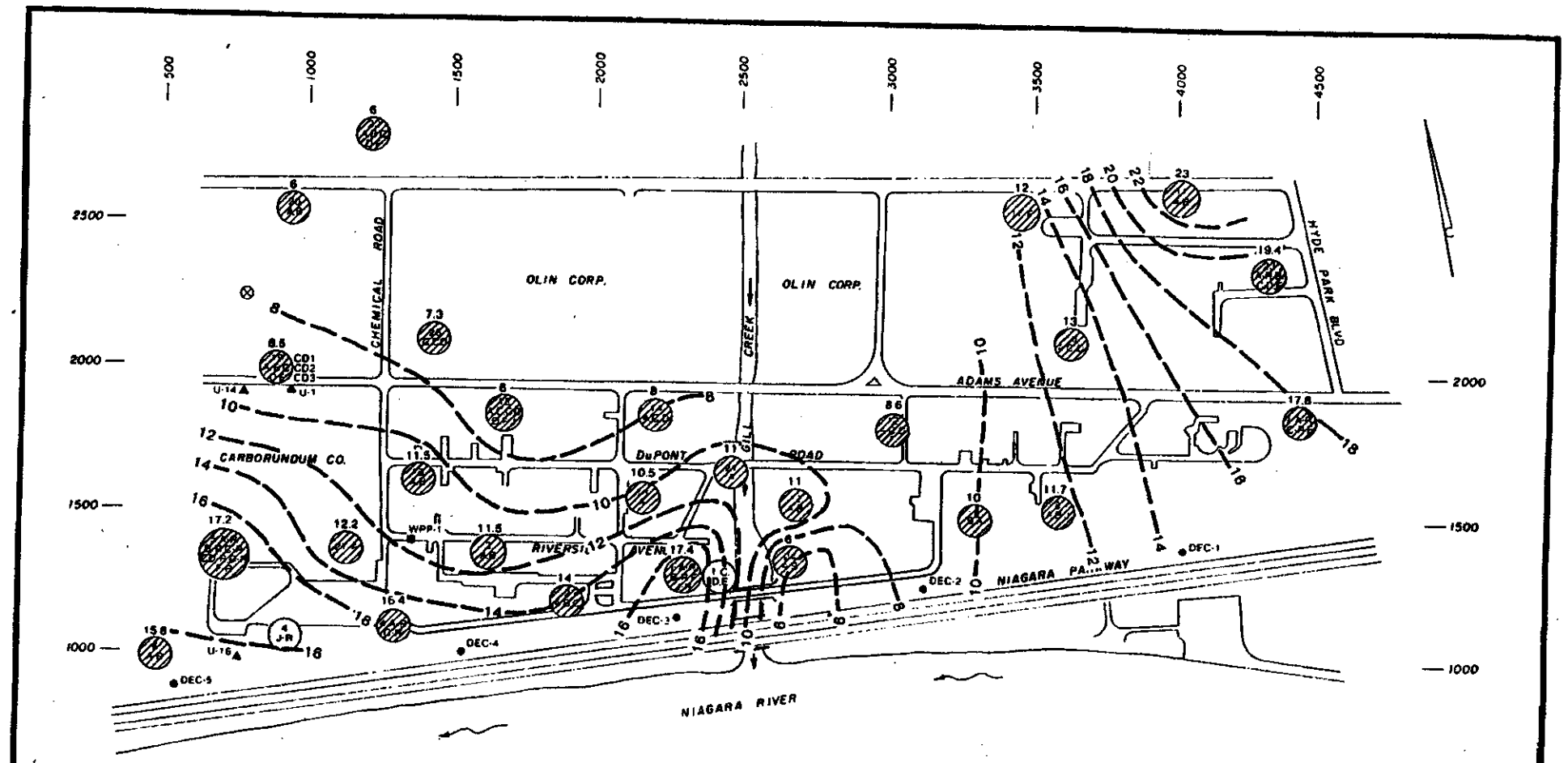

500
1000
1500
2000
2500
3000
3500
4000
4500
2500
2000
1500
1000
BEDROCK REMEDIATION PUMPING WELL
ADAMS AVENUE SEWER CUTOFF WALL
CHEMICAL ROAD
OLIN CORP.
OLIN CORP.
GILL CREEK AND BUILDING 310 EXCAVATION AREA
CREEK
HYDE PARK BLVD
ADAMS AVENUE
CARBORUNDUM CO.
DuPONT
ROAD
WEST MAINTENANCE YARD CAPPING PROJECT
WPP-1
RIVERSIDE
AVENUE
NIAGARA PARKWAY
BUILDING 107 CLEAN UP
NIAGARA RIVER
DEC-1
DEC-2
DEC-3
DEC-4
DEC-5
U-1
U-1A
006
LEGEND:
WELL CLUSTER NUMBER (NO.)
WELL TYPE (LETTER)
OLIN PRODUCTION WELL
DEC WELLS
UTILITY WELLS
PIEZOMETERS
OUTFALL DISCHARGE POINT
LOCATION OF PAST AND PRESENT REMEDIAL AREAS
NIAGARA PLANT
E. I. du PONT de NEMOURS & CO.
WOODWARD-CLYDE CONSULTANTS
CONSULTING ENGINEERS, GEOLOGISTS AND ENVIRONMENTAL SCIENTISTS
Drawn by J C
Checked by L R P
SCALE IN FEET
0
400
Date: 3/84
Job: 88C2015-B-5

FIGURE 6

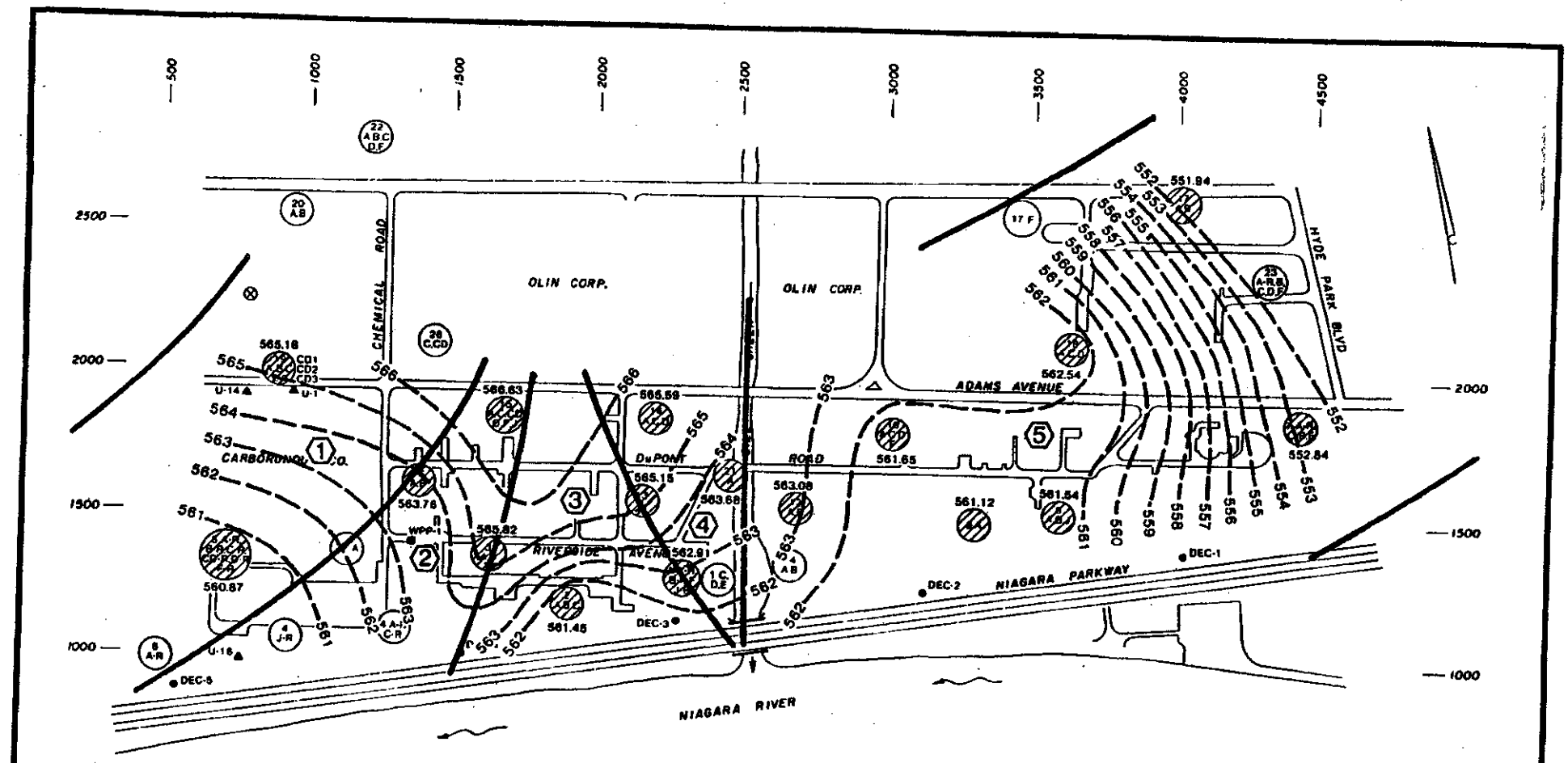


ISOPACH MAP OF FILL / OVERBURDEN
NIAGARA PLANT
E. I. du PONT de NEMOURS & COMPANY

WOODWARD-CLYDE CONSULTANTS
CONSULTING ENGINEERS, GEOLOGISTS AND ENVIRONMENTAL SCIENTISTS

Drawn by T.P.	SCALE IN FEET 0 400	Date 12/11/87
Checked by M.D.		Job 87 C 2555 J-1

FIGURE 7



LEGEND:

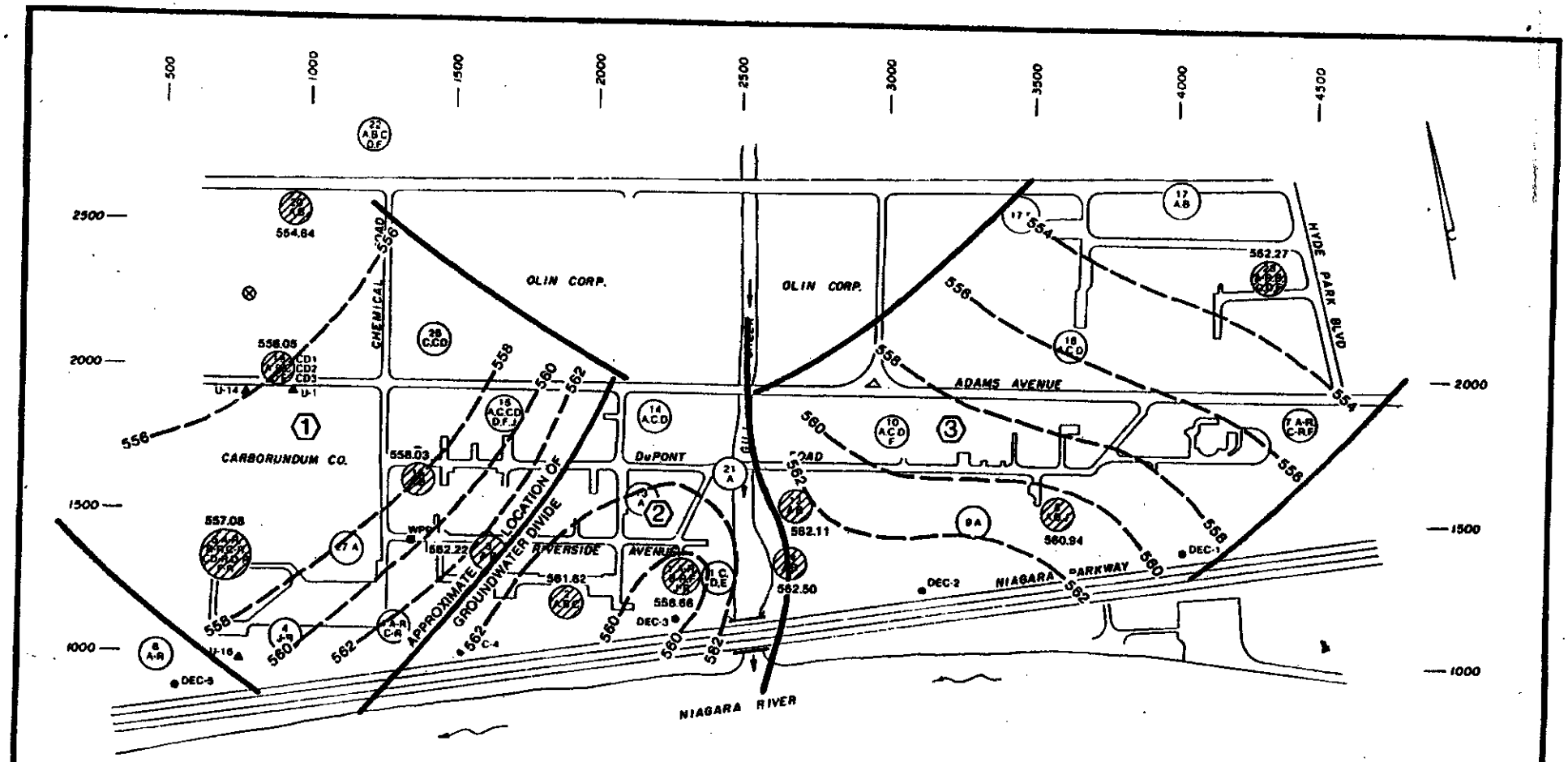
- WELL CLUSTER NUMBER (NO.)
- WELL TYPE (LETTER)
- OLIN PRODUCTION WELL
- DEC WELLS
- UTILITY WELLS
- PIEZOMETERS
- 560 GROUNDWATER CONTOUR (ft.)
- WELL USED IN STUDY
- FLOW ZONE NO.
- FLOW ZONE DIVIDING LINE
- BDL BELOW DETECTABLE LIMITS

A-ZONE
GROUNDWATER ELEVATION CONTOURS
1st QUARTER, 1989
NIAGARA PLANT
E. I. du PONT de NEMOURS & COMPANY

WOODWARD-CLYDE CONSULTANTS
CONSULTING ENGINEERS, GEOLOGISTS AND ENVIRONMENTAL SCIENTISTS

Drawn by J.C.	SCALE IN FEET 0 400	Date	6/27/89
Checked by L.R.P.		Job	88C2075L-1

FIGURE 8

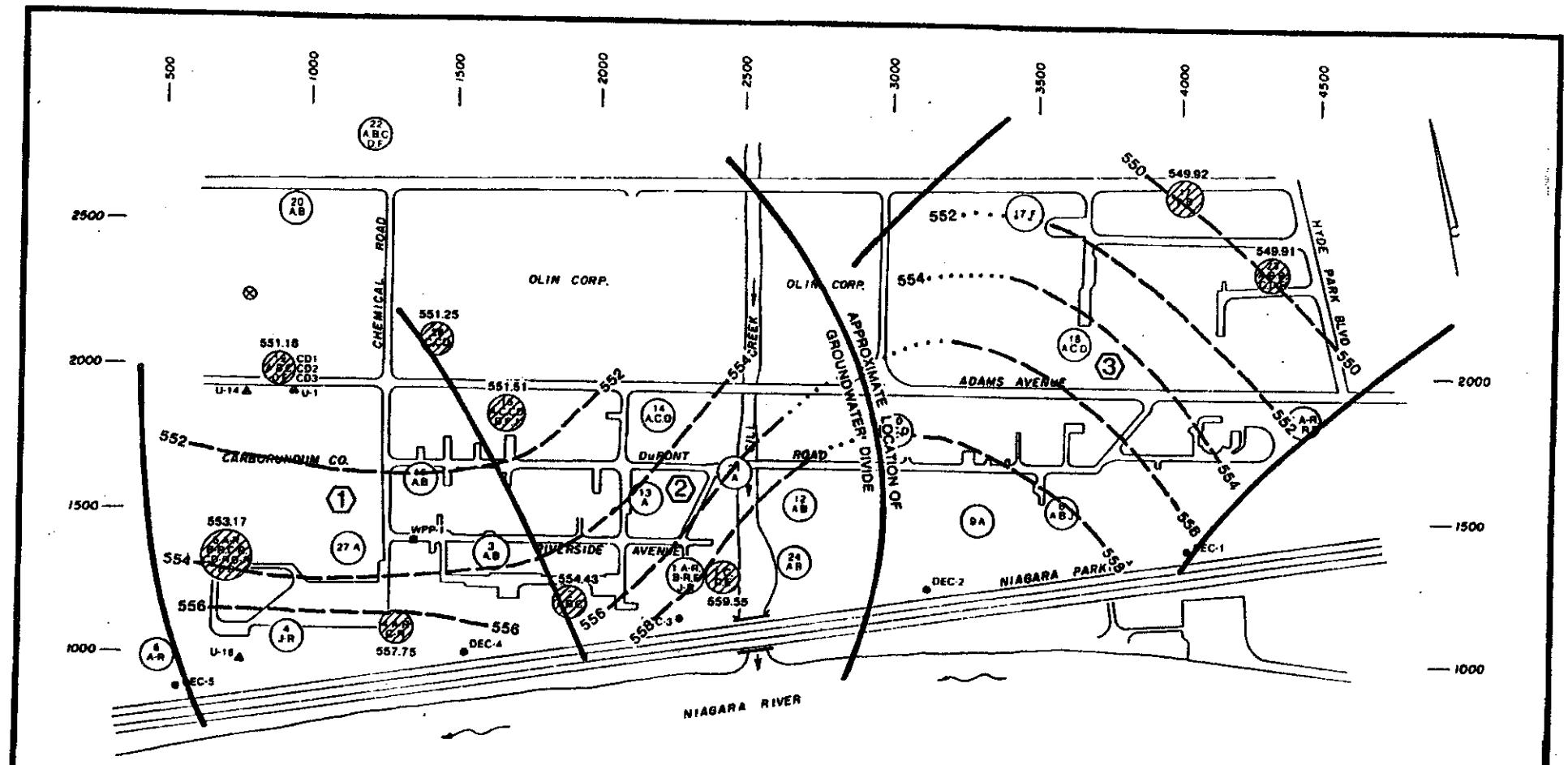


B-ZONE
GROUNDWATER ELEVATION CONTOURS
1st QUARTER, 1989
NIAGARA PLANT
E. I. du PONT de NEMOURS & COMPANY

WOODWARD-CLYDE CONSULTANTS
CONSULTING ENGINEERS, GEOLOGISTS AND ENVIRONMENTAL SCIENTISTS

Drawn by J.C.	SCALE IN FEET 0 400	Date 8/27/89
Checked by L.R.P.		Job 88C2075L-1

FIGURE 8 (continued)



