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February 17, 1984
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E. I. duPont de Nemours & Co., Inc.
Niagara Plant
P. O. Box 787
Niagara Falls, New York 14302

Attention: Mr. Timothy D. Van Domelen

MANMADE PASSAGEWAYS INVESTIGATIONS
NIAGARA PLANT
NIAGARA FALLS, NEW YORK

Gentlemen:

We are pleased to present herein our Report of Manmade Passageways Investigations conducted for the Niagara Plant site, Niagara Falls, New York. This study was conducted in accordance with your request and our Proposal dated October 10, 1983. The objectives of the study and an outline of the scope of work were defined in the "DuPont Niagara Site Groundwater Study" status report submitted to the New York State Department of Environmental Conservation dated September 2, 1983.

This report was prepared utilizing the presently available data in order to comply with the established schedule of submittals to New York State Department of Environmental Conservation. It is recognized that additional work is planned, including additional sampling and analysis of groundwater. As additional information becomes available, findings and conclusions presented herein will be reassessed in light of the continually developing data base. The data utilized during the preparation of this report includes that presented in our report of Geohydrologic Investigations, Volumes I and II dated December 23, 1983.

We sincerely appreciate the opportunity of providing these services to you on this project. If you have any questions, please contact us.

Very truly yours,

WOODWARD-CLYDE CONSULTANTS

Richard M. Coad, P.E.
Project Engineer

Jeffrey C. Evans, P.E.
Project Manager

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Principal

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Attachment

cc: Mr. Richard J. Gentilucci, DuPont
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MANMADE PASSAGEWAYS INVESTIGATIONS
NIAGARA PLANT
NIAGARA FALLS, NEW YORK

Prepared for:

E. I. DUPONT DE NEMOURS & CO., INC.

Niagara Falls, New York

Prepared by:

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Plymouth Meeting, Pennsylvania

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EXECUTIVE SUMMARY

This investigation was undertaken at the DuPont Niagara Plant site to evaluate the presence or movement of suspect chemical contaminants through manmade passageways. Manmade passageways are defined as those portions of the subsurface which have been excavated and refilled to accommodate the placement of buried utilities, such as water, sewer or electrical lines. This report presents our findings and conclusions regarding contaminant transport, within and through the manmade passageways. The base of information developed during this study can be used in conjunction with that presented in our "Geohydrologic Investigations Report", dated December 23, 1983 to formulate design recommendations for any potential remedial actions.

During the period October through December, 1983, test pits were excavated along 13 manmade passageways. These excavations were made in order to obtain samples for an evaluation of the physical and chemical properties of the materials surrounding and beneath the buried utilities. Further, the test pits were utilized for the installation of well screens with riser pipes to permit sampling and analysis of the water flowing in the surrounding bedding materials. Sampling and analysis of groundwater and soils were completed in January 1984. Based upon the results of the chemical analyses, the concentration for any given parameter has been found to vary from below detectable limits up to 240 ppm for the areas sampled. The results of these analyses were compared with those obtained during our previous site-wide study in order to evaluate the potential for contaminant transport along each of the manmade passageways investigated. Further, groundwater levels were obtained in each of the installed utility wells and these levels were compared with the site-wide groundwater flow patterns to assess the presence of pathways along the passageways.

Based upon the data available, regarding the level of contamination in the underlying material, the bedding material and the groundwater, coupled with an assessment of the groundwater flow directions between the manmade passageways and the adjacent overburden, conclusions regarding the potential of the manmade passageway to act as a pathway for contaminant transport have been drawn. Based upon these available data and the subsequent analyses, it is likely that the Adams Avenue sewer (location 1) is

a pathway for contaminant transport off-site. The data are not conclusive as to whether location 2, an Adams Avenue sewer lateral east of Chemical Road, location 4, the Alundum Road sewer near the intersection of Adams Avenue, location 5, the Gill Creek Outfall 006, and location 10, a State Power Authority line near the southern fenceline of the site are pathways for contaminant migration. The remainder of the manmade passageways investigated do not appear to be passageways for contaminant transport off-site.

INTRODUCTION

The subsurface investigations, laboratory testing and well installations reported herein were made at the request of the E.I. duPont de Nemours and Company, Inc. as part of the Geohydrologic Investigations of the Niagara Plant. The DuPont Niagara Plant Site is located in Niagara Falls, New York, as shown on the Regional Location Plan, Plate 1. These investigations were made for assessment of contaminant movement along manmade passageways. Manmade passageways are defined as those portions of the subsurface that have been excavated and refilled to accomodate placement of buried utilities such as water, sewer or electrical lines. The specific locations studied are shown on Plate 2, Test Pit/Utility Well Location Plan.