LEGEND:

- WELL CLUSTER NUMBER (NO.)
- WELL TYPE (LETTER)
- OLIN PRODUCTION WELL
- DEC WELLS
- UTILITY WELLS
- PIEZOMETERS
- 560 GROUNDWATER CONTOUR (ft.)
- WELL USED IN STUDY
- FLOW ZONE NO.
- FLOW ZONE DIVIDING LINE
- BDL BELOW DETECTABLE LIMITS

CD-ZONE
GROUNDWATER ELEVATION CONTOURS
1st QUARTER, 1989
NIAGARA PLANT
E. I. du PONT de NEMOURS & COMPANY

WOODWARD-CLYDE CONSULTANTS
CONSULTING ENGINEERS, GEOLOGISTS AND ENVIRONMENTAL SCIENTISTS

Drawn by J.C.	SCALE IN FEET 0 400	Date 6/27/89
Checked by L.R.P.		Job 88C2075L-1

FIGURE 8 (continued)

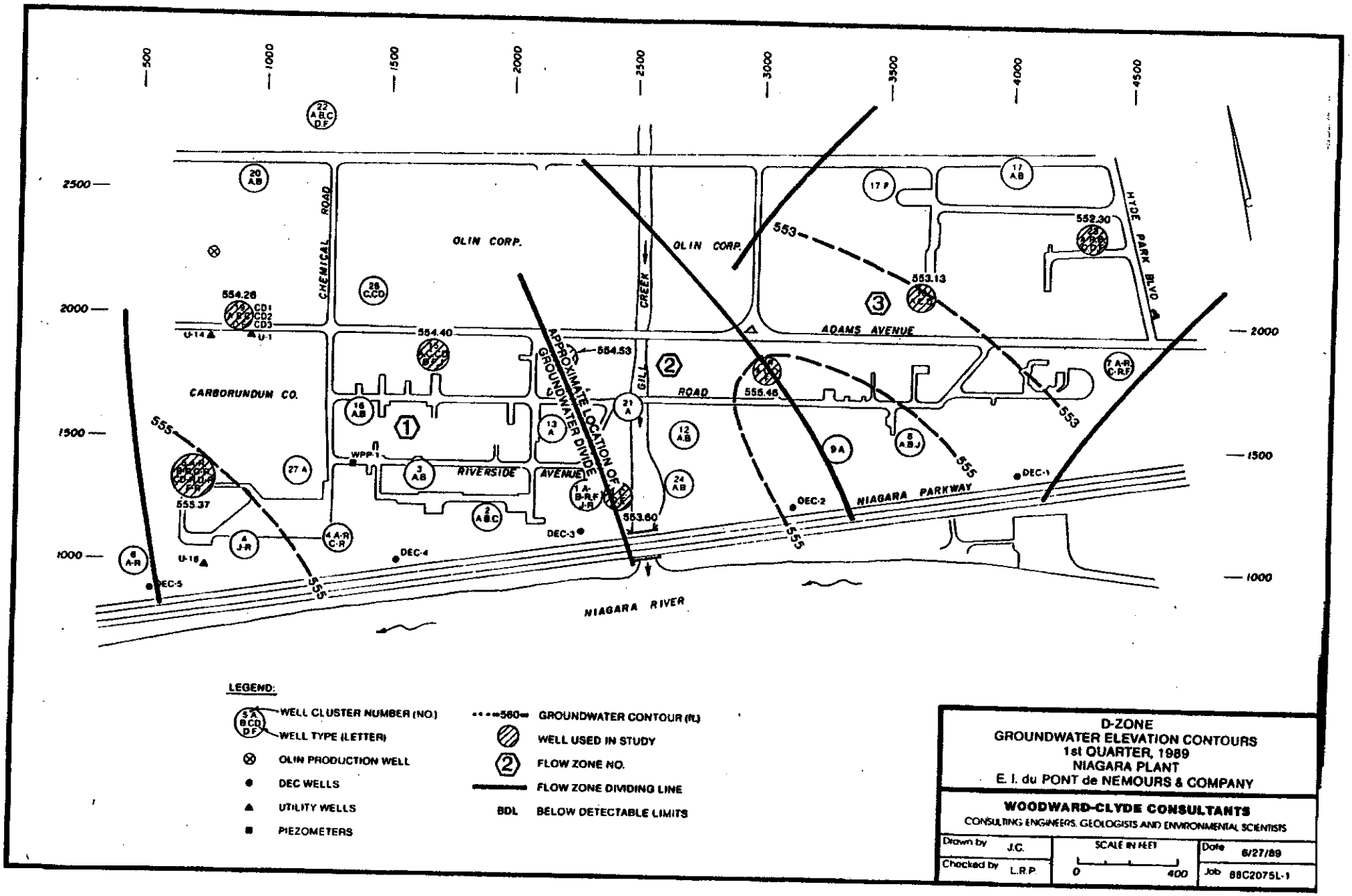
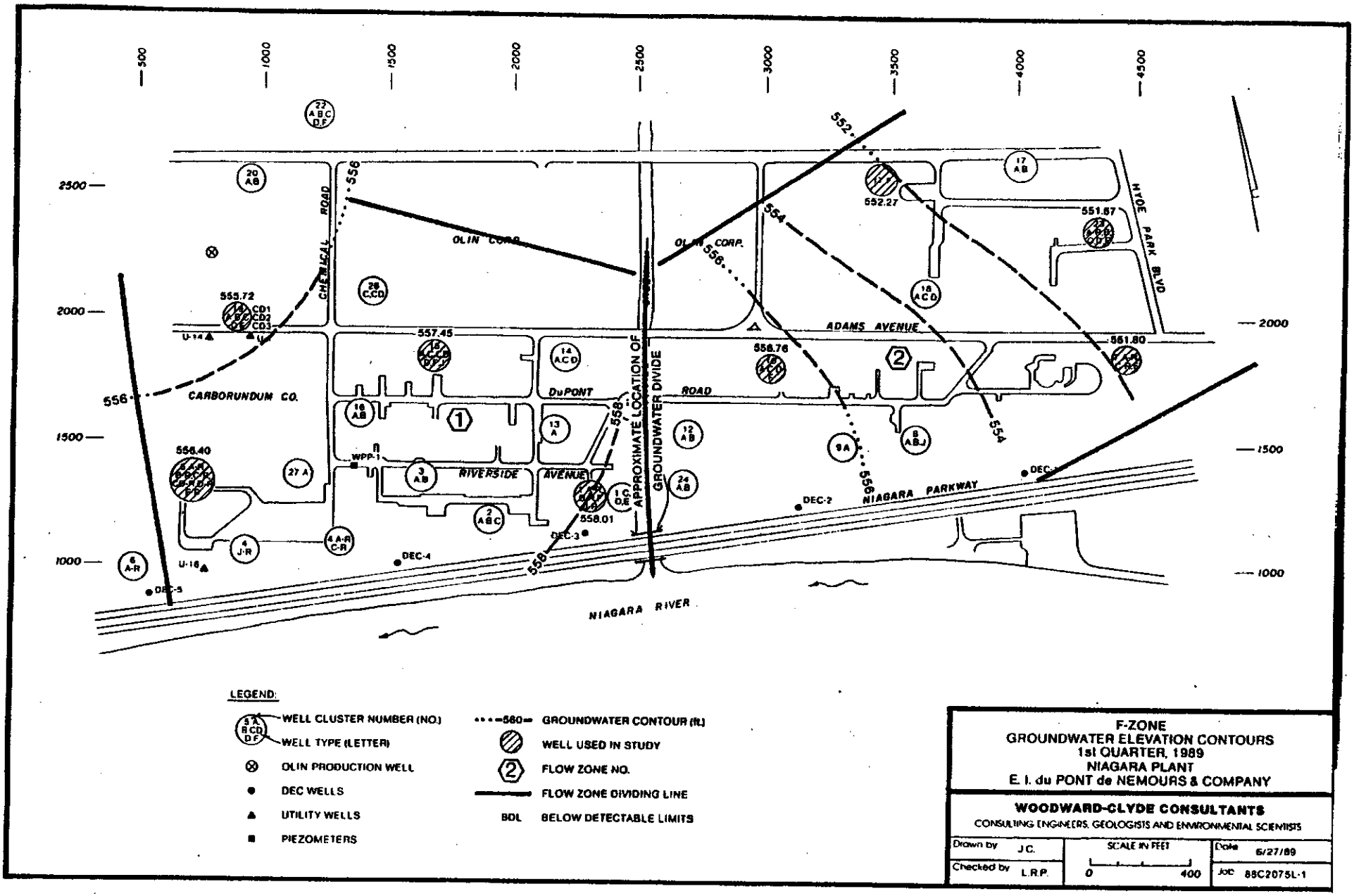


FIGURE 8 (continued)

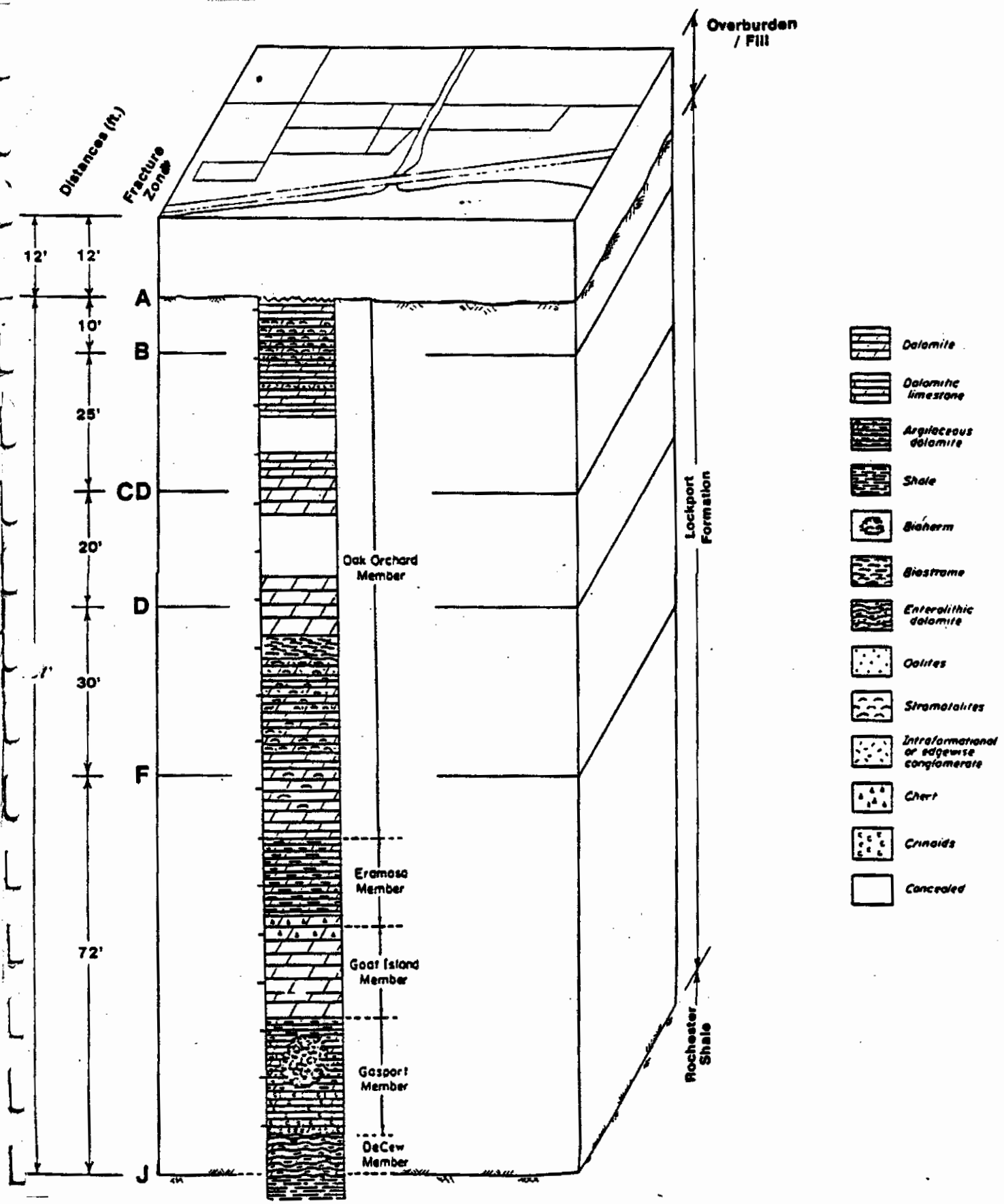


F-ZONE
GROUNDWATER ELEVATION CONTOURS
1st QUARTER, 1989
NIAGARA PLANT
E. I. du PONT de NEMOURS & COMPANY

WOODWARD-CLYDE CONSULTANTS
CONSULTING ENGINEERS, GEOLOGISTS AND ENVIRONMENTAL SCIENTISTS

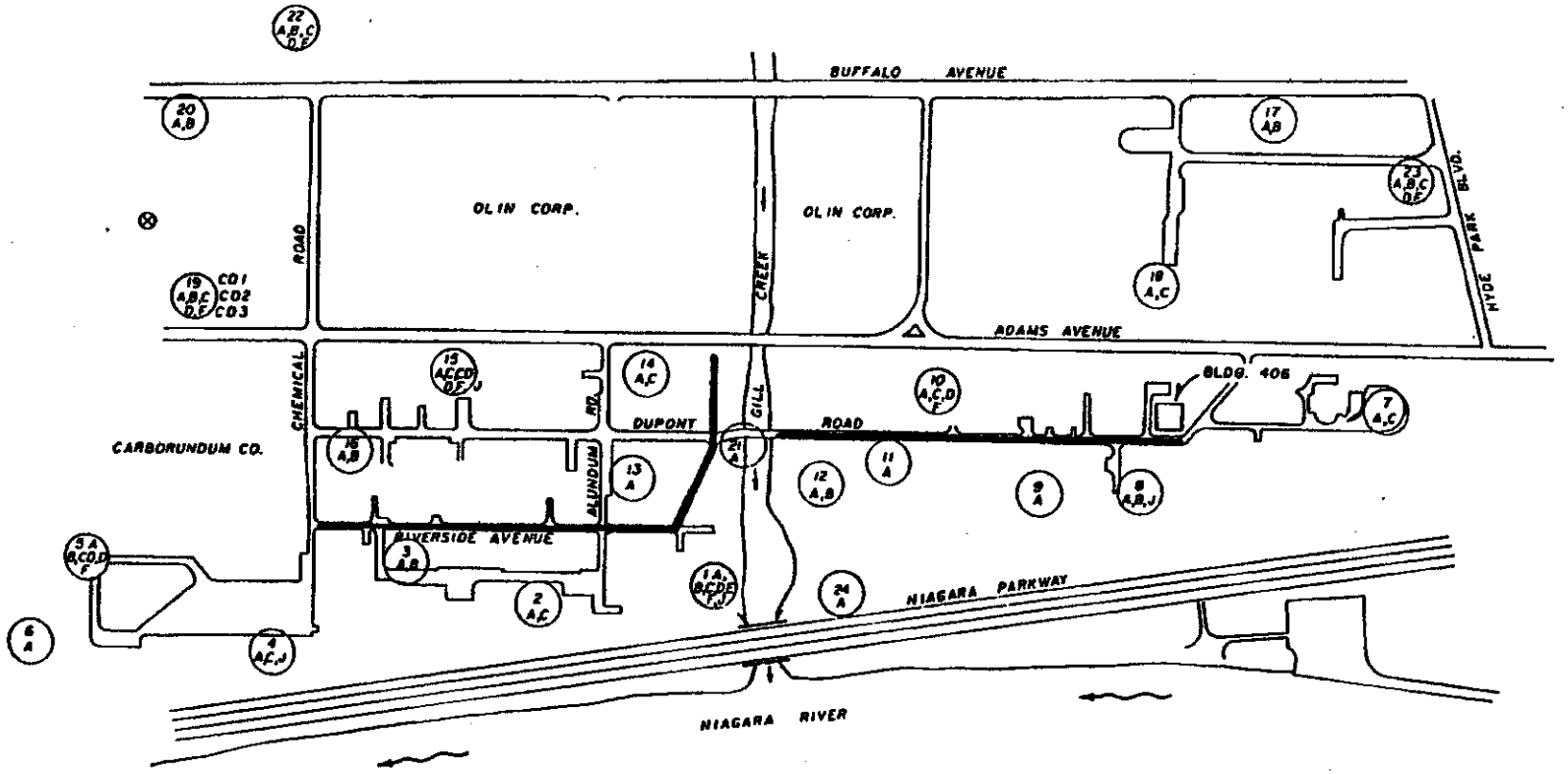
Drawn by J.C.	SCALE IN FEET 0 400	Date 6/27/89
Checked by L.R.P.		Job 88C2075L-1

FIGURE 8 (continued)



LOCKPORT FORMATION STRATIGRAPHY
NIAGARA PLANT
E. I. DuPONT DE NEMOURS & CO.