Test pits were excavated to allow evaluation of physical and chemical properties of materials surrounding and beneath the buried utilities. Soil samples of the bedding and underlying material around the utility lines were obtained for selected chemical parameter analyses. Well screens with riser pipes, hereafter called utility wells (UW), were installed upon completion of the test pit excavation and prior to backfill to permit sampling and analysis of the water flowing in the surrounding bedding material. A schematic of the sample locations and utility well installations is presented on Plate 3. The scope of this investigation included the monitoring of the field exploration work, analysis of all relevant subsurface and analytical data, and the preparation of this report.

A description of the field investigations and laboratory analyses and findings and conclusions are presented in the following text. A description of the materials encountered in the test pits is contained in the test pit logs which are presented in Appendix A. The Utility (Monitoring) Well Installation Reports are included in Appendix B. The chemistry of the bedding material, the underlying material and the groundwater sampled from the manmade passageways is included in Appendix C.

FIELD INVESTIGATIONS

The subsurface conditions at selected utility locations were investigated by means of 13 test pits. A well screen and riser pipe were then installed at each of these

test pit locations. The selection of utilities to be investigated and the locations of the test pits were initially determined by DuPont and reviewed by Woodward-Clyde Consultants. The manmade passageways investigations are described in Attachment 5 of DuPont's September 2, 1983 Status Report to the New York State Department of Environmental Conservation. A location plan of the 13 test pits and associated utility wells is included as Plate 2. The excavations were completed by Sicoli and Massaro Inc., Niagara Falls, N.Y., under contract with DuPont. Samples of the bedding material, underlying material and groundwater were analyzed by Recra Research Inc., Town of Amherst, New York.

EXCAVATION PROCEDURES

Test pits for the manmade passageways investigations were generally excavated by a rubber tire mounted Case 680 tractor backhoe with an excavating depth capability of about 12 feet. Location Number 8 was excavated with a Caterpillar 215 backhoe with an excavating depth capability of about 20 feet. A daily work permit was obtained by the contractor prior to commencement of work each day.

The excavations were mechanically advanced to first locate the particular utility in question. The excavation then continued along the side of the utility to expose the bedding and underlying material. This procedure was generally utilized for excavation of the utilities unless the utility was buried in a rock channel. In these cases, the excavation was advanced toward the invert by hand.

When excavations were in excess of five feet, a pre-fabricated wood shoring system was assembled and set into the excavation for protection of personnel in the excavation, in accordance with OSHA and DuPont regulations. Shored excavations were tested for oxygen, explosion potential and toxic vapors prior to personnel entering the excavation and hourly thereafter in accordance with DuPont regulation for "Closed Chamber Entry Permits".

SOIL SAMPLING

The soils from the test pits were logged for geotechnical properties and examined for evidence of chemical contamination. The soil samples were generally taken

from the backhoe bucket, however, some of the soil samples were taken from the walls of the test pits. These samples were not retained.

Soil samples for chemical analysis were collected from the 13 test pits. Eleven samples were taken from the bedding material by hand excavating in the test pit, while, due to uncontrolled groundwater, two samples from test pits (Numbers 8 and 9) were taken from the backhoe bucket. Soil samples of the underlying material were collected for chemical analysis in Test Pits Nos. 5, 7, 10, 11, 12 and 13. There were no samples from the remaining 7 test pits as the underlying material was bedrock. A log of each test pit was prepared in the field at the time of excavation by Mr. Richard M. Coad, P.E. These logs are presented in Appendix A.

The soil samples of the bedding material, taken by hand excavating, were approximately located under the center of the utility when possible and about two to three inches below the utility. The samples of the underlying material were taken below and adjacent to the utility. The locations of bedding and underlying material sampling are shown on Plate 3.

Soil samples for chemical analysis were placed in VOA Vials and pint bottles, sealed, labeled and placed on ice in a cooler to minimize volatilization. Strict chain of custody procedures were followed at all times and the samples were turned over to the testing agency for analysis.

WELL INSTALLATION

Wells were installed for groundwater level monitoring and sampling in each of the excavated test pits. The wells consisted of a 4-inch I.D. stainless steel 10 slot screen 2 feet long and 4-inch I.D. black steel riser pipe. The tip of each well extended below the invert of the adjacent utility except for the wells 1 through 4 and 6, where excavation could not reach the utility invert. A sand pack consisting of washed screenings was placed around each well screen and utility (generally in accordance with DuPont Dwg. EE20-2780), covered sequentially with crusher run stone, compacted clay and topped off with crushed stone. The thickness of each component is shown on the individual monitoring well reports in Appendix B. A specification and sample gradation for the crushed stone is shown in Appendix B on Figure B-1.