FIGURE 9



LEGEND:

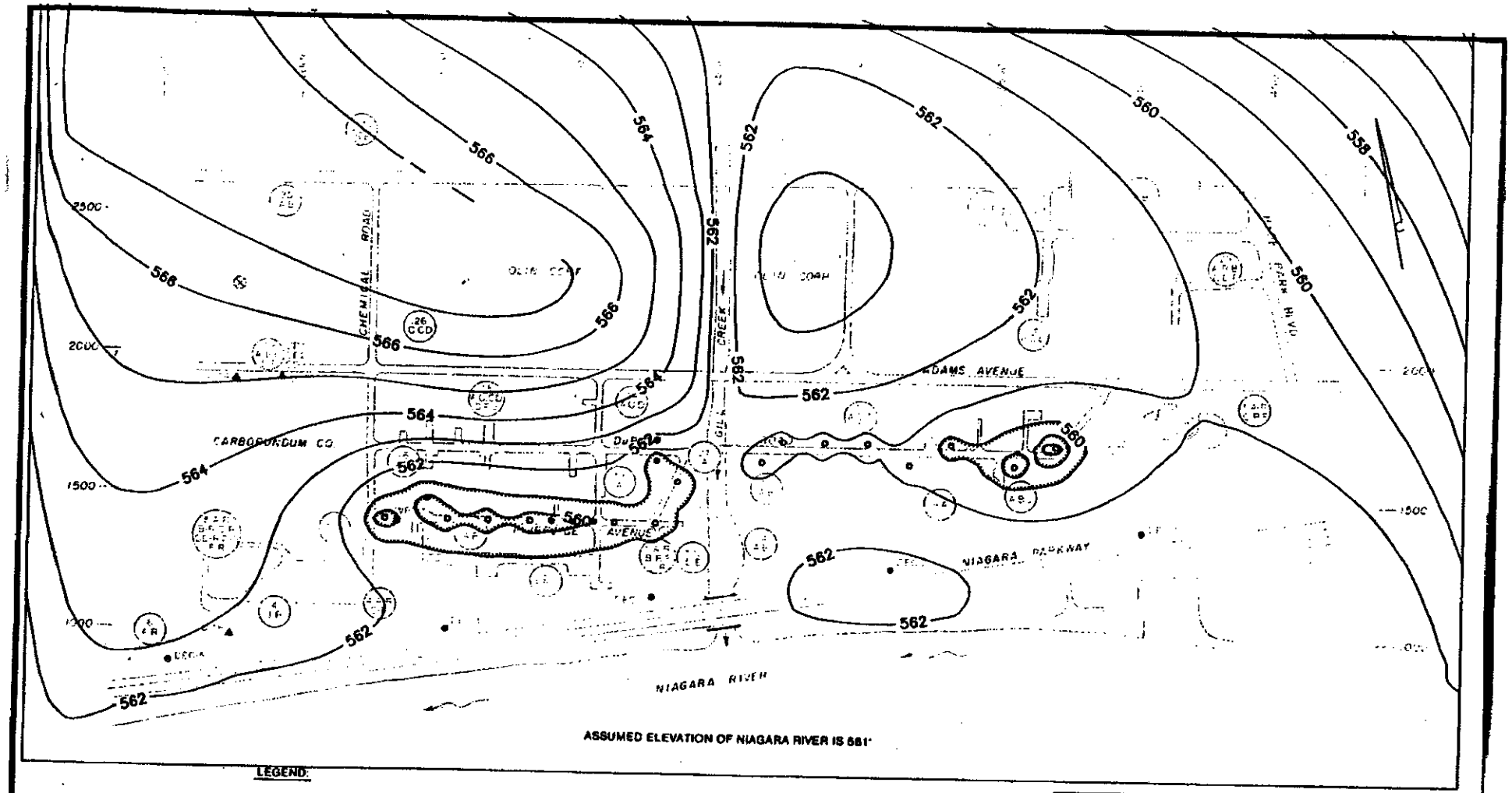
- 17 A,B — WELL CLUSTER NUMBER (NO.) / WELL TYPE (LETTER)
- ⊗ OLIN PRODUCTION WELL
- PUMPING WELL TRACE

PUMPING WELL TRACE
CONFIGURATION NO. 2
NIAGARA PLANT
E.I. DuPONT DE NEMOURS & CO.

WOODWARD-CLYDE CONSULTANTS
CONSULTING ENGINEERS, GEOLOGISTS AND ENVIRONMENTAL SCIENTISTS

DRAWN BY: T.P.	SCALE IN FEET 0 300	DATE: 2/21/86
CHECKED: M.N.G.		JOB #: 83C2236

FIGURE 10



LEGEND:

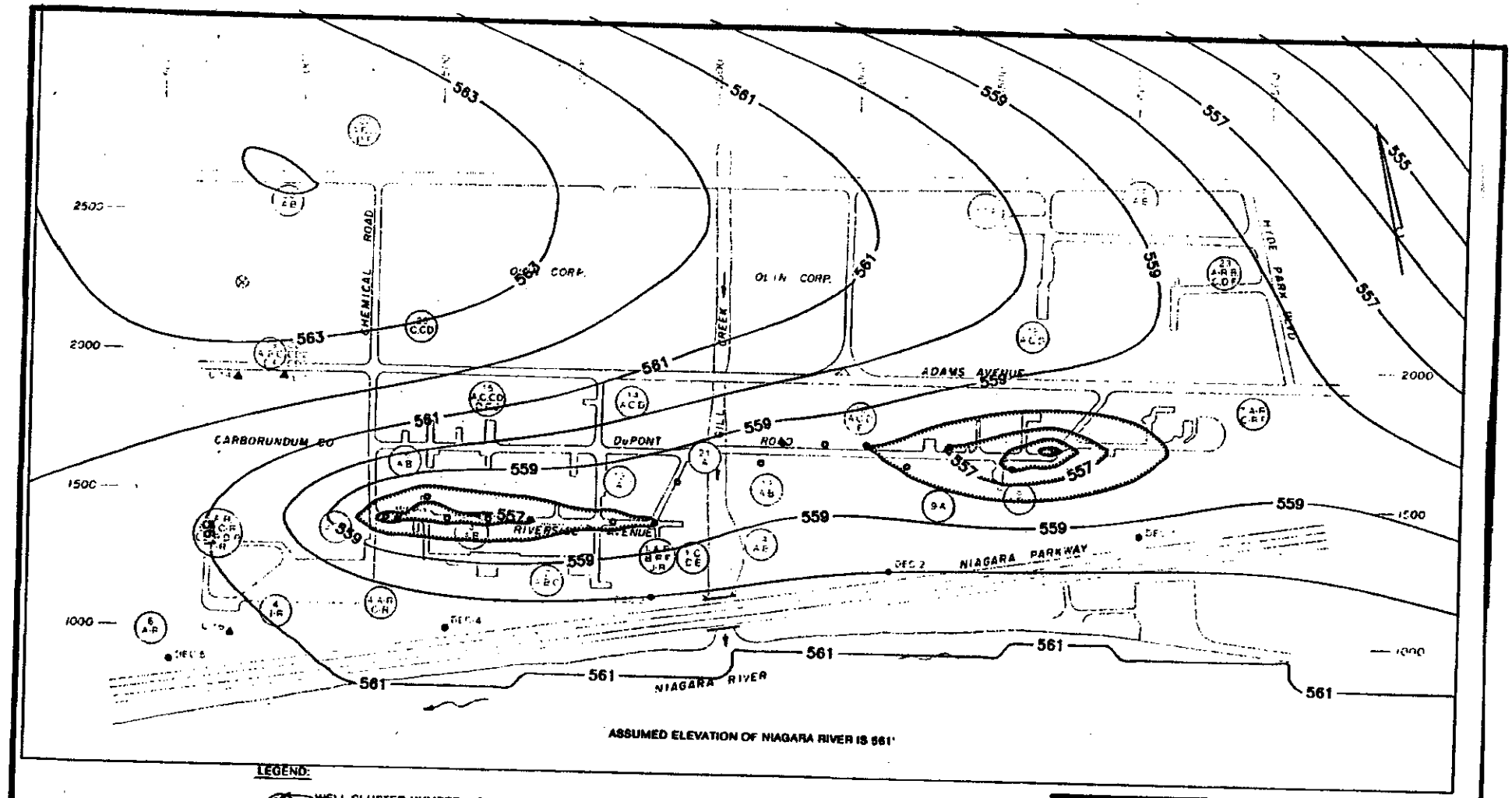
- WELL CLUSTER NUMBER (NO.)
- WELL TYPE (LETTER)
- OLIN PRODUCTION WELL
- DEC WELLS
- UTILITY WELLS
- PIEZOMETERS
- OVERBURDEN - ONLY WELLS
- OVERBURDEN/TOP-OF-ROCK

SIMULATION 3
HEAD DISTRIBUTION (WATER LEVELS) IN THE OVERBURDEN

WOODWARD-CLYDE CONSULTANTS
CONSULTING ENGINEERS, GEOLOGISTS AND ENVIRONMENTAL SCIENTISTS

Drawn by D.E.G.	SCALE IN FEET 0 400	Date	7/5/88
Checked by S.L.T.		Job	88C2076D-3

FIGURE 11

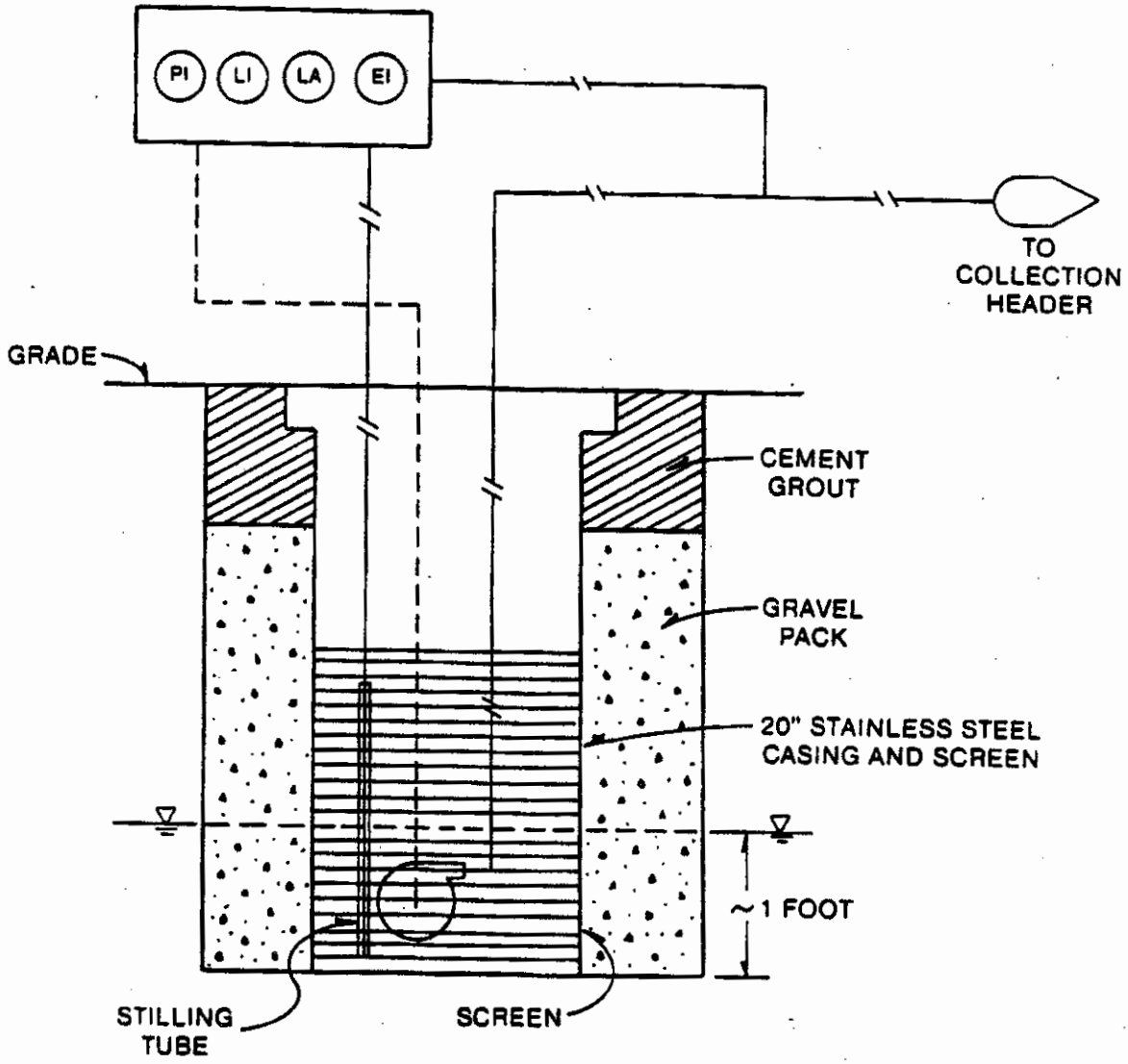


SIMULATION 3
HEAD DISTRIBUTION (WATER LEVELS) IN THE TOP-OF-ROCK ZONE

WOODWARD-CLYDE CONSULTANTS
CONSULTING ENGINEERS, GEOLOGISTS AND ENVIRONMENTAL SCIENTISTS

Drawn by T.P.	SCALE IN FEET 0 400	Date 7/1/88
Checked by S.L.T.		Job 88C2075D-3

FIGURE 12



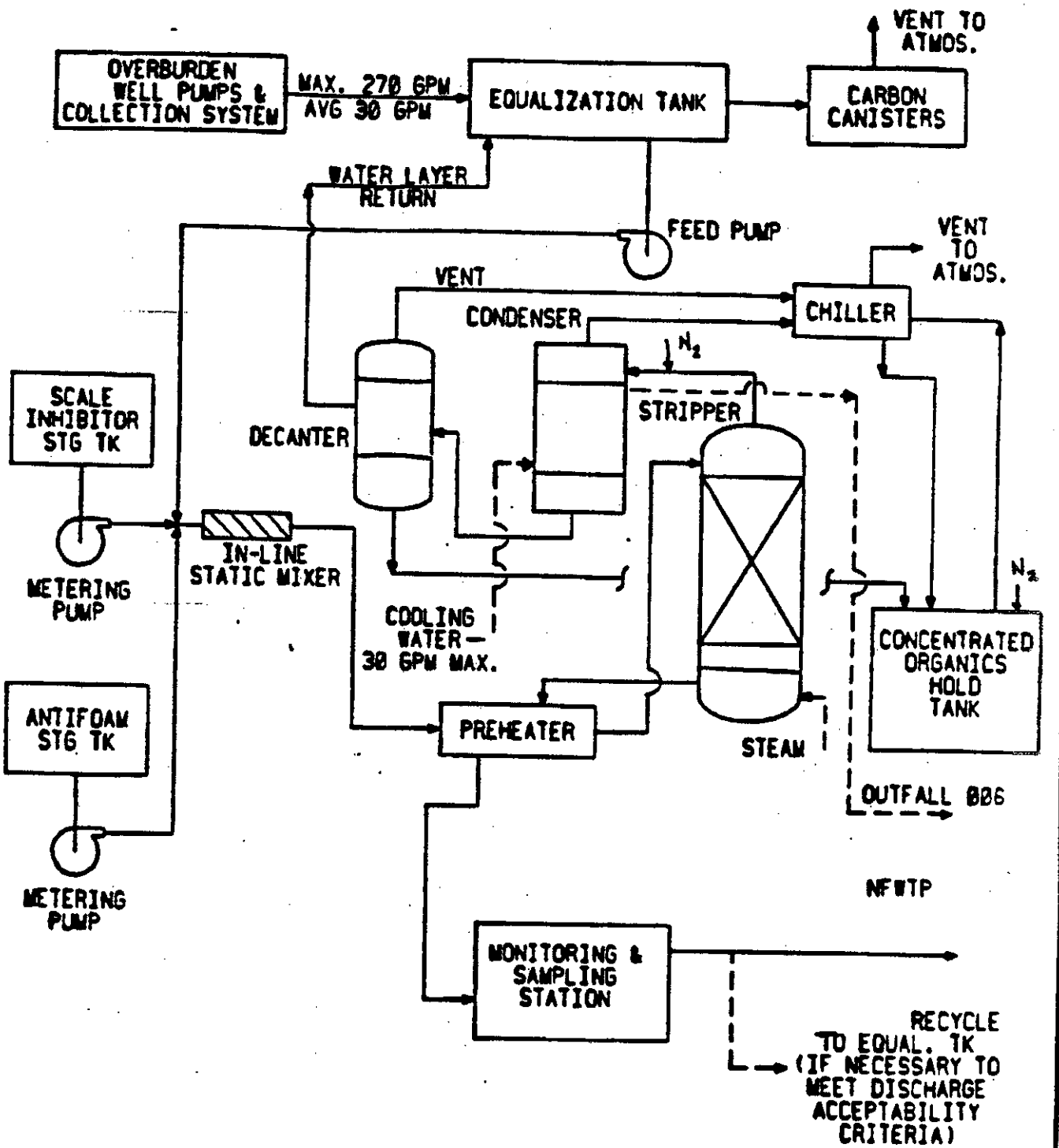
NOT TO SCALE

LEGEND:

LI	LEVEL INDICATOR
PI	PRESSURE INDICATOR
LA	LEVEL ALARM
EI	VOLTAGE/CURRENT INDICATOR

TYPICAL WELL PUMPING CONFIGURATION
OVERBURDEN REMEDIATION SYSTEM
E. I. DU PONT DE NEMOURS & CO.
NIAGARA FALLS, NEW YORK

FIGURE 12



GROUNDWATER TREATMENT
PROCESS SCHEMATIC
DuPONT-NIAGARA PLANT
NIAGARA FALLS, NEW YORK

Drawn by J.C.	SCALE IN FEET	Date 9/15/89
Checked by L.R.P.	N.T.S.	Job 88C2075B-5

FIGURE 14

TABLE 1

LIST OF REFERENCES
INTERIM REMEDIATION PROGRAM
DU PONT NIAGARA PLANT
NIAGARA FALLS, NEW YORK

Reference No.	Document	Date of Submittal
	WOODWARD-CLYDE TO DU PONT	
R. 1	"Subsurface Investigation and Monitoring Wells"	05/01/79
R. 2	"Geohydrologic Investigations", Volumes I and II	12/23/83
R. 3	Geologic Logs	01/12/84
R. 4	"Man-made Passageways Investigation"	02/17/84
R. 5	"Review of Cleanup of B-107 Landfill and Terrain Conductivity"	02/29/84
R. 6	"Supplemental Investigations & Remedial Program"	03/14/84
R. 7	"Remedial Investigation Via Recovery Wells"	03/20/84
R. 8	"Phase I Remediation Studies"	04/06/84
R. 9	Field Work Procedures Geologic Logging of Rock Core	04/06/84
R.10	"Geophysical Investigations"	04/11/84
R.11	"Phase II Remediation"	07/05/84
R.12	"Representative Samples Formulation"	09/07/84
R.13	"Groundwater Modeling for Remediation Studies"	09/27/84
R.14	"Sensitivity Analysis of Groundwater Modeling Parameters"	10/04/84
R.15	"Supplemental Man-made Passageways Investigation"	10/24/84
R.16	"Supplemental Geohydrologic Investigation"	10/24/84
R.17	"Investigation of Hydraulic Connection between A-zone and B-zone"	10/25/84
R.18	Project Specifications re. Adams Avenue Sewer Cutoff	11/01/84
R.19	"Contaminant Loading for Organic Compounds"	11/08/84
R.20	Fourth Quarter Contaminant Loading Results	04/16/85
R.21	"Geotechnical Investigation West Yard Maintenance Area"	05/15/85
R.22	"Pump Test Program"	06/19/85
R.23	J-Zone Off-Site Contaminant Loading Rates	07/01/85
R.24	Supplemental Groundwater Modeling Analysis	07/03/85
R.25	"Groundwater Collection System"	10/18/85
R.26	"Hydraulic Comparison Tile Drain and Pumping"	12/02/85
R.27	Pump Well Design	02/26/86

TABLE 1
(continued)

Reference No.	Document	Date of Submittal
R.28	"Monitoring Plan for A-zone Remediation"	02/26/86
R.29	"Justification of Configuration No. 2 Pumping Wells"	03/27/86
R.30	"Groundwater Monitoring Plan for Site Remediation"	03/27/86
R.31	"Hydraulic Impact of Olin Production Wells"	04/03/86
R.32	"Olin Pump Performance"	11/19/87
R.33	"Off-Site Contaminant Loading Rates, Fourth Quarter 1984 Through Third Quarter 1985"	04/03/86
R.34	"Off-Plant Contaminant Loading Rates, Fourth Quarter 1985 through Third Quarter 1986"	06/10/87
R.35	"Off-Plant Contaminant Loading Rates, Fourth Quarter 1986"	06/10/87
R.36	"Off-Plant Contaminant Loading Rates, First Quarter 1987"	07/22/87
R.37	"Off-Plant Contaminant Loading Rates, Second Quarter 1987"	08/21/87
R.38	"Off-Plant Contaminant Loading Rates, Third Quarter 1987"	01/08/88
R.39	"Numerical Simulation of Bedrock Water Bearing Zones"	04/08/86
R.40	"Infiltration/Inflow Study Plan"	08/28/87
R.41	"Endangerment Chemicals Loading Estimates"	06/02/87
R.42	"J-Zone Investigation"	06/11/87
R.43	"Response to DEC comments on J-Zone Investigation Report"	09/22/87
R.44	"Endangerment Assessment"	10/86
R.45	"West Plant Area Endangerment Chemical Evaluation"	08/12/87
R.46	"Southwest Niagara Plant Storm Sewer Evaluation"	06/02/87
R.47	"Du Pont Niagara Plant - Infiltration Study Plan Addendum"	11/25/87
R.48	"Response to DEC comments on Infiltration Plan"	11/02/87
R.49	"Adams Avenue Slurry Wall"	07/29/86
R.50	"Refinement of the Aqueous Indicator Parameter List"	10/07/86
R.51	"Groundwater Chemistry Quality Assurance/Quality Control Audit, Fourth Quarter 1985 and First Quarter 1986"	07/14/86
R.52	"Groundwater Chemistry Quality Assurance/Quality Control Audit, Second Quarter 1986 and Third Quarter 1986"	12/19/86
R.53	"Groundwater Chemistry Quality Assurance/Quality Control Audit, Fourth Quarter 1986"	07/30/86
R.54	"Groundwater Chemistry Quality Assurance/Quality Control Audit, First Quarter 1987"	08/27/87
R.55	"Groundwater Chemistry Quality Assurance/Quality Control Audit, Second Quarter 1987"	09/16/87
R.55A	"Addendum to Groundwater Chemistry Quality Assurance/ Quality Control Audit, Second Quarter 1987"	10/16/87
R.56	"Groundwater Chemistry Quality Assurance/Quality Control Audit, Third Quarter 1987"	11/24/87
R.56A	"Addendum to Groundwater Chemistry Quality Assurance Quality Control Audit, Third Quarter 1987"	12/08/87

TABLE 1
(continued)

Reference No.	Document	Date of Submittal
R.57	"Quality Assurance/Quality Control Audit Manual, Fourth Quarter 1986 through Third Quarter 1987 for the Niagara Plant and Necco Park, Version 1.1	07/31/87
R.58	"1987 Field Audit Manual"	06/29/87
R.59	"General Testing Corporation Laboratory Audit"	10/28/87
R.60	"Non-Aqueous Phase Liquid Chemistry Quality Assurance/Quality Control Audit for the Niagara Plant	09/15/87
R.61	"Effects of Cap Emplacement on Endangerment Chemical Migration, West Yard Niagara Plant"	01/25/88
R.62	"Long-Term Pump Test Procedures"	01/25/88
R.63	"Quality Assurance/Quality Control Audit Manual, Fourth Quarter 1987 through Third Quarter 1989, Niagara Plant and Necco Park, Version 2.0"	02/26/88
R.64	"Off-Plant Contaminant Loading Rates, Fourth Quarter 1987"	03/11/88
R.65	"Groundwater Chemistry, Quality Assurance/ Quality Control Audit, Fourth Quarter 1987"	03/11/88
R.66	"Draft Version 2 Remedial Action Program, Niagara Plant, Niagara Falls, New York"	03/14/88
R.67	"Groundwater Chemistry Quality Assurance/ Quality Control Audit, First Quarter 1988"	05/18/88
R.68	"Off-Plant Contaminant Loading Rates, First Quarter 1988"	06/17/88
R.69	"1988 Field Audit, Niagara Plant"	07/07/88
R.70	"General Testing Corporation Laboratory Audit"	07/14/88
R.71	"Effectiveness Evaluation Adams Avenue Sewer Slurry Wall"	08/11/88
R.72	"Evaluation of Overburden Remediation System"	08/24/88
R.73	"Off-Plant Contaminant Loading Rates, Second Quarter 1988"	10/06/88
R.74	"Groundwater Chemistry Quality Assurance/ Quality Control Audit, Second Quarter 1988"	11/04/88
R.75	"Response to NYSDEC letter, WCC Evaluation of Overburden Remediation System Report"	01/20/89
R.76	"Groundwater Chemistry Quality Assurance/ Quality Control Audit, Third Quarter 1988"	01/24/89
R.77	"Off-Plant Contaminant Loading Rates, Third Quarter 1988"	02/02/89
R.78	"Response to NYSDEC letter, QA/QC Audit Manual Version 2.0 and Fourth Quarter 1987 Groundwater Chemistry QA/QC Audit"	02/07/89
R.79	"Off-Plant Contaminant Loading Rates, Fourth Quarter 1988"	03/22/89

TABLE 1
(continued)

Reference No.	Document	Date of Submittal
R.80	"Groundwater Chemistry Quality Assurance/Quality Control Audit, Fourth Quarter 1988"	03/28/89
R.81	"Draft Version 2, Remedial Action Program, Niagara Plant, Niagara Falls, New York"	03/14/89
R.82	"Long Term Pump Test, WCC Response to NYSDEC Comments"	03/25/89
R.83	"Overburden Remediation System Projected Time to Reach Steady State Conditions"	06/08/89
R.84	"Groundwater Chemistry Quality Assurance/Quality Control Audit, First Quarter 1989 Data Niagara Plant"	06/19/89
R.85	"Response to EPA Comments on the Quality Assurance/ Quality Control Manual Version 2.0 with Regards to the Niagara Plant"	07/05/89
R.86	"Response to Comments in February 16, 1989 NYSDEC Letter"	07/05/89
R.87	"Off-Plant Contaminant Loading Rates, First Quarter 1989"	07/19/89

The follow references were added after September 21, 1989 "Final Report Du Pont Niagara Falls Plant Remediation Summary Report" was issued.

R.88	"General Testing Corporation, Laboratory Audit 1989"	08/10/89
R.89	"1989 Field Audit, Niagara Plant"	08/16/89
R.90	"Final Report Du Pont Niagara Falls Plant Remediation Summary Report"	09/21/89
R.91	"Off-Plant Contaminant Loading Rates, Second Quarter 1989"	10/18/89
R.92	"Groundwater Chemistry Quality Assurance/Quality Control Audit, Second Quarter 1989 Data, Niagara Plant"	11/02/89

TABLE 1
(continued)

Reference No.	Document	Date of Submittal
	OTHER SOURCES	
S.1	Questionnaire Results, Du Pont to Interagency Task Force on Hazardous Wastes.	11/13/78
S.2	"Groundwater Investigation Plan", Du Pont to New York Department of Environmental Conservation	5/83
S.3	"Report of The Niagara River Toxics Committee", Toxics Committee to the EPA	10/84
S.4	"Groundwater in the Niagara Falls Area, New York" N.Y. Conservation Department, Water Resources Division	1964
S.5	Data Request from New York Power Authority by WCC	11/07/84
S.6	"Niagara Power Project - Data-Statistics", Power Authority of the State of New York (New York Power Authority)	4/65
S.7	"Determining the Impact of Land Disposal - The Review of Organic Analytical Data," Environmental Testing and Certification Corporation (Internal Report)	1/86
S.8	"Evaluation of Extending Pump Well Collection System to West Yard at Du Pont Niagara Plant" Du Pont to NYSDEC	08/14/87
S.9	Letter, Du Pont to NYSDEC	04/22/86
S.10	"Gill Creek," Du Pont to New York State Department of Environmental Conservation	01/11/82
S.11	"Final Report - Cleanup of B-107 Landfill," Du Pont to Du Pont	02/16/81
S.12	"Niagara Plant Ground Water Remediation Plans, Specifications and Engineering Report"	02/05/87
S.13	"Du Pont Niagara Plant Ground Water Treatment Facilities, Preliminary Permit Applications"	03/18/87
S.14	"Groundwater Treatment Facilities - Engineering Report - and Permit Applications," Du Pont to NYSDEC	03/18/87
S.15	"Soil Excavation and Disposal Plan - Treatment Facilities Construction," Du Pont to NYSDEC	01/27/87
S.16	"Ground Water Remediation - Ferrocyanide Treatment Alternatives Review," Du Pont to NYSDEC	11/19/87
S.17	"Evaluation of Ferrocyanide Removal Facilities Investment and Operating Costs," Du Pont to NYSDEC	09/08/87
S.18	"Soil Excavation and Disposal Plan for Pumping Well Construction," Du Pont to NYSDEC	11/12/86
S.19	"Plan for Management of Soils and Groundwater Resulting from Excavation Work," Dupont to NYSDEC	10/29/86 (Rev. #2)
S.20	"E.I. du Pont de Nemours & Co., Inc., Niagara Falls (c), Niagara County SPDES Permit #NY 0003328," NYSDEC to Du Pont	06/28/85
S.21	"E.I. du Pont de Nemours & Co., Inc., Niagara Falls (c), Niagara County SPDES Permit #NY 0003328," Du Pont to NYSDEC	08/30/85

TABLE 1
(continued)

Reference No.	Document	Date of Submittal
	OTHER SOURCES (continued)	
S.22	"E.I. du Pont de Nemours & Co., Inc., Niagara Falls (c), Niagara County SPDES Permit #NY 0003328," Du Pont to NYSDEC	09/10/85
S.23	"E.I. du Pont de Nemours & Co., Inc., Niagara Falls (c), Niagara County SPDES Permit #NY 0003328," Du Pont to NYSDEC	11/13/85
S.24	"E.I. du Pont de Nemours & Co., Inc., Niagara Falls (c), Niagara County SPDES Permit #NY 0003328," NYSDEC to Du Pont	12/19/85
S.25	"Reapplication for SPDES Permit NY-0003328 Including Niachlor Status of Compliance with Permit Conditions and Storm Water Discharge Information," Du Pont to NYSDEC	10/30/87
S.26	"Response to Comments on Proposed Discharge from the Plant Treatment Facilities to the Niagara Falls POTW"	11/02/87
S.27	"Ground Water Monitoring Program Scope of Work for Necco Park and Niagara Plant," Du Pont to NYSDEC	12/01/87
S.28	"Ground Water Sampling, Analyses, Elevations Scope of Work," Du Pont to NYSDEC	10/09/86
S.29	"Du Pont Niagara Plant - Sampling and Analytical Plan," Du Pont to NYSDEC	09/30/86
S.30	"Comments Infiltration/Inflow Study Plan Niagara Falls, New York," NYSDEC to Du Pont	12/18/87
S.31	"Groundwater Water Monitoring Analytical Results, Niagara Plant: Fourth Quarter 1986," Du Pont to NYSDEC	07/27/87
S.32	"Du Pont Niagara Plant, Hydraulic Conductivity of Recently Installed Monitoring Wells," Du Pont to NYSDEC	12/15/87
S.33	"Ferrocyanide Degradation Literature Review, Du Pont Ground Water Remediation Project" Du Pont to NYSDEC	12/29/87
S.34	"Ferrocyanide Low pH Treatment Test Work, Du Pont Ground Water Remediation Project," Du Pont to NYSDEC	02/05/88
S.35	"Comments on Long-Term Pump Test Proposal" NYSDEC to Du Pont	03/02/88
S.36	"SEQR Lead Agency Selection Du Pont Groundwater Remediation Application No. 90-88-0029" NYSDEC to Mayor Niagara Falls	05/24/88
S.37	"Copies of References from Draft Remedial Action Program" Du Pont to NYSDEC	06/10/88
S.38	"Request to Evaluate Additional Analysis on Niagara Plant Groundwater Samples," NYSDEC to Du Pont	07/06/88