LABORATORY INVESTIGATIONS

SOIL

The soil samples collected were relinquished to Recra Research Inc. at the site for subsequent chemical analyses. Analyses were performed for specific indicator parameters, consistent with other on-going site assessments. The specific indicator parameters tested for are presented in Table 1. The results of the chemical analyses are included in Appendix C with a Summary of Analytical Test Results presented in Table 2 and 3 for the bedding and underlying material, respectively.

GROUNDWATER

Groundwater samples were collected from the utility wells between December 5 and 14, 1983, by Recra Research Inc. A "Field Report" was submitted by Recra Research, Inc., describing in detail the sampling technique and presenting the data obtained in the field. This report is attached as part of Appendix C. Analyses were performed for specific indicator parameters (Table 1) consistent with previous and on-going site assessments. The results of the analyses are included in Appendix C with a Summary of the Analytical Test Results presented in Table 4.

SUBSURFACE CONDITIONS

The subsurface conditions and materials are similar to those described in Woodward-Clyde Consultants' report entitled "Geohydrologic Investigations, Niagara Plant, Niagara Falls, N.Y." dated December 23, 1983. The subsurface materials encountered in the test pits for this study consisted of fill materials and natural clay/till. A brief description of the materials encountered is presented below. For additional detail, the logs are contained in Appendix A.

OVERBURDEN

Fill materials consisting of shot rock with little fine material were encountered in Test Pits Nos. 1, 2, 4, 8 and 9. Fill material consisting predominantly of

silty clay/clayey silt with sand, gravel, cobbles, brick, tile, etc. was encountered in Test Pits Nos. 5, 6, 7, 10, 11, 12 and 13. A very thin layer (1.0 to 1.5 feet) of fill material (crushed stone) was also encountered in Test Pits Nos. 1 and 3 over the natural material. The natural material encountered in Test Pits No. 1 and 3 was generally a very stiff silty clay/clayey silt with some cobbles and occasional rock fragment. The natural material encountered in Test Pit No. 5 was a soft gray-black silty clay. Bedrock (broken dolomite) was encountered in Test Pits Nos. 1,2,3,4,6,8 and 9. A summary of the fill, clay/till and bedrock depths is included in Table 5.

GROUNDWATER

Water was encountered in all of the test pits at depths ranging from 0.2 to 10.9 feet. Groundwater elevation in the overburden materials ranged from 563.0 to 567.3. Groundwater elevations in test pits that encountered bedrock ranged from 561.4 to 565.6, with two wells dry at 560.5 and 559.3 (UW-3 and UW-4, respectively). Test Pit No. 3 was dry during excavation, while Test Pit No. 4 encountered water during excavation at 564.7 and at completion groundwater was recorded at 560.3. Water in Test Pit Nos. 8 and 9 was in such quantity that it could not be controlled during excavation with a 3 inch centrifugal pump. At the other extreme, water was controlled by bailing with a 5 gallon bucket at Test Pit Nos. 5,7,12 and 13. A summary of groundwater depths and elevations is included as part of Table 5.

AIR

The air quality at the excavation was monitored by means of a Century Systems Organic Vapor Analyzer (OVA) Model OVA-128. This unit, when set on the most sensitive scale, is capable of monitoring trace quantities of organic material, as low as 1 ppm above background levels. When the test pits were shored for protection (limited access), the air quality within the excavation was monitored at least once an hour for oxygen deficiency, concentration of flammable gases and organic vapors.

The air quality monitoring for all of the excavations indicated that the organic vapors were less than 1 ppm above background except for Test Pits Nos. 1 and 11. The OVA readings at Test Pit No. 1 were noted to be about 300 ppm. These readings were

occasionally erratic and could be related to weather conditions (rain and mist) with potential shorting within the OVA. Further testing at Test Pit No. 1 for tetra- and trichloroethylene with MSA tubes (similar to Draeger tubes) indicated that there was less than 1 ppm of contaminants in the air. The OVA reading at Test Pit 11, fluctuated within a very short period of time and are believed to have resulted from the cleaning of equipment immediately adjacent to the test pit site. Respirators (1/2 face) were used at Test Pit 1 until there were data to document there was not a health hazard. Respirators were not used at Test Pit 11. The air quality for the limited access testing was, at all times, in compliance with the previouisly referenced DuPont requirements.

ANALYSIS OF FINDINGS

The findings of the man-made passageways investigations were compared to those presented in Woodward-Clyde Consultants' "Geohydrologic Investigations, Niagara Plant, Niagara Falls, New York" dated December 23, 1983.