TABLE 1
(continued)

Reference No.	Document	Date of Submittal
	OTHER SOURCES (continued)	
S.39	"Response to Request to Evaluate Analysis on Niagara Plant Groundwater Samples," Du Pont to NYSDEC	07/22/88
S.40	"Comparison of Necco Park and Niagara Plant Safety and Health Plans - Remedial Activities," Du Pont and NYSDEC	10/19/88
S.41	"Comments on Evaluation of Overburden Remediation System," NYSDEC to Du Pont	10/27/88
S.42	"Response to Du Pont's Comments on Niagara Plant Health and Safety Plan," NYSDEC to Du Pont	11/22/88
S.43	"Du Pont Niagara Plant Remediation - Summary Report Outline," Du Pont to NYSDEC	01/18/89
S.44	"Response to comments on Safety and Health Plan, Du Pont Niagara Plant Remedial Action Program, Du Pont to NYSDEC	01/30/89
S.45	"Comments on QA/QC and Off-Plant Contaminant Loading Rates Third Quarter 1988 Data Reports"	02/16/89
S.46	"Response to DEC Comments on Part 373 Requirements," Du Pont to NYSDEC	02/28/89
S.47	"Du Pont Niagara Plant - Draft Remediation Summary Report, additional items" Du Pont to NYSDEC	03/20/89
S.48	"Response to Du Pont January 30, 1989 Comments on Health and Safety Plan," NYSDEC to Du Pont	04/10/89
S.49	"Response to Comments on Safety and Health Plan," Du Pont to NYSDEC	06/27/89
S.50	"Response to NYSDEC Requests Regarding the QA/QC Manual and Quarterly Audit Report" Du Pont to NYSDEC	07/13/89
S.51	"Well Maintenance Program - Scope of Work for Necco Park and Niagara Plant"	01/12/88

The following references were added after September 21, 1989 "Final Report Du Pont Niagara Falls Plant Remediation Summary Report" was issued.

S.52	"Update to Plans and Specification, Du Pont Niagara Plant Groundwater Remediation Program," Du Pont to NYSDEC	07/06/89
S.53	"Du Pont Niagara Plant - Groundwater Remediation Program, List of Changes to Quality Assurance/Quality Control Manual," Du Pont to NYSDEC	08/15/89
S.54	"Du Pont Niagara Plant - Groundwater Remediation, List of Changes to the Safety and Health Plan," Du Pont to NYSDEC	08/16/89

TABLE 2

Techniques	West Yard	West Plant	East Plant
Excavation and Disposal	Practical	Possible	Possible
Passive Containment Techniques	Practical	Possible	Possible
Active Containment Techniques	N.A.	Practical	Practical
Solidification	N.A.	N.A.	N.A.
Flushing	N.A.	Practical	Possible
Bioreclamation of Contaminated Groundwater	N.A.	Possible	Possible
Conventional Treatment of Groundwater	N.A.	Practical	Practical

N.A. - Not Applicable

TABLE 3
FOURTH QUARTER, 1988
NIAGARA PLANT GROUNDWATER INVESTIGATION
MONITORING WELL INDICATOR PARAMETER ANALYSIS

CATEGORY	PARAMETER	UNITS	WELL NUMBER 01A-R CONCENTRATION	WELL NUMBER 01B-R CONCENTRATION	WELL NUMBER 01C CONCENTRATION	WELL NUMBER 01D CONCENTRATION	WELL NUMBER 01F CONCENTRATION	WELL NUMBER 02A CONCENTRATION	WELL NUMBER 02B CONCENTRATION	WELL NUMBER 02C CONCENTRATION	WELL NUMBER 03A CONCENTRATION
	SAMPLE DATE		11/22/88	11/22/88	11/22/88	11/30/88	11/30/88	11/22/88	11/22/88	11/22/88	11/23/88
FIELD PARAMETERS											
	PH		7.94	6.42	6.47	7.56	7.54	6.43	6.28	7.79	8.73
	SPECIFIC CONDUCTANCE	umhos/cm	9350	2750	2480	4300	3000	119	2350	86	2200
	SPECIFIC GRAVITY	g/ml	1.000	1.000	1.001	1.000	1.000	0.995	1.000	0.997	1.000
	TEMPERATURE	C	15.0	14.0	16.0	13.0	12.0	15.0	12.0	14.5	8.5
OTHER PARAMETERS											
	CHLORIDE	ppm	2930.0	353.0	279.0	230.0	350.0	11.4	195.0	5.1	231.0
	TOTAL PHENOLICS	ppm	(0.050	(0.050	(0.050	(0.050	(0.050	(0.050	(0.050	(0.050	(0.050
	TOTAL ORGANIC CARBON	ppm	4.62	16.30	4.46	2.13	1.34	2.10	7.05	2.05	3.11
	TOTAL ORGANIC HALOGENS	ppm	22.700	277.000	90.500	6.580	6.640	12.500	188.000	8.000	1.600
	TOTAL CYANIDE	ppm	22.20	0.10	0.07	0.05	(0.02	(0.02	0.03	(0.02	0.27
	SOLUBLE BARIUM	ppm	(1.0	(1.0	(1.0	(1.0	(1.0	(1.0	(1.0	(1.0	(1.0
VOLATILES											
	*VINYL CHLORIDE	ppb	1370.0	(2000.0	2120.0	593.0	99.2	21.0	12000.0	(100.0	1340.0
	CHLOROETHANE	ppb	(500.0	(5000.0	(2500.0	(100.0	(50.0	(50.0	(5000.0	(250.0	(10.0
	1,1-DICHLOROETHYLENE	ppb	165.0	(1000.0	(500.0	38.0	(10.0	23.8	(1000.0	(50.0	(2.0
	*METHYLENE CHLORIDE	ppb	1590.0	46800.0	3800.0	122.0	28.2	201.0	4650.0	1460.0	(2.0
	*TRANS-1,2-DICHLOROETHENE	ppb	(100.0	(1000.0	(500.0	180.0	22.2	(10.0	(1000.0	(50.0	12.5
	1,1-DICHLOROETHANE	ppb	(100.0	(1000.0	(500.0	(20.0	(10.0	(10.0	(1000.0	(50.0	(2.0
	*(CIS)1,2-DICHLOROETHENE	ppb	19300.0	19200.0	16600.0	4740.0	2460.0	158.0	30000.0	198.0	466.0
	*CHLOROFORM	ppb	3260.0	4000.0	(500.0	(20.0	(10.0	(10.0	(1000.0	57.0	(2.0
	1,1,1-TRICHLOROETHANE	ppb	(100.0	(1000.0	(500.0	(20.0	(10.0	(10.0	(1000.0	(50.0	(2.0
	CARBON TETRACHLORIDE	ppb	(100.0	(1000.0	(500.0	(20.0	(10.0	(10.0	(1000.0	(50.0	(2.0
	*TRICHLOROETHYLENE	ppb	10400.0	215000.0	104000.0	2920.0	3830.0	864.0	158000.0	9440.0	108.0
	1,1,2-TRICHLOROETHANE	ppb	(100.0	(1000.0	(500.0	(20.0	(10.0	(10.0	(1000.0	(50.0	(2.0
	*TETRACHLOROETHENE	ppb	1540.0	40400.0	43800.0	367.0	5300.0	31.5	37800.0	3040.0	25.0
	1,4-DICHLOROBUTANE	ppb	(300.0	(3000.0	(1500.0	(60.0	(30.0	(30.0	(3000.0	(150.0	(6.0
	*1,1,2,2-TETRACHLOROETHANE	ppb	(200.0	90600.0	21700.0	225.0	34.0	(20.0	5090.0	836.0	(4.0
	*CHLOROBENZENE	ppb	(200.0	(2000.0	(1000.0	(40.0	(20.0	(20.0	(2000.0	(100.0	(4.0
	HEXACHLOROETHANE	ppb	(300.0	(3000.0	(1500.0	(60.0	(30.0	(30.0	(3000.0	(150.0	(6.0
	1,4-DICHLOROBENZENE	ppb	(200.0	(2000.0	(1000.0	(40.0	(20.0	(20.0	(2000.0	(100.0	(4.0
	1,2-DICHLOROBENZENE	ppb	(200.0	(2000.0	(1000.0	(40.0	(20.0	(20.0	(2000.0	(100.0	(4.0
	HEXACHLOROBUTADIENE	ppb	(300.0	(3000.0	(1500.0	(60.0	(30.0	(30.0	(3000.0	(150.0	(6.0
	TETRAHYDROTHIOPHENE	ppb	(300.0	(3000.0	(1500.0	(60.0	(30.0	(30.0	(3000.0	(150.0	(6.0
	*BENZENE	ppb	(200.0	7380.0	1910.0	80.2	(20.0	(20.0	(2000.0	(100.0	(4.0
	TOLUENE	ppb	428.0	(2000.0	(1000.0	(40.0	(20.0	(20.0	(2000.0	(100.0	(4.0
	TOTAL VOLATILES	ppb	38053.0	413380.0	195930.0	9265.4	11793.6	1299.3	235540.0	15031.0	1943.5
OTHER ORGANICS											
	*A-BHC	ppb	(0.50	95.30	93.80	2.75	1.71	(0.50	3.35	(0.50	(0.50
	*G-BHC	ppb	(0.50	87.10	126.00	3.87	0.53	(0.50	0.88	(0.50	(0.50
	*B-BHC	ppb	(0.50	30.10	22.20	(5.00	(0.50	(0.50	1.37	(0.50	(0.50
	*D-BHC	ppb	(0.50	31.70	75.00	1.90	(0.50	(0.50	(0.50	(0.50	(0.50
	*PCB 1221	ppb	(1.00	(100.00	(100.00	(100.00	(1.00	(1.00	(1.00	(1.00	(1.00
	*PCB 1232	ppb	(1.00	(100.00	(100.00	(100.00	(1.00	(1.00	(1.00	(1.00	(1.00
	*PCB 1016	ppb	(1.00	(100.00	(100.00	(100.00	(1.00	(1.00	(1.00	(1.00	(1.00
	*PCB 1242	ppb	(0.50	(50.00	(0.50	(5.00	(0.50	(0.50	(0.50	(0.50	(0.50
	*PCB 1248	ppb	(0.50	(50.00	(0.50	(5.00	(0.50	(0.50	(0.50	(0.50	(0.50
	*PCB 1254	ppb	(0.50	202.00	(0.50	(5.00	(0.50	(0.50	20.40	(0.50	(0.50
	*PCB 1260	ppb	(0.50	(50.00	(0.50	(5.00	(0.50	(0.50	(0.50	(0.50	(0.50
	BIS (2-ETHYLHEXYL) PHTHALATE	ppb	(10.0	20.3	18.0	(10.0	20.3	13.5	(10.0	11.3	13.5
	NAPHTHALENE	ppb	(20	(20	(20	(20	(20	(20	(20	(20	(20
	TOTAL INDICATOR ORGANICS	ppb	37460.00	413826.20	196249.00	9235.72	11795.84	1275.50	235565.92	15031.00	1943.50

NOTE: ND indicates that the parameter was not detected; < indicates a detectable concentration below the detection limit, ≤ indicates a concentration less than or equal to the detection limit.

* Compounds used for contaminant loading rates.

TABLE 3 (continued)
FOURTH QUARTER, 1988
NIAGARA PLANT GROUNDWATER INVESTIGATION
MONITORING WELL INDICATOR PARAMETER ANALYSIS

CATEGORY	PARAMETER	UNITS	WELL NUMBER 03B CONCENTRATION	WELL NUMBER 04A-R CONCENTRATION	WELL NUMBER 04C-R CONCENTRATION	WELL NUMBER 05A-R CONCENTRATION	WELL NUMBER 05B-R CONCENTRATION	WELL NUMBER 05C-R CONCENTRATION	WELL NUMBER 05CD-R CONCENTRATION	WELL NUMBER 05B-R CONCENTRATION	WELL NUMBER 05F-R CONCENTRATION
	SAMPLE DATE		11/23/88	12/07/88	12/07/88	11/23/88	11/23/88	11/22/88	11/30/88	11/30/88	11/30/88
FIELD PARAMETERS											
	PH		7.21	8.21	7.36	6.85	9.88	6.82	7.68	7.54	8.15
	SPECIFIC CONDUCTANCE	umhos/cm	4000	2300	6600	4010	2750	615	410	1140	280
	SPECIFIC GRAVITY	g/ml	0.996	0.998	0.998	0.997	1.000	0.997	1.000	1.000	1.000
	TEMPERATURE	C	10.0	11.5	12.8	14.0	13.0	10.5	11.5	12.0	11.5
OTHER PARAMETERS											
	CHLORIDE	ppm	419.0	600.0	64.8	1450.0	616.0	24.6	31.5	25.3	29.1
	TOTAL PHENOLICS	ppm	(0.050	(0.050	(0.050	(0.050	(0.050	(0.050	(0.050	(0.050	(0.050
	TOTAL ORGANIC CARBON	ppm	11.20	9.24	3.78	3.00	2.97	1.57	1.42	4.01	3.88
	TOTAL ORGANIC HALOGENS	ppm	907.000	0.093	6.120	0.105	7.400	(0.025	1.760	0.755	0.765
	TOTAL CYANIDE	ppm	7.31	0.67	(0.02	0.12	0.57	(0.02	0.02	(0.02	(0.02
	SOLUBLE BARIUM	ppm	(1.0	(1.0	(1.0	1.4	(1.0	(1.0	(1.0	(1.0	(1.0
VOLATILES											
	*VINYL CHLORIDE	ppb	(10000.0	(2.0	99.7	7.3	51.2	3.0	19.4	3.1	(10.0
	CHLOROETHANE	ppb	(25000.0	(5.0	(50.0	(5.0	(5.0	(5.0	(5.0	(5.0	(25.0
	1,1-DICHLOROETHYLENE	ppb	(5000.0	(1.0	(10.0	(1.0	(1.0	(1.0	(1.0	(1.0	(5.0
	*METHYLENE CHLORIDE	ppb	213000.0	(1.0	14.3	(1.0	10.8	(1.0	40.8	2.5	12.2
	*TRANS-1,2-DICHLOROETHENE	ppb	(5000.0	(1.0	(10.0	(1.0	6.8	(1.0	(1.0	(1.0	(5.0
	1,1-DICHLOROETHANE	ppb	(5000.0	(1.0	(10.0	4.1	(1.0	(1.0	(1.0	(1.0	(5.0
	*CIS-1,2-DICHLOROETHENE	ppb	6020.0	(1.0	176.0	1.3	9.9	(1.0	56.8	4.7	6.7
	*CHLOROFORM	ppb	970000.0	(1.0	329.0	(1.0	3.5	(1.0	179.0	6.9	53.6
	1,1,1-TRICHLOROETHANE	ppb	(5000.0	(1.0	(10.0	(1.0	(1.0	(1.0	(1.0	(1.0	(5.0
	CARBON TETRACHLORIDE	ppb	60400.0	(1.0	51.9	2.9	(1.0	(1.0	36.5	(1.0	(5.0
	*TRICHLOROETHYLENE	ppb	153000.0	(1.0	2090.9	11.0	4.2	1.1	1310.0	54.1	510.0
	1,1,2-TRICHLOROETHANE	ppb	(5000.0	(1.0	(10.0	(1.0	(1.0	(1.0	(1.0	(1.0	(5.0
	*TETRACHLOROETHENE	ppb	49300.0	(1.0	2410.0	(1.0	(1.0	(1.0	841.0	26.9	160.0
	1,4-DICHLOROBUTANE	ppb	(15000.0	(3.0	136.0	(3.0	(3.0	(3.0	(3.0	(3.0	(15.0
	*1,1,2,2-TETRACHLOROETHANE	ppb	(10000.0	(2.0	247.0	(2.0	(2.0	(2.0	12.9	(2.0	(10.0
	*CHLOROBENZENE	ppb	(10000.0	(2.0	(20.0	(2.0	(2.0	(2.0	12.0	(2.0	(10.0
	HEXACHLOROETHANE	ppb	(15000.0	(3.0	44.7	(3.0	(3.0	(3.0	14.4	(3.0	(15.0
	1,4-DICHLOROBENZENE	ppb	(10000.0	(2.0	120.0	(2.0	(2.0	(2.0	(2.0	(2.0	(10.0
	1,2-DICHLOROBENZENE	ppb	(10000.0	(2.0	(20.0	(2.0	(2.0	(2.0	(2.0	(2.0	(10.0
	HEXACHLOROBUTADIENE	ppb	(15000.0	(3.0	(30.0	(3.0	(3.0	(3.0	17.3	19.4	39.5
	TETRAHYDROTHIOPHENE	ppb	(15000.0	(3.0	(30.0	(3.0	(3.0	(3.0	(3.0	(3.0	(15.0
	*BENZENE	ppb	(10000.0	(2.0	(20.0	(2.0	(2.0	(2.0	(2.0	(2.0	(10.0
	TOLUENE	ppb	119000.0	(2.0	(20.0	(2.0	(2.0	(2.0	(2.0	(2.0	(10.0
	TOTAL VOLATILES	ppb	1570720.0	ND	5464.6	15.6	81.4	4.1	2545.3	114.2	782.0
OTHER ORGANICS											
	*A-BHC	ppb	(0.50	(0.50	5.37	(0.50	(0.50	(0.50	(0.50	(0.50	(0.50
	*G-BHC	ppb	(0.50	(0.50	3.49	(0.50	(0.50	(0.50	(0.50	(0.50	(0.50
	*B-BHC	ppb	(0.50	(0.50	(5.00	(0.50	(0.50	(0.50	(0.50	(0.50	(0.50
	*D-BHC	ppb	(0.50	(0.50	(5.00	(0.50	(0.50	(0.50	(0.50	(0.50	(0.50
	*PCB 1221	ppb	(10.00	(1.00	(10.00	(1.00	(1.00	(1.00	(1.00	(1.00	(1.00
	*PCB 1232	ppb	(10.00	(1.00	(10.00	(1.00	(1.00	(1.00	(1.00	(1.00	(1.00
	*PCB 1016	ppb	(10.00	(1.00	(10.00	(1.00	(1.00	(1.00	(1.00	(1.00	(1.00
	*PCB 1242	ppb	(0.50	(0.50	(0.50	(0.50	(0.50	(0.50	(0.50	(0.50	(0.50
	*PCB 1248	ppb	(0.50	(0.50	(0.50	(0.50	(0.50	(0.50	(0.50	(0.50	(0.50
	*PCB 1254	ppb	(0.50	(0.50	(0.50	(0.50	(0.50	(0.50	(0.50	(0.50	(0.50
	*PCB 1260	ppb	(0.50	(0.50	(0.50	(0.50	(0.50	(0.50	2.48	(0.50	(0.50
	BIS (2-ETHYLHEXYL) PHTHALATE	ppb	11.9	(10.0	(10.0	(10.0	(10.0	(10.0	16.0	(10.0	11.4
	NAPHTHALENE	ppb	(20	(20	(20	(20	(20	(20	(20	(20	(20
	TOTAL INDICATOR ORGANICS	ppb	1291329.00	0.00	5376.86	8.60	81.40	4.10	2479.58	94.60	742.59

NOTE ND indicates that the parameter was not detected. < indicates a detectable concentration below the detection limit. <= indicates a concentration less than or equal to the detection limit.

* Compounds used for contamination loading rates.

TABLE 3 (continued)
FOURTH QUARTER, 1988
NIAGARA PLANT GROUNDWATER INVESTIGATION
MONITORING WELL INDICATOR PARAMETER ANALYSIS

CATEGORY	PARAMETER	UNITS	WELL NUMBER 06A-R CONCENTRATION	WELL NUMBER 07A-R CONCENTRATION	WELL NUMBER 07C-R CONCENTRATION	WELL NUMBER 07F CONCENTRATION	WELL NUMBER 08A CONCENTRATION	WELL NUMBER 08B CONCENTRATION	WELL NUMBER 09A CONCENTRATION	WELL NUMBER 10A CONCENTRATION	WELL NUMBER 10C CONCENTRATION
	SAMPLE DATE		11/22/88	11/30/88	11/30/88	11/30/88	11/30/88	11/30/88	11/30/88	12/07/88	11/30/88
FIELD PARAMETERS											
	PH		6.79	5.97	6.96	6.21	8.18	7.34	7.15	6.59	7.15
	SPECIFIC CONDUCTANCE	umhos/cm	895	2900	1800	6700	5200	3000	4200	2400	4900
	SPECIFIC GRAVITY	g/ml	0.999	1.000	1.000	1.002	1.000	1.000	1.000	1.000	1.000
	TEMPERATURE	C	11.0	12.0	10.0	12.0	13.0	14.0	13.0	11.0	11.5
OTHER PARAMETERS											
	CHLORIDE	ppm	2.2	19.4	34.9	930.0	1100.0	370.0	210.0	520.0	610.0
	TOTAL PHENOLICS	ppm	(0.050	(0.050	(0.050	(0.050	(0.050	(0.050	(0.050	(0.050	(0.050
	TOTAL ORGANIC CARBON	ppm	1.52	2.16	2.44	2.43	189.00	92.70	22.60	4.07	5.42
	TOTAL ORGANIC HALOGENS	ppm	(0.025	5.000	0.197	3.100	53.800	75.100	19.200	0.065	5.510
	TOTAL CYANIDE	ppm	1.32	(0.02	(0.02	(0.02	6.69	1.68	1.73	(0.02	0.07
	SOLUBLE BARIUM	ppm	(1.0	(1.0	(1.0	(1.0	(1.0	(1.0	(1.0	(1.0	(1.0
VOLATILES											
	*VINYL CHLORIDE	ppb	(2.0	(10.0	5.2	285.0	(2000.0	(2000.0	(200.0	15.1	519.0
	CHLOROETHANE	ppb	(5.0	(25.0	(5.0	(25.0	(5000.0	(5000.0	(500.0	(5.0	(500.0
	1,1-DICHLOROETHYLENE	ppb	(1.0	(5.0	(1.0	(5.0	(1000.0	(1000.0	(100.0	(1.0	232.0
	*METHYLENE CHLORIDE	ppb	(1.0	5.8	3.2	(5.0	2990.0	2960.0	258.0	1.6	280.0
	*TRANS-1,2-DICHLOROETHENE	ppb	(1.0	(5.0	(1.0	(1.0	(1000.0	4920.0	(100.0	(1.0	984.0
	1,1-DICHLOROETHANE	ppb	(1.0	6.4	(1.0	(5.0	(1000.0	(1000.0	(100.0	3.1	143.0
	*(CIS)1,2-DICHLOROETHENE	ppb	(1.0	(5.0	3.9	941.0	(1000.0	3230.0	390.0	4.3	10300.0
	*CHLOROFORM	ppb	(1.0	(5.0	5.1	(5.0	(1000.0	(1000.0	(100.0	1.3	(100.0
	1,1,1-TRICHLOROETHANE	ppb	(1.0	(5.0	(1.0	(5.0	(1000.0	(1000.0	(100.0	(1.0	(100.0
	CARBON TETRACHLORIDE	ppb	(1.0	(5.0	(1.0	(5.0	(1000.0	(1000.0	(100.0	(1.0	(100.0
	*TRICHLOROETHYLENE	ppb	(1.0	(5.0	98.4	20.5	(1000.0	1310.0	179.0	18.1	218000.0
	1,1,2-TRICHLOROETHANE	ppb	(1.0	(5.0	(1.0	(5.0	(1000.0	(1000.0	(100.0	(1.0	(100.0
	*TETRACHLOROETHENE	ppb	(1.0	(5.0	15.4	29.2	(1000.0	(1000.0	693.0	13.5	4660.0
	1,4-DICHLOROBUTANE	ppb	(3.0	212.0	173.0	(15.0	134000.0	247000.0	32500.0	3.5	1300.0
	*1,1,2,2-TETRACHLOROETHANE	ppb	(2.0	(10.0	(2.0	(10.0	(2000.0	(2000.0	(200.0	4.2	1140.0
	*CHLOROBENZENE	ppb	(2.0	(10.0	(2.0	(10.0	(2000.0	(2000.0	(200.0	17.3	4640.0
	HEXACHLOROETHANE	ppb	(3.0	(15.0	(3.0	(15.0	(3000.0	(3000.0	(300.0	(3.0	(300.0
	1,4-DICHLOROBENZENE	ppb	(2.0	(10.0	(2.0	(10.0	(2000.0	(2000.0	(200.0	18.7	717.0
	1,2-DICHLOROBENZENE	ppb	(2.0	(10.0	(2.0	(10.0	(2000.0	(2000.0	(200.0	8.9	1050.0
	HEXACHLOROBUTADIENE	ppb	(3.0	(15.0	(3.0	(15.0	(3000.0	(3000.0	(300.0	(3.0	873.0
	TETRAHYDROTHIOPHENE	ppb	(3.0	335.0	402.0	465.0	152000.0	16300.0	13700.0	5.3	1390.0
	*BENZENE	ppb	(2.0	(10.0	(2.0	(10.0	3890.0	(2000.0	(200.0	3.5	1790.0
	TOLUENE	ppb	(2.0	(10.0	(2.0	(10.0	(2000.0	(2000.0	(200.0	(2.0	(200.0
	TOTAL VOLATILES	ppb	ND	559.2	656.2	905.6	292880.0	289720.0	47720.0	118.4	246718.0
OTHER ORGANICS											
	*A-BHC	ppb	(0.50	(0.50	(0.50	(0.50	(0.50	(0.50	(0.50	(0.50	(5.00
	*G-BHC	ppb	(0.50	(0.50	(0.50	(0.50	(0.50	(0.50	(0.50	(0.50	4.00
	*B-BHC	ppb	(0.50	(0.50	(0.50	(0.50	(0.50	(0.50	(0.50	(0.50	(0.50
	*D-BHC	ppb	(0.50	(0.50	(0.50	(0.50	(0.50	(0.50	(0.50	(0.50	(0.50
	*PCB 1221	ppb	(1.00	(1.00	(1.00	(1.00	(10.00	(1.00	(1.00	(1.00	(10.00
	*PCB 1232	ppb	(1.00	(1.00	(1.00	(1.00	(10.00	(1.00	(1.00	(1.00	(10.00
	*PCB 1016	ppb	(1.00	(1.00	(1.00	(1.00	(10.00	(1.00	(1.00	(1.00	(10.00
	*PCB 1242	ppb	(0.50	(0.50	(0.50	(0.50	(0.50	(0.50	(0.50	(0.50	(0.50
	*PCB 1248	ppb	(0.50	(0.50	(0.50	(0.50	(0.50	(0.50	(0.50	(0.50	30.30
	*PCB 1254	ppb	(0.50	(0.50	(0.50	(0.50	(0.50	(0.50	(0.50	(0.50	(0.50
	*PCB 1260	ppb	(0.50	(0.50	(0.50	(0.50	(0.50	(0.50	3.93	(0.50	(0.50
	BIS (2-ETHYLHEXYL) PHTHALATE	ppb	22.5	(10.0	(10.0	31.6	84.7	17.1	22.9	(10.0	35.5
	NAPHTHALENE	ppb	120	(20	(20	(20	(20	(20	(20	(20	120
	TOTAL INDICATOR ORGANICS	ppb	0.00	5.80	81.20	1287.50	6880.00	12420.00	1523.93	78.90	242347.30

NOTE: ND indicates that the parameter was not detected, < indicates a detectable concentration below the detection limit, <= indicates a concentration less than or equal to the detection limit, NS indicates that there was insufficient sample

* Compounds used for contaminant loading rates.

TABLE 3 (continued)
FOURTH QUARTER, 1988
NIAGARA PLANT GROUNDWATER INVESTIGATION
MONITORING WELL INDICATOR PARAMETER ANALYSIS

CATEGORY	PARAMETER	UNITS	WELL NUMBER 10F CONCENTRATION	WELL NUMBER 12R CONCENTRATION	WELL NUMBER 12R CONCENTRATION	WELL NUMBER 13R CONCENTRATION	WELL NUMBER 14A CONCENTRATION	WELL NUMBER 14D CONCENTRATION	WELL NUMBER 15A CONCENTRATION	WELL NUMBER 15C CONCENTRATION	WELL NUMBER 15CD CONCENTRATION
	SAMPLE DATE		11/30/88	11/22/88	11/22/88	11/30/88	12/07/88	11/30/88	11/23/88	11/23/88	11/30/88
FIELD PARAMETERS											
	PH		6.58	6.18	6.66	7.35	8.10	5.06	6.94	6.55	6.43
	SPECIFIC CONDUCTANCE	umhos/cm	1580	22600	16200	2700	6700	3200	2100	3450	1400
	SPECIFIC GRAVITY	g/ml	1.000	1.009	1.008	1.000	1.001	1.000	0.997	1.000	1.000
	TEMPERATURE	c	11.5	12.5	11.5	11.5	11.0	13.5	11.5	13.5	13.0
OTHER PARAMETERS											
	CHLORIDE	ppm	170.0	9790.0	5330.0	160.0	2300.0	260.0	107.0	413.0	110.0
	TOTAL PHENOLICS	ppm	(0.050	(0.050	(0.050	(0.050	0.087	(0.050	(0.050	(0.050	(0.050
	TOTAL ORGANIC CARBON	ppm	3.78	1.28	2.68	9.88	61.50	10.40	3.02	3.70	6.42
	TOTAL ORGANIC HALOGENS	ppm	2.110	130.000	565.000	0.768	172.000	27.400	1.240	143.000	108.500
	TOTAL CYANIDE	ppm	(0.02	(0.02	0.03	(0.02	3.10	(0.02	0.02	0.05	0.02
	SOLUBLE BARIUM	ppm	(1.0	(1.0	(1.0	(1.0	(1.0	(1.0	(1.0	(1.0	(1.0
VOLATILES											
	*VINYL CHLORIDE	ppb	16.2	26.7	171.0	290.0	(1000.0	560.0	(10.0	(500.0	(1000.0
	CHLOROETHANE	ppb	(25.0	(5.0	(125.0	(5.0	(2500.0	(250.0	(25.0	(1250.0	(2500.0
	1,1-DICHLOROETHYLENE	ppb	(5.0	(1.0	55.0	(1.0	(500.0	74.0	106.0	(250.0	(500.0
	*METHYLENE CHLORIDE	ppb	6.1	(1.0	185.0	(1.0	(500.0	62.8	15.9	8370.0	15100.0
	*TRANS-1,2-DICHLOROETHENE	ppb	5.9	1.5	262.0	(1.0	(500.0	58.4	7.2	(250.0	(500.0
	1,1-DICHLOROETHANE	ppb	(5.0	(1.0	(25.0	(1.0	(500.0	(50.0	(5.0	(250.0	(500.0
	*(CIS)1,2-DICHLOROETHENE	ppb	1050.0	48.0	1860.0	118.0	3070.0	13100.0	56.4	366.0	967.0
	*CHLOROFORM	ppb	(5.0	(1.0	606.0	(1.0	1080.0	(50.0	369.0	60600.0	17300.0
	1,1,1-TRICHLOROETHANE	ppb	(5.0	(1.0	(25.0	(1.0	(500.0	(50.0	(5.0	(250.0	(500.0
	CARBON TETRACHLORIDE	ppb	(5.0	(1.0	(25.0	(1.0	(500.0	(50.0	(5.0	24600.0	1890.0
	*TRICHLOROETHYLENE	ppb	434.0	15.7	6390.0	2.1	103000.0	3820.0	239.0	49800.0	90600.0
	1,1,2-TRICHLOROETHANE	ppb	(5.0	(1.0	(25.0	(1.0	(500.0	(50.0	(5.0	(250.0	(500.0
	*TETRACHLOROETHENE	ppb	1010.0	4.2	1060.0	3.4	79200.0	1440.0	91.8	27800.0	30300.0
	1,4-DICHLOROBUTANE	ppb	(15.0	(3.0	475.0	(3.0	(1500.0	(150.0	(15.0	(750.0	(1500.0
	*1,1,2,2-TETRACHLOROETHANE	ppb	(10.0	(2.0	1570.0	(2.0	23800.0	(100.0	(10.0	5310.0	7200.0
	*CHLOROBENZENE	ppb	(10.0	(2.0	(50.0	(2.0	(1000.0	(100.0	(10.0	(500.0	(1000.0
	HEXACHLOROETHANE	ppb	(15.0	(3.0	111.0	(3.0	1680.0	(150.0	(15.0	935.0	(1500.0
	1,4-DICHLOROBENZENE	ppb	(10.0	(2.0	(50.0	(2.0	(1000.0	(100.0	(10.0	(500.0	(1000.0
	1,2-DICHLOROBENZENE	ppb	(10.0	(2.0	(50.0	(2.0	(1000.0	(100.0	(10.0	(500.0	(1000.0
	HEXACHLOROBUTADIENE	ppb	(15.0	(3.0	126.0	(3.0	(1500.0	(150.0	(15.0	(750.0	(1500.0
	TETRAHYDROTHIOPHENE	ppb	(15.0	(3.0	(75.0	(3.0	(1500.0	(150.0	(15.0	(750.0	(1500.0
	*BENZENE	ppb	(10.0	(2.0	(50.0	(2.0	(1000.0	(100.0	(10.0	(500.0	(1000.0
	TOLUENE	ppb	(10.0	(2.0	(50.0	(2.0	(1000.0	(100.0	(10.0	(500.0	(1000.0
	TOTAL VOLATILES	ppb	25522.2	96.9	12396.0	363.5	211830.0	19113.2	865.3	177801.0	163357.0
OTHER ORGANICS											
	*A-BHC	ppb	(0.50	(0.50	(0.50	(0.50	(5.00	1.43	(0.50	1.63	11.90
	*G-BHC	ppb	(0.50	(0.50	(0.50	(0.50	(5.00	(0.50	(0.50	9.19	5.87
	*B-BHC	ppb	(0.50	(0.50	(0.50	(0.50	(5.00	(0.50	(0.50	0.91	4.04
	*D-BHC	ppb	(0.50	(0.50	(0.50	(0.50	(5.00	(0.50	(0.50	0.99	0.90
	*PCB 1221	ppb	(1.00	(1.00	(1.00	(1.00	(10.00	(1.00	(1.00	(100.00	(10.00
	*PCB 1232	ppb	(1.00	(1.00	(1.00	(1.00	(10.00	(1.00	(1.00	(100.00	(10.00
	*PCB 1016	ppb	(1.00	(1.00	(1.00	(1.00	(10.00	(1.00	(1.00	(100.00	(10.00
	*PCB 1242	ppb	(0.50	(0.50	(0.50	(0.50	(5.00	(0.50	(0.50	(50.00	(0.50
	*PCB 1248	ppb	(0.50	(0.50	18.40	(0.50	(5.00	(0.50	(0.50	(50.00	(0.50
	*PCB 1254	ppb	(0.50	(0.50	(0.50	(0.50	(5.00	(0.50	(0.50	(50.00	(0.50
	*PCB 1260	ppb	(0.50	(0.50	(0.50	(0.50	(5.00	(0.50	(0.50	(50.00	(0.50
	BIS (2-ETHYLHEXYL) PHTHALATE	ppb	(10.0	(10.0	11.3	13.3	(10.0	(10.0	25.8	15.8	(10.0
	NAPHTHALENE	ppb	(20	(20	(20	(20	(20	(20	(20	(20	(20
	TOTAL INDICATOR ORGANICS	ppb	2522.20	96.90	12122.40	363.50	210150.00	19042.63	779.30	152258.72	161488.91