SUBSURFACE CONDITIONS

The subsurface conditions encountered in the test pits excavated at the Niagara Plant were consistent with those previously encountered and described in the above referenced report. Consistent with the old shore lines, the overburden materials encountered were fill materials south of Adams Avenue. A layer of natural clay was encountered underlying the fill materials at Test Pit No. 5, a likely remnant from Gill Creek Island. As indicated in Table 5, bedrock was encountered in seven of the 13 test pits, with approximate elevations indicated on Plate 4. It is noted that there is relatively good agreement between the contoured bedrock surface and that encountered at Test Pit Nos. 3, 4, 6 and 8. The variation at Test Pit Nos. 1, 2 and 9 is generally less than two feet. The material encountered in the test pits showed no indication of second phase organics on/in any of the samples.

Some of the test pits excavated at the Niagara Plant encountered shot rock, specifically test pit Nos. 1, 2, 4, 8, and 9. The use of the term shot rock is used in a very generalized manner to denote rock that does not appear to be a quarry processed stone.

GROUNDWATER

Groundwater levels were recorded on December 19, 1983 for both the previously installed monitoring wells (Cluster 1 through 21) and the utility wells (1 through 13) installed during this investigation. The groundwater contours obtained for the December 19, 1983 groundwater levels in the "A" zone monitoring wells, are presented on Plate 5. Elevations of the water level in the utility wells are also shown on Plate 5 for correlation purposes.

The groundwater levels for wells in utility trenches in the bedrock on the western section of the site (UW-1, 3 and 4) are generally about five feet lower, except for UW-2 which exhibits a water elevation consistent with the generalized "A" well contours. This indicates an apparent sink along Adams and Buffalo Avenues. However, the water levels for the utility wells in rock in the eastern portion of the site (UW-6, 8, and 9) are about the same as the generalized contours for the site. The groundwater levels for the utility wells in the overburden (UW-5, 7, 10, 11, 12 and 13) were higher than the generalized "A" well contours for the site except for utility well 12 which is about the same elevation as the generalized "A" well contours.

There are basically three groundwater conditions that were encountered at the utility wells relative to the "A" zone monitoring wells. The three conditions would be (1) an "elevated groundwater condition", (2) a groundwater level similar to "A" zone groundwater condition and (3) a "lowered groundwater condition". These three conditions are illustrated on Plate 6.

The "elevated groundwater condition" would be a groundwater level at the utility wells higher than that recorded for the groundwater in the "A" wells. This condition was usually encountered where the overburden materials, e.g. silty clay fill, do not allow groundwater to flow freely to the underlying bedrock. The elevated groundwater is slowly moving toward the site groundwater level.

The second condition exists when the utility well groundwater was similar to "A" zone groundwater. This condition would exist when there was good communication between the groundwater regime in the "A" zone and the groundwater in the area of the

utility. This condition generally means there is a hydraulic connection but no groundwater gradient to transport contaminants from one location to another.

The third condition where the groundwater level at the utility well is lower than that of the "A" zone monitoring wells was generally at locations where the utility had been placed in a channel excavated into the bedrock. The hydraulic gradient in this case indicates groundwater flow toward the utility and contaminants in the groundwater can be transported toward the lower groundwater elevation in the manmade passageway.

ANALYTICAL RESULTS

A group of both DuPont-related and non-DuPont related compounds have been selected by DuPont as indicator parameters based on analytical results from previous groundwater sampling rounds. These indicator parameters can be grouped as volatile organic, organic and inorganic compounds. Four of the indicator compounds, benzene, chlorobenzene, BHC's and phenolics are considered non-DuPont related. The analytical data are summarized in Tables 2, 3 and 4. Presented on Table 6 is a summary of the relative concentrations of indicator parameters within the underlying material, bedding material and groundwater.

DUPONT RELATED VOLATILE ORGANIC COMPOUNDS: Seven DuPont-related volatile organic compounds were selected for chemical analyses. They can be divided into two groups based on the number of carbon atoms in their molecular structure, C-2 and C-1 compounds. The C-2 compounds are organic compounds that contain two carbon atoms in the molecular structure. They include tetrachloroethylene, trans-1,2-dichloroethylene, trichloroethylene, vinyl chloride, and 1,1,2,2-tetrachloroethane. The C-1 compounds contain one carbon atom and include chloroform and methylene chloride. Results of the DuPont-related volatile organic compounds analyses indicate that concentrations ranged from non-detectable to 260 ppm in the bedding material, underlying material and utility groundwater samples (see Tables 2, 3 and 4).