NOTE: ND indicates that the parameter was not detected; < indicates a detectable concentration below the detection limit; <= indicates a concentration less than or equal to the detection limit; NS indicates that there was insufficient sample for analysis

* Compounds used for contaminant loading rates

TABLE 3 (continued)
FOURTH QUARTER, 1988
NIAGARA PLANT GROUNDWATER INVESTIGATION
MONITORING WELL INDICATOR PARAMETER ANALYSIS

CATEGORY	PARAMETER	UNITS	WELL NUMBER 15D CONCENTRATION	*WELL NUMBER 15F CONCENTRATION	WELL NUMBER 16A CONCENTRATION	WELL NUMBER 17D CONCENTRATION	WELL NUMBER 17B CONCENTRATION	WELL NUMBER 17F CONCENTRATION	WELL NUMBER 18A CONCENTRATION	WELL NUMBER 18C CONCENTRATION	WELL NUMBER 19A CONCENTRATION
	SAMPLE DATE		11/30/88	11/30/88	11/23/88	12/07/88	12/07/88	12/07/88	12/07/88	12/07/88	11/22/88
FIELD PARAMETERS											
	PH		7.46	7.17	11.03	7.99	7.64	6.80	7.20	7.84	8.22
	SPECIFIC CONDUCTANCE	umhos/cm	970	3600	4850	500	820	3400	2700	700	1320
	SPECIFIC GRAVITY	g/ml	1.000	1.000	1.002	0.998	1.000	1.002	1.000	0.998	0.999
	TEMPERATURE	C	13.0	13.0	13.5	17.0	19.0	12.5	11.5	13.5	10.5
OTHER PARAMETERS											
	CHLORIDE	ppm	67.1	370.0	481.0	34.1	33.8	630.0	440.0	84.5	234.0
	TOTAL PHENOLICS	ppm	(0.050	(0.050	(0.050	(0.050	(0.050	(0.050	(0.050	(0.050	(0.050
	TOTAL ORGANIC CARBON	ppm	2.58	1.40	148.00	2.42	1.71	1.56	18.80	5.04	0.41
	TOTAL ORGANIC HALOGENS	ppm	14.700	5.750	13.600	0.055	(0.025	2.540	1.990	2.810	0.352
	TOTAL CYANIDE	ppm	(0.02	(0.02	23.10	0.04	(0.02	(0.02	0.03	0.11	(0.02
	SOLUBLE BARIUM	ppm	(1.0	(1.0	(1.0	(1.0	(1.0	(1.0	(1.0	(1.0	(1.0
VOLATILES											
	*VINYL CHLORIDE	ppb	(200.0	559.0	(200.0	(2.0	4.5	1080.0	1600.0	386.0	(2.0
	CHLOROETHANE	ppb	(500.0	(100.0	(500.0	(5.0	(5.0	(100.0	(25.0	(125.0	(5.0
	1,1-DICHLOROETHYLENE	ppb	(100.0	(20.0	(100.0	(1.0	(1.0	(20.0	7.8	(25.0	(1.0
	*METHYLENE CHLORIDE	ppb	228.0	25.6	1790.0	(1.0	(1.0	(20.0	(5.0	(25.0	(1.0
	*TRANS-1,2-DICHLOROETHENE	ppb	(100.0	34.5	(100.0	(1.0	(1.0	47.1	84.0	46.1	(1.0
	1,1-DICHLOROETHANE	ppb	(100.0	(20.0	392.0	(1.0	(1.0	(20.0	72.5	(25.0	(1.0
	*(CIS)1,2-DICHLOROETHENE	ppb	135.0	1690.0	596.0	1.8	10.3	1430.0	1930.0	53.7	13.4
	*CHLOROFORM	ppb	235.0	586.0	4910.0	(1.0	2.8	(20.0	(5.0	(25.0	11.4
	1,1,1-TRICHLOROETHANE	ppb	(100.0	(20.0	(100.0	(1.0	(1.0	(20.0	(5.0	(25.0	(1.0
	CARBON TETRACHLORIDE	ppb	(100.0	285.0	(100.0	(1.0	(1.0	(20.0	(5.0	(25.0	(1.0
	*TRICHLOROETHYLENE	ppb	7980.0	2180.0	7020.0	1.2	1.2	(20.0	9.4	(25.0	32.3
	1,1,2-TRICHLOROETHANE	ppb	(100.0	(20.0	(100.0	(1.0	(1.0	(20.0	(5.0	(25.0	(1.0
	*TETRACHLOROETHENE	ppb	11400.0	2540.0	(100.0	2.4	6.1	(20.0	15.0	(25.0	98.1
	1,4-DICHLOROBUTANE	ppb	(300.0	(60.0	(300.0	(3.0	(3.0	(60.0	(15.0	165.0	(3.0
	*1,1,2,2-TETRACHLOROETHANE	ppb	(200.0	139.0	(200.0	(2.0	(2.0	(40.0	(10.0	(20.0	(2.0
	*CHLOROBENZENE	ppb	(200.0	(40.0	(200.0	(2.0	(2.0	383.0	(10.0	2800.0	(2.0
	HEXACHLOROETHANE	ppb	(300.0	(60.0	(300.0	(3.0	(3.0	(60.0	(15.0	(75.0	(3.0
	1,4-DICHLOROBENZENE	ppb	(200.0	(40.0	(200.0	(2.0	(2.0	313.0	(10.0	830.0	(2.0
	1,2-DICHLOROBENZENE	ppb	(200.0	(40.0	(200.0	(2.0	(2.0	747.0	(10.0	711.0	(2.0
	HEXACHLOROBUTADIENE	ppb	(300.0	(60.0	(300.0	(3.0	(3.0	(60.0	28.6	112.0	(3.0
	TETRAHYDROTHIOPHENE	ppb	(300.0	(60.0	(300.0	(3.0	(3.0	(60.0	(15.0	1490.0	(3.0
	*BENZENE	ppb	(200.0	(40.0	(200.0	(2.0	(2.0	148.0	619.0	135.0	(2.0
	TOLUENE	ppb	(200.0	(40.0	(200.0	(2.0	(2.0	(40.0	29.8	(50.0	(2.0
	TOTAL VOLATILES	ppb	19998.0	8039.1	14708.0	5.4	24.9	4348.0	4196.1	6848.8	175.2
OTHER ORGANICS											
	*A-BHC	ppb	7.58	(5.00	(0.50	(0.50	(0.50	(0.50	(0.50	(0.50	(0.50
	*G-BHC	ppb	1.35	0.70	(0.50	(0.50	(0.50	(0.50	(0.50	(0.50	(0.50
	*B-BHC	ppb	(5.00	(0.50	(0.50	(0.50	(0.50	(0.50	(0.50	(0.50	(0.50
	*D-BHC	ppb	(5.00	(0.50	(0.50	(0.50	(0.50	(0.50	(0.50	(0.50	(0.50
	*PCB 1221	ppb	(1.00	(10.00	(1.00	(1.00	(1.00	(10.00	(1.00	(10.00	(1.00
	*PCB 1232	ppb	(1.00	(10.00	(1.00	(1.00	(1.00	(10.00	(1.00	(10.00	(1.00
	*PCB 1016	ppb	(1.00	(10.00	(1.00	(1.00	(1.00	(10.00	(1.00	(10.00	(1.00
	*PCB 1242	ppb	(0.50	(0.50	(0.50	(0.50	(0.50	(0.50	(0.50	(0.50	(0.50
	*PCB 1248	ppb	(0.50	(0.50	(0.50	(0.50	(0.50	(0.50	(0.50	(0.50	(0.50
	*PCB 1254	ppb	(0.50	(0.50	(0.50	(0.50	(0.50	(0.50	(0.50	(0.50	(0.50
	*PCB 1260	ppb	(0.50	(0.50	(0.50	(0.50	(0.50	(0.50	(0.50	(0.50	(0.50
	BIS (2-ETHYLHEXYL) PHTHALATE	ppb	17.1	(10.0	22.5	15.2	(10.0	(10.0	(10.0	(10.0	(10.0
	NAPHTHALENE	ppb	(20	(20	(20	(20	(20	(20	(20	(20	(20
	TOTAL INDICATOR ORGANICS	ppb	20006.93	7754.80	14316.00	5.40	24.90	3288.10	4057.90	3540.80	175.20

NOTE. ND indicates that the parameter was not detected; < indicates a detectable concentration below the detection limit; <= indicates a concentration less than or equal to the detection limit;

* Compounds used for contaminant loading rates.

TABLE 3 (continued)
FOURTH QUARTER, 1988
NIAGARA PLANT GROUNDWATER INVESTIGATION
MONITORING WELL INDICATOR PARAMETER ANALYSIS

CATEGORY	PARAMETER	UNITS	WELL NUMBER 19B CONCENTRATION	WELL NUMBER 19CB1 CONCENTRATION	WELL NUMBER 19D CONCENTRATION	WELL NUMBER 19F CONCENTRATION	WELL NUMBER 20B CONCENTRATION	WELL NUMBER 21A CONCENTRATION	WELL NUMBER 22B CONCENTRATION	WELL NUMBER 22C CONCENTRATION	WELL NUMBER 22D CONCENTRATION
	SAMPLE DATE		11/22/88	11/30/88	11/30/88	11/30/88	12/07/88	11/30/88	12/07/88	12/07/88	12/07/88
FIELD PARAMETERS											
	PH		7.30	6.53	7.97	6.85	10.38	9.27	7.45	7.65	7.48
	SPECIFIC CONDUCTANCE	umhos/cm	4250	5600	5600	1270	8600	12000	550	3200	200
	SPECIFIC GRAVITY	g/ml	1.006	1.000	1.000	1.000	1.003	1.005	0.998	1.000	0.998
	TEMPERATURE	C	11.0	11.5	11.5	12.0	12.0	11.5	11.0	12.5	15.0
OTHER PARAMETERS											
	CHLORIDE	ppm	835.0	230.0	38.0	76.4	2800.0	2700.0	21.4	250.0	23.0
	TOTAL PHENOLICS	ppm	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
	TOTAL ORGANIC CARBON	ppm	5.18	2.72	1.87	2.78	10.80	7.66	2.68	3.58	2.54
	TOTAL ORGANIC HALOGENS	ppm	0.367	9.960	0.413	4.480	5.420	2.670	0.075	2.640	0.856
	TOTAL CYANIDE	ppm	<0.02	<0.02	<0.02	<0.02	0.06	1.50	<0.02	<0.02	<0.02
	SOLUBLE BARIUM	ppm	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	2.6
VOLATILES											
	*VINYL CHLORIDE	ppb	<5.0	335.0	44.0	<40.0	<40.0	743.0	820.0	867.0	<10.0
	CHLOROETHANE	ppb	<1.0	<250.0	<5.0	<100.0	<100.0	<250.0	<100.0	<100.0	<25.0
	1,1-DICHLOROETHYLENE	ppb	<1.0	<50.0	<1.0	<20.0	<20.0	89.7	<20.0	<20.0	<5.0
	*METHYLENE CHLORIDE	ppb	1.5	1310.0	48.9	<20.0	1100.0	135.0	170.0	159.0	32.5
	*TRANS-1,2-DICHLOROETHENE	ppb	<1.0	<50.0	<1.0	<20.0	<20.0	168.0	<20.0	<20.0	<5.0
	1,1-DICHLOROETHANE	ppb	<1.0	<50.0	<1.0	<20.0	<20.0	<50.0	<20.0	<20.0	<5.0
	*(CIS)1,2-DICHLOROETHENE	ppb	28.6	1090.0	30.1	1520.0	462.0	2410.0	354.0	430.0	40.3
	*CHLOROFORM	ppb	8.5	4170.0	117.0	<20.0	1520.0	<50.0	376.0	379.0	<5.0
	1,1,1-TRICHLOROETHANE	ppb	<1.0	<50.0	<1.0	<20.0	<20.0	<50.0	<20.0	<20.0	<5.0
	CARBON TETRACHLORIDE	ppb	<1.0	290.0	6.8	<20.0	<20.0	227.0	<20.0	<20.0	<5.0
	*TRICHLOROETHYLENE	ppb	12.6	5410.0	142.0	44.0	1110.0	1530.0	230.0	256.0	428.0
	1,1,2-TRICHLOROETHANE	ppb	<1.0	<50.0	<1.0	<20.0	<20.0	<50.0	<20.0	<20.0	<5.0
	*TETRACHLOROETHENE	ppb	6.4	2200.0	29.1	134.0	158.0	613.0	57.4	89.0	744.0
	1,4-DICHLOROBUTANE	ppb	<3.0	<150.0	<3.0	<60.0	<60.0	<150.0	<60.0	<60.0	<15.0
	*1,1,2,2-TETRACHLOROETHANE	ppb	<2.0	<100.0	<2.0	<40.0	<40.0	<100.0	<40.0	102.0	<10.0
	*CHLOROBENZENE	ppb	<2.0	<100.0	<2.0	<40.0	<40.0	<100.0	<40.0	<40.0	<10.0
	HEXACHLOROETHANE	ppb	<3.0	<150.0	<3.0	<60.0	<60.0	<150.0	<60.0	<60.0	<15.0
	1,4-DICHLOROBENZENE	ppb	<2.0	<100.0	<2.0	<40.0	<40.0	<100.0	<40.0	<40.0	<10.0
	1,2-DICHLOROBENZENE	ppb	<2.0	<100.0	<2.0	<40.0	<40.0	<100.0	<40.0	<40.0	<10.0
	HEXACHLOROBUTADIENE	ppb	<3.0	<150.0	4.8	<60.0	<60.0	154.0	<60.0	<60.0	<15.0
	TETRAHYDROTHIOPHENE	ppb	<3.0	<150.0	<3.0	<60.0	<60.0	<150.0	<60.0	<60.0	<15.0
	*BENZENE	ppb	<2.0	<100.0	<2.0	<40.0	<40.0	<100.0	<40.0	<40.0	<10.0
	TOLUENE	ppb	<2.0	<100.0	<2.0	<40.0	<40.0	<100.0	<40.0	<40.0	<10.0
	TOTAL VOLATILES	ppb	137.8	14825.0	440.7	1698.0	4330.0	6049.7	2007.4	2277.4	1244.8
OTHER ORGANICS											
	*A-BHC	ppb	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	*G-BHC	ppb	<0.50	0.53	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	*B-BHC	ppb	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	*D-BHC	ppb	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	*PCB 1221	ppb	<1.00	<10.00	<1.00	<1.00	<1.00	<10.00	<1.00	<1.00	<1.00
	*PCB 1232	ppb	<1.00	<10.00	<1.00	<1.00	<1.00	<10.00	<1.00	<1.00	<1.00
	*PCB 1016	ppb	<1.00	<10.00	<1.00	<1.00	<1.00	<10.00	<1.00	<1.00	<1.00
	*PCB 1242	ppb	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	*PCB 1248	ppb	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	*PCB 1254	ppb	<0.50	1.60	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	*PCB 1260	ppb	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
	BIS (2-ETHYLHEXYL) PHTHALATE	ppb	<10.0	13.3	73.4	21.9	<10.0	<10.0	13.3	13.9	19.1
	NAPHTHALENE	ppb	<20	<20	<20	<20	<20	<20	<20	<20	<20
	TOTAL INDICATOR ORGANICS	ppb	57.60	10537.13	451.10	1698.00	4330.00	5599.00	2097.00	2277.00	1260.80