In order to compare the analytical results of the most recent soil and groundwater sampling with the previous data which were presented in the Geohydrologic

Investigation report, the concentrations of the underlying material, bedding material and groundwater were plotted on each of the volatile organic concentration maps for the October/November 1983 sampling data (see Plates 7 through 13).

The concentration data for the underlying material, the bedding material and the groundwater were also plotted as total "C-2" and total "C-1" compounds (Plates 14 and 15).

The concentration of C-2 compounds ranged from 0.221 to 4.9 ppm, .020 to 5.8 ppm, and 0.008 to 19.5 ppm in the underlying material, bedding material, and groundwater samples, respectively. The concentration of the C-1 compounds ranged from not detected to 0.043 ppm, not detected to 1.4 ppm, and not detected to 257 ppm in the underlying material, bedding material, and groundwater samples, respectively.

DUPONT RELATED ORGANIC COMPOUNDS: The DuPont-related organic indicator parameters include PCB compounds (1016, 1221, 1232, 1242, 1248, 1254 and 1260). It is noted that all PCB compounds are considered to be DuPont related for this investigation, however, only one compound PCB-1248 was used at Building B-310. The analytical results indicate that only four PCB compounds (1242, 1248, 1254 and 1260) were detected in any of the samples (see Tables 2, 3 and 4). PCB compounds were below detectable limits in all of the groundwater and underlying material samples.

PCB compounds 1248 and 1260 were detected at location 6 in the bedding material at concentrations of 0.43 and 0.53 ppm, respectively. This is the vicinity where voluntary restoration activities had been performed by DuPont for the removal of PCB-contaminated materials (B-310 Excavation Project). Soils, in the B-310 excavation project, with PCB compound concentrations in excess of 50 ppm were reportedly removed from the area. PCB compounds 1242 and 1254 were detected in the bedding material at location 10 at concentrations of 1.5 and 0.67 ppm, respectively. PCB compound 1254 was also detected in the bedding material at location 11 at a concentration of 0.26 ppm.

DUPONT RELATED INORGANIC COMPOUNDS: Soluble barium was detected in all of the groundwater samples (Table 4). The soil samples were not analyzed for soluble barium. Soluble barium was measured at less than 1 ppm in wells 1, 2, 5

through 9, 12 and 13. These concentrations are in agreement with previous groundwater analyses of samples from the "A" zone wells. The barium concentrations in the water samples collected from utility wells 10 and 11, however, were 3530 and 450 ppm, respectively. It is noted that barium is associated with the sodium cell tear down and weathering areas and utility wells 10 and 11 are in the vicinity of these areas.

Total cyanide was detected in most of the bedding material, underlying material and groundwater samples as shown in Tables 2, 3, and 4 and on Plate 18. Total cyanide concentrations ranged from <0.5 to 280 ppm and <0.5 to 540 ppm in the bedding material and underlying material, respectively. With the exception of location 11, which was reportedly a cyanide wash area (Plate 22), the concentration of total cyanide is higher in the bedding materials as compared to the underlying material at the same location. Concentrations of cyanide in the groundwater samples ranged from <0.01 to 19 ppm.

Total copper was detected in all of the underlying material and bedding material samples (Tables 2, 3 and Plate 19). The bedding material concentrations of total copper ranged from 7.5 to 935 ppm. The underlying materials had total copper concentrations ranging from 11 to 23 ppm. The high concentration of total copper measured in the bedding material at location 10 may be attributable to the cyanide weathering area previously located nearby.

Soluble copper was also detected in the groundwater samples. Concentrations ranged from <0.008 to 8.2 ppm (Table 4 and Plate 19). These values are within the range of concentrations of soluble copper detected during the previous October/November 1983 sampling round.

NON-DUPONT RELATED VOLATILE ORGANIC COMPOUNDS: Samples were analyzed for two non-DuPont related volatile organic compounds. Detectable concentrations were measured in one of the underlying material samples, two of the bedding material samples and one of the utility groundwater samples. These compounds, benzene and chlorobenzene, were detected at location numbers 8 and 10 in concentrations of less than 0.1 ppm (Tables 2, 3 and 4). The measured concentrations of benzene and chlorobenzene are shown on Plates 16 and 17, respectively.

NON-DUPONT RELATED ORGANIC COMPOUNDS: Analytical results of samples collected from the bedding material and groundwater indicate measurable concentrations of hexachlorocyclohexane isomers (BHC's) (Plate 20). The total BHC concentrations in the bedding material ranges from below detectable limits to 16.7 ppm. The highest BHC concentration was measured in the bedding material at location 4. The total BHC concentrations measured in the groundwater ranges from below detectable limits to 0.008 ppm, with the highest concentration occurring at location 6. Total BHC concentrations were below detectable limits for all of the underlying materials sampled.

Total recoverable phenolics have been detected in most of the samples (Plate 21). The measurable concentration of total recoverable phenolics for the underlying material, bedding material and water samples ranged from 0.17 to 15 ppm, 0.15 to 42 ppm and <0.01 to 15 ppm, respectively. As reported previously, there does not appear to be an apparent pattern to the presence of the phenolics.

PASSAGEWAYS ANALYSIS

The following discussion addresses each of the passageways investigated with respect to the contaminants encountered and potential for contaminant transport.

LOCATION NO. 1: Location Number one is the Adams Avenue sewer west of Chemical Road. The sewer at this location is channeled in bedrock and flows to the west. The groundwater elevation is low with respect to the surrounding wells (Plate 5), which would tend to indicate that there is a groundwater flow into and along the passageway. The total concentration of C-2 and C-1 compounds in the groundwater (Plates 14 and 15) would appear to be about two orders of magnitude greater than the concentrations at monitoring well 19A from the October 1983 sampling. At the same time, the concentration in the groundwater of total cyanide (Plate 18) would appear to be about an order of magnitude greater than in the October 1983 sample from monitoring well 19A. These data would suggest that the Adams Avenue Sewer may be a pathway for contaminant transport from the site. Likely sources may be considered to be the areas in the vicinity of monitoring well clusters 15 and 16, based on a comparison of compound concentrations at the utility well and the surrounding monitoring wells.

The concentration of C-2 (0.236 ppm) and C-1 (0.230 ppm) compounds in the bedding material more closely resemble the groundwater concentrations detected in monitoring well 19A than utility well 1. This could indicate that higher concentrations of C-2 and C-1 compounds are moving through this pathway but are not being significantly retained by the gravelly sandy silty clay bedding material.

LOCATION NO. 2: Location Number two is a 12-inch lateral north of the Adams Avenue Sewer east of Chemical Road and west of Alundum Road. The sewer at this location was not located, but is believed to be channeled in bedrock. Groundwater samples at monitoring well 15A have exhibited second phase organic fluid and with the top of bedrock lower at utility well 2 than at well cluster 15 (elevation 560 versus 562), some impact on the quality of the groundwater at utility well 2 would be expected. However, the concentration of C-2 and C-1 compounds (Plates 14 and 15) is lower than might be expected on the basis of the apparent concentration from the October 1983 sampling of monitoring well 15A. Because the Adams Avenue sewer is located to the south of utility well 2, contaminants may possibly be intercepted by this passageway and transported to the west. The results at utility well 1, as previously discussed, tend to support this contention.

The bedding material sample from Test Pit 2 consisted of shotrock. It contained 63 ppm of total copper and 2.4 ppm of C-2 compounds. These elevated levels do not appear to be directly related to subsurface migration from any of DuPont's processes.

LOCATION NO. 3: Location Number three is along the Chemical Road sewer just south of Buffalo Avenue. The sewer was located channelled in bedrock and the obvert was uncovered. The invert was not excavated due to the "cemented" materials. The "cemented" materials consisted of silty clay/clayey silt with rock fragment and slag that were tightly bonded together. At this location there was no groundwater encountered and, consequently, conditions for contaminant transport along this passageway do not appear to exist.

In addition, concentrations of the indicator parameters measured in the bedding material sample are low with the exception of Total Recoverable Phenolics (42

ppm). As mentioned previously, there is no readily apparent pattern to the presence of phenolics at the site.

LOCATION NO. 4: Location Number four is near the intersection of Adams Avenue and Alundum Road. The sewer, reportedly an 18-inch line, was not uncovered due to grouted bedding materials in the bedrock channel. At this location, groundwater was encountered during excavation, but dropped below the bottom of the well after installation. Note that the groundwater elevation at the proximate monitoring well, 14A, has been at about 564 and the test pit was excavated to an elevation of about 559. As noted in a previous section of this report, groundwater in the test pit was initially encountered at an elevation of about 564. Reportedly, the Adams Avenue sewer was out of service during this period and subsequently returned to service. The groundwater infiltration to the sewer could have caused this groundwater drop. The Alundum Road sewer at this location is channeled in bedrock and the area has been previously grouted in an effort to seal the passageway. There is not sufficient data to indicate that the Alundum Road sewer is a pathway for contaminant transport from the site, however with the test pit groundwater level below the surrounding groundwater elevations, it is possible that the Alundum Road sewer connected to the Adams Avenue sewer is a pathway for contaminant transport from the site.