NOTE: ND indicates that the parameter was not detected. < indicates a detectable concentration

TABLE 3 (continued)
FOURTH QUARTER, 1988
NIAGARA PLANT GROUNDWATER INVESTIGATION
MONITORING WELL INDICATOR PARAMETER ANALYSIS

CATEGORY	PARAMETER	UNITS	WELL NUMBER 22F CONCENTRATION	WELL NUMBER 23A-R CONCENTRATION	WELL NUMBER 23B CONCENTRATION	WELL NUMBER 23C CONCENTRATION	WELL NUMBER 23D CONCENTRATION	WELL NUMBER 23F CONCENTRATION	WELL NUMBER 24B CONCENTRATION	WELL NUMBER 26C CONCENTRATION	WELL NUMBER 26CB CONCENTRATION
	SAMPLE DATE		12/07/88	12/07/88	12/07/88	12/07/88	12/07/88	12/07/88	11/22/88	12/07/88	12/07/88
FIELD PARAMETERS											
	PH		6.63	7.02	8.56	7.04	9.24	8.01	9.86	6.21	9.30
	SPECIFIC CONDUCTANCE	umhos/cm	3000	3200	240	1340	460	3600	8650	2600	590
	SPECIFIC GRAVITY	g/ml	1.000	1.000	0.998	1.000	0.998	1.000	1.002	0.999	0.999
	TEMPERATURE	c	13.0	13.5	13.5	12.5	13.0	14.0	11.5	12.5	12.0
OTHER PARAMETERS											
	CHLORIDE	ppm	380.0	450.0	24.0	75.8	62.7	870.0	1050.0	600.0	33.0
	TOTAL PHENOLICS	ppm	(0.050	(0.050	(0.050	(0.050	(0.050	(0.050	(0.050	(0.050	(0.050
	TOTAL ORGANIC CARBON	ppm	14.00	2.54	1.97	3.32	4.02	2.40	2.54	4.78	1.72
	TOTAL ORGANIC HALOGENS	ppm	2.440	0.028	(0.025	0.077	0.170	1.470	8.230	267.000	5.330
	TOTAL CYANIDE	ppm	(0.02	(0.02	(0.02	(0.02	(0.02	(0.02	0.10	(0.02	0.02
	SOLUBLE BARIUM	ppm	(1.0	(1.0	(1.0	(1.0	(1.0	(1.0	(1.0	(1.0	(1.0
VOLATILES											
	*VINYL CHLORIDE	ppb	4360.0	2.4	(2.0	36.1	(2.0	189.0	3480.0	(1000.0	(40.0
	CHLOROMETHANE	ppb	(100.0	(5.0	(5.0	(5.0	(5.0	(125.0	(1000.0	(2500.0	(100.0
	1,1-DICHLOROETHYLENE	ppb	(20.0	(1.0	(1.0	(1.0	(1.0	(25.0	(200.0	(500.0	(20.0
	*METHYLENE CHLORIDE	ppb	(20.0	1.1	1.5	1.7	(1.0	(25.0	(200.0	43300.0	574.0
	*TRANS-1,2-DICHLOROETHENE	ppb	62.0	1.3	(1.0	1.2	(1.0	(25.0	(200.0	(500.0	(20.0
	1,1-DICHLOROETHANE	ppb	26.9	(1.0	(1.0	(1.0	(1.0	(25.0	(200.0	(500.0	(20.0
	*(CIS)1,2-DICHLOROETHENE	ppb	1450.0	3.3	(1.0	43.1	23.1	2530.0	7670.0	4110.0	137.0
	*CHLOROFORM	ppb	(20.0	1.6	2.5	(1.0	13.2	(25.0	(200.0	91600.0	2900.0
	1,1,1-TRICHLOROETHANE	ppb	(20.0	(1.0	(1.0	(1.0	(1.0	(25.0	(200.0	(500.0	223.0
	CARBON TETRACHLORIDE	ppb	(20.0	(1.0	(1.0	(1.0	4.0	(25.0	(200.0	8600.0	248.0
	*TRICHLOROETHYLENE	ppb	21.3	(1.0	(1.0	7.4	31.2	(25.0	3380.0	116000.0	3520.0
	1,1,2-TRICHLOROETHANE	ppb	(20.0	(1.0	(1.0	(1.0	(1.0	(25.0	(200.0	(500.0	(20.0
	*TETRACHLOROETHENE	ppb	66.3	(1.0	11.4	6.0	20.7	162.0	2940.0	26200.0	1900.0
	1,4-DICHLOROBUTANE	ppb	160.0	(3.0	(3.0	33.6	(3.0	175.0	1600.0	(1500.0	(60.0
	*1,1,2,2-TETRACHLOROETHANE	ppb	(40.0	(2.0	(2.0	(2.0	(2.0	(50.0	(400.0	10300.0	62.4
	*CHLOROBENZENE	ppb	(40.0	(2.0	(2.0	(2.0	(2.0	(50.0	(400.0	(1000.0	(40.0
	HEXACHLOROETHANE	ppb	(60.0	(3.0	(3.0	(3.0	(3.0	(75.0	(600.0	(1500.0	(60.0
	1,4-DICHLOROBENZENE	ppb	(40.0	(2.0	(2.0	(2.0	(2.0	(50.0	(400.0	(1000.0	(40.0
	1,2-DICHLOROBENZENE	ppb	(40.0	(2.0	(2.0	(2.0	(2.0	(50.0	(400.0	(1000.0	(40.0
	HEXACHLOROBUTADIENE	ppb	(60.0	(3.0	(3.0	14.4	5.4	(75.0	(600.0	(1500.0	(60.0
	TETRAHYDROTHIOPHENE	ppb	160.0	(3.0	(3.0	228.0	8.7	(75.0	(600.0	(1500.0	(60.0
	*BENZENE	ppb	(40.0	(2.0	(2.0	19.8	(2.0	(50.0	(400.0	(1000.0	(40.0
	TOLUENE	ppb	(40.0	(2.0	(2.0	(2.0	(2.0	(50.0	(400.0	(1000.0	(40.0
	TOTAL VOLATILES	ppb	5987.3	9.7	15.4	391.3	106.3	2881.0	17470.0	300110.0	9564.0
OTHER ORGANICS											
	*A-BHC	ppb	0.50	(0.50	(0.50	(0.50	(0.50	(0.50	54.70	10.80	1.14
	*G-BHC	ppb	(0.50	(0.50	(0.50	(0.50	(0.50	(0.50	0.65	20.00	0.92
	*B-BHC	ppb	(0.50	(0.50	(0.50	(0.50	(0.50	(0.50	5.43	2.83	(0.50
	*D-BHC	ppb	(0.50	(0.50	(0.50	(0.50	(0.50	(0.50	(0.50	3.38	(0.50
	*PCB 1221	ppb	(10.00	(1.00	(1.00	(1.00	110.00	(1.00	(10.00	(100.00	(1.00
	*PCB 1232	ppb	(10.00	(1.00	(1.00	(1.00	(10.00	(1.00	(10.00	(100.00	(1.00
	*PCB 1016	ppb	(10.00	(1.00	(1.00	(1.00	(10.00	(1.00	(10.00	(100.00	(1.00
	*PCB 1242	ppb	(0.50	(0.50	(0.50	(0.50	(0.50	(0.50	(0.50	(5.00	(0.50
	*PCB 1248	ppb	(0.50	(0.50	(0.50	(0.50	(0.50	(0.50	(0.50	(5.00	(0.50
	*PCB 1254	ppb	(0.50	(0.50	(0.50	(0.50	(0.50	(0.50	(0.50	(5.00	(0.50
	*PCB 1260	ppb	(0.50	(0.50	(0.50	(0.50	(0.50	(0.50	(0.50	(5.00	(0.50
	BIS (2-ETHYLHEXYL) PHTHALATE	ppb	(10.0	(10.0	(10.0	13.3	15.2	11.4	22.5	18.0	13.9
	NAPHTHALENE	ppb	(20	(20	(20	(20	(20	(20	(20	(20	(20
	TOTAL INDICATOR ORGANICS	ppb	5960.90	9.70	15.40	115.30	88.20	2881.00	17530.78	291547.01	9095.44

NOTE: ND indicates that the parameter was not detected; < indicates a detectable concentration below the detection limit; <= indicates a concentration less than or equal to the detection limit.

* Compounds used for contaminant loading rates

TABLE 3 (continued)
FOURTH QUARTER, 1988
NIAGARA PLANT GROUNDWATER INVESTIGATION
MONITORING WELL INDICATOR PARAMETER ANALYSIS

CATEGORY	PARAMETER	UNITS	WELL NUMBER DEC2 CONCENTRATION	WELL NUMBER DEC3 CONCENTRATION	WELL NUMBER DEC4 CONCENTRATION	WELL NUMBER DEC5 CONCENTRATION	WELL NUMBER U16 CONCENTRATION
	SAMPLE DATE		12/07/88	12/07/88	12/07/88	12/07/88	12/07/88
FIELD PARAMETERS							
	PH		10.51	6.50	7.41	7.31	7.39
	SPECIFIC CONDUCTANCE	umhos/cm	20000	11800	1830	610	1400
	SPECIFIC GRAVITY	g/ml	1.022	1.008	0.999	0.999	0.999
	TEMPERATURE	c	12.0	12.0	13.0	13.5	9.0
OTHER PARAMETERS							
	CHLORIDE	ppm	2200.0	4700.0	410.0	45.5	300.0
	TOTAL PHENOLICS	ppm	0.089	(0.050	(0.050	(0.050	(0.050
	TOTAL ORGANIC CARBON	ppm	92.10	24.90	4.30	5.77	3.72
	TOTAL ORGANIC HALOGENS	ppm	2.510	498.000	7.610	0.344	0.452
	TOTAL CYANIDE	ppm	11.40	0.39	(0.02	(0.02	(0.02
	SOLUBLE BARIUM	ppm	(1.0	(1.0	(1.0	(1.0	(1.0
VOLATILES							
	*VINYL CHLORIDE	ppb	466.0	(4000.0	447.0	(2.0	(2.0
	CHLOROETHANE	ppb	(25.0	(10000.0	(250.0	(5.0	102.0
	1,1-DICHLOROETHYLENE	ppb	31.6	(2000.0	(50.0	(1.0	(1.0
	*METHYLENE CHLORIDE	ppb	61.2	329000.0	(50.0	2.1	1.5
	*TRANS-1,2-DICHLOROETHENE	ppb	32.2	(2000.0	157.0	1.7	1.9
	1,1-DICHLOROETHANE	ppb	8.3	(2000.0	(50.0	(1.0	(1.0
	*(CIS)1,2-DICHLOROETHENE	ppb	1680.0	10800.0	3200.0	36.1	25.1
	*CHLOROFORM	ppb	257.0	16900.0	(50.0	(1.0	(1.0
	1,1,1-TRICHLOROETHANE	ppb	(5.0	(2000.0	(50.0	(1.0	(1.0
	CARBON TETRACHLORIDE	ppb	(5.0	(2000.0	(50.0	(1.0	(1.0
	*TRICHLOROETHYLENE	ppb	313.0	120000.0	1030.0	28.1	33.5
	1,1,2-TRICHLOROETHANE	ppb	(5.0	(2000.0	(50.0	(1.0	(1.0
	*TETRACHLOROETHENE	ppb	89.8	10100.0	310.0	11.5	23.0
	1,4-DICHLOROBUTANE	ppb	180.0	(4000.0	(150.0	(3.0	(3.0
	*1,1,2,2-TETRACHLOROETHANE	ppb	(10.0	14200.0	576.0	40.7	4.2
	*CHLOROBENZENE	ppb	23.5	(4000.0	(100.0	(2.0	(2.0
	HEXACHLOROETHANE	ppb	(15.0	(6000.0	(150.0	(3.0	(3.0
	1,4-DICHLOROBENZENE	ppb	44.8	(4000.0	(100.0	(2.0	(2.0
	1,2-DICHLOROBENZENE	ppb	(10.0	(4000.0	(100.0	(2.0	(2.0
	HEXACHLOROBUTADIENE	ppb	35.6	(6000.0	(150.0	461.0	11.4
	TETRAHYDROTHIOPHENE	ppb	110.0	(6000.0	(150.0	(3.0	(3.0
	*BENZENE	ppb	47.3	(4000.0	(100.0	(2.0	(2.0
	TOLUENE	ppb	77.5	(4000.0	(100.0	(2.0	(2.0
	TOTAL VOLATILES	ppb	3861.8	501000.0	5720.0	581.2	202.6
OTHER ORGANICS							
	*A-BHC	ppb	(0.50	58.90	1.16	(0.50	(0.50
	*G-BHC	ppb	(0.50	1.54	(0.50	(0.50	(0.50
	*B-BHC	ppb	(0.50	12.70	1.20	(0.50	(0.50
	*D-BHC	ppb	(0.50	2.45	(0.50	(0.50	(0.50
	*PCB 1221	ppb	(1.00	(100.00	(10.00	(1.00	(1.00
	*PCB 1232	ppb	(1.00	(100.00	(10.00	(1.00	(1.00
	*PCB 1016	ppb	(1.00	(100.00	(10.00	(1.00	(1.00
	*PCB 1242	ppb	(0.50	(5.00	(5.00	(0.50	(0.50
	*PCB 1248	ppb	(0.50	(5.00	(5.00	(0.50	(0.50
	*PCB 1254	ppb	(0.50	(5.00	(0.50	(0.50	(0.50
	*PCB 1260	ppb	(0.50	(5.00	(0.50	(0.50	(0.50
	BIS (2-ETHYLHEXYL) PHTHALATE	ppb	71.0	25.7	(10.0	23.9	(10.0
	NAPHTHALENE	ppb	(20	(20	(20	(20	(20
	TOTAL INDICATOR ORGANICS	ppb	3374.00	501075.59	5722.36	120.20	89.20

NOTE: ND indicates that the parameter was not detected; < indicates a detectable concentration below the detection limit; <= indicates a concentration less than or equal to the detection limit; NS indicates that there was insufficient sample for analysis.

* Compounds used for contaminant loading rates.

TABLE 4

AVERAGES TO DATE
NON-POINT SOURCE LOADING INDICATOR ORGANIC TOTALS
FOURTH QUARTER 1984 THROUGH FIRST QUARTER 1989
Niagara Plant
E.I. du Pont de Nemours and Company

Water-Bearing Zone	Average for 4th Qtr 1984 to 4th Qtr 1988	1st Qtr 1989 Rates	Average To Date
TOTAL LOADING RATES (lb/day)			
A	2.4	2.99	2.4
B	11.1	4.85	10.8
CD	52.9	26.24	51.4
D	0.4	0.33	0.4
F	0.4	0.09	0.4
Total	67.2	34.50	65.4
LOADING RATES TO THE OLIN PRODUCTION WELLS (lb/day)			
A	0.0	0.00	0.0
B	7.8	3.62	7.6
CD	49.5	26.17	48.2
D	0.3	0.32	0.3
F	0.0	0.01	0.0
Total	57.6	30.12	56.1
LOADING RATES OFF-PLANT			
A	2.4	2.99	2.4
B	3.3	1.23	3.2
CD	3.4	0.07	3.2
D	0.1	0.01	0.1
F	0.3	0.08	0.3
Total	9.5	4.38	9.4
TOTAL EXCLUDING A-ZONE	7.1	1.39	7.0

/WM-8M

DU PONT RECORD OF DECISION
APPENDIX B

RECORD OF THE NYSDEC - BIBLIOGRAPHY