The bedding material sample, which consisted of grouted shotrock, contained 43 ppm of total copper, 3.6 ppm of C-2 compounds and 1.3 ppm of C-1 compounds. The C-2 and C-1 compound concentrations may be related to this respective process areas as shown on Plate 22. In a similar manner, the bedding material also contained elevated levels of total BHC's which are considered to be non-DuPont related.

LOCATION NO. 5: Location Number five is along the Gill Creek Outfall 006, along DuPont Road, just west of Gill Creek. The outfall at this location is founded in the overburden material with the outfall flowing to the east. The groundwater level at this location (measured in the overburden) is higher than at monitoring well 21A, which suggests that an elevated groundwater condition exists in this area. Monitoring well 21A has exhibited second phase organics, whereas the concentrations of the C-2 and C-1 compounds in the groundwater at utility well 5 were less than 1 ppm (Plates 14 and 15). Total Cyanide concentrations at utility well 5 and monitoring well 21A do not appear to

be statistically different enough to suggest any trend. Based on the available data, the Gill Creek Outfall 006 may be a pathway for contaminant transport. However, the mechanism producing the apparent elevated groundwater condition may preclude or retard lateral movement, thereby limiting the potential of the Gill Creek Outfall 006 to act as a pathway for contaminant migration.

The concentrations of C-1 compounds (0.014 ppm), and C-2 compounds (1.9 ppm) in the bedding material compare favorably with groundwater concentrations measured in the utility well. In addition, the types of volatile organics measured in the underlying material sample corresponds to the bedding material. Total BHC's in the bedding material was elevated (18.1 ppm). Although the source of the BHC's has not been established, monitoring wells in the vicinity of Gill Creek also contained BHC's.

LOCATION NO. 6: Location Number six is along the CWPT Outfall 023, east of Gill Creek between Adams Ave. and DuPont Road. The outfall at this location is channeled in bedrock and encased in concrete with the outfall flowing to the north. This is near the vicinity of the B-310 Excavation Project. The groundwater level at this location was consistent with the groundwater contours for the "A" wells as shown on Plate 5. Only two volatile compounds were detected in the groundwater sample, and both at low concentrations (tetrachloroethylene - 0.013 ppm; trichloroethylene - 0.010 ppm). The B-310 Excavation Project was performed in response to PCB contamination. No PCB's were detected in the groundwater at utility well 6. Based upon the data available, the CWPT Outfall 023 does not appear to be a passageway for contaminant transport off-site.

Samples collected from the bedding material contained low concentrations of C-2 compounds (0.045 ppm), but C-1 compounds were not detected. Low concentrations of PCB-1248 (0.43 ppm) and PCB-1260 (0.53 ppm) were also detected. They likely represent residual levels from the B-310 excavation project.

LOCATION NO. 7: Location Number seven is along the 15-inch storm sewer, south of Buffalo Avenue, just west of Hyde Park Blvd. The outfall at this location is founded in the overburden, without granular bedding material, flows north and is adjacent to Warehouse Building Number 425. The groundwater level at this location is higher than would be indicated by the groundwater contours extrapolated between

monitoring wells 17A and 18A (Plate 5), which suggests that an elevated water table exists in this area. The C-1 compounds were not detected in the groundwater sample from utility well 7. The total C-2 concentration was 0.146 ppm. In general, the analytical results may be considered to be comparable to the October 1983 results at monitoring wells 17A and 18A. Consequently, although the storm sewer may be a passageway for water flow off-site, the available data do not suggest a contaminant transport pathway.

Both the bedding material and underlying material samples contained low concentrations of C-2 compounds (0.484 ppm and 0.241 ppm, respectively). Total recoverable phenolics concentrations were measured as 11 ppm and 15 ppm in the bedding and underlying materials, respectively. Phenolic is considered to be a non-DuPont related compound.

LOCATION NO. 8: Location Number eight is the East Plant Raw Water Intake 117, just south and west of the eastern pumphouse. The raw water intake is founded on bedrock with the surrounding material being shotrock. The groundwater level at utility well 8 is consistent with the A-zone groundwater contours, with a gradient away from the river (toward the Northeast). Monitoring well 8A, located generally west of utility well 8, has exhibited relatively high concentrations of C-2 compounds and total cyanide. However, only trace amounts (0.008 ppm) of trichloroethylene were detected in utility well 8. Based upon the data available, the Raw Water Intake does not appear to be a passageway for contaminant transport off-site.

In addition to low concentrations of trichloroethylene (0.020 ppm), the bedding material also contained low amounts of chlorobenzene (0.006 ppm) (non-DuPont), methylene chloride (0.065 ppm) and cyanide (6.3 ppm).

LOCATION NO. 9: Location Number nine is the Niagara River Outfall 004 from DuPont Road to the Niagara River; just south of Riverside Avenue, south of the Polyglycol (403) Building. The Niagara River Outfall 004 is founded on bedrock with the surrounding material being shotrock. The groundwater level at this location is consistent with the groundwater contours for the "A" wells in the bedrock (Plate 5). The utility well was located southwest of monitoring well 8A and south of monitoring well 9A. The

analytical results for groundwater obtained from utility well 9 indicate the presence of C-2 compounds (0.132 ppm) and cyanide (1.8 ppm). However, the data do not indicate the Niagara River Outfall 004 to be a pathway for contaminant migration. The analytical results from the bedding material indicate an elevated level of total cyanide (190 ppm), which is also the case for the groundwater from utility well 9.

LOCATION NO. 10: Location Number ten is the State Power Authority (SPA) Line 9 near the southern fence line of the site in the west maintenance storage area. The SPA line 9 is founded in fill material that is predominantly silty clay/clayey silt with the pipe bedded in a sandy material. The groundwater level at the location is about 14 feet higher than the groundwater levels measured at monitoring wells 5A and 6A indicating perched groundwater exists. The total concentrations of the C-2 and C-1 compounds (Plates 14 and 15) in the groundwater sample from utility well 10 appear to be greater than have been detected in the proximate monitoring wells 5A and 6A. The concentration of soluble barium in the utility well 10 groundwater sample was about 3500 ppm, well in excess of any previously reported data. The test pit was located in the vicinity of the Pre-1965 Pit Burning Area and a previous Cyanide Weathering Area (Plate 22). The area is currently utilized as a sodium weathering area and sodium cell tear down area, with barium being one of the salts used in the sodium cells. Based upon the data available, including the apparent elevated of groundwater, there is not conclusive information to say the SPA Line 9 is a passageway for contaminant transport off-site.

The C-2 compounds and total copper concentrations of the bedding material were elevated at 5.8 ppm and 935 ppm, respectively. The C-2 concentration in the bedding material agrees favorably with groundwater concentrations measured in utility well 10. The high level of copper may be related to the nearby Cyanide Weathering Area (Plate 22).

LOCATION NO. 11: Location Number eleven is the SPA Line 47 at the south end of Chemical Road near Building 102. The SPA Line 47 is founded on fill materials with the bedding material consisting of silty medium to fine sand. The groundwater level at this location is about 8 feet higher than at monitoring well 4A, which suggests that an elevated groundwater exists. No C-1 compounds were detected in the groundwater at utility well 11 (Plate 15). Total C-2 concentration was 0.276 ppm (Plate

14). The concentrations of soluble barium (450 ppm) and total cyanide (3.8 ppm) may be considered to be reflecting an impact from a previous Cyanide Wash Area (Plate 22) and the sodium cell wash down area adjacent to utility well 11. However, the available data do not indicate a pathway for contaminant migration along SPA Line 47. The underlying material contained 540 ppm and the bedding material contained 280 ppm of total cyanide. As with the groundwater, these high concentrations likely reflect the impact of the previous Cyanide Wash Area.

LOCATION NO. 12: Location Number twelve is the SPA Line 50 at the southern site boundary, south of the plant truck scales platform. The SPA Line 50 is founded in fill materials with bedding material of silty medium to fine sand. The groundwater level at this location appears to be consistent with the groundwater levels interpolated between monitoring wells 2A, 3A and 4A. The total concentrations of the C-2 and C-1 compounds, in the groundwater sample from utility well 12, (Plates 14 and 15) are generally lower than the results for monitoring wells 2A and 3A, and appear to be generally comparable to monitoring well 4A results, for the October 1983 sampling. The concentration of cyanide in the groundwater sample was less than detected in the October 1983 sampling of monitoring wells 2A, 3A and 4A. The results of the analytical testing of groundwater from utility well 12 do not indicate the SPA Line 50 to be a passageway for contaminant transport.

The C-2 and C-1 compound concentrations were 1.2 ppm and 0.118 ppm, respectively, for the bedding material. The underlying material contained 4.94 ppm and 0.43 ppm of the C-2 and C-1 compounds, respectively. These levels are higher than what was measured in the utility well, and could indicate that some of these compounds are being retained by the silty sand bedding and gravelly sandy silty clay underlying materials.

LOCATION NO. 13: Location Number thirteen was near the SPA Line 58, at the southern end of Alundum Road. The utility was an 8-inch cast iron pipe that was founded in fill material without bedding material. The groundwater level at this location is about four feet higher than indicated by extrapolation of water levels between monitoring wells 1A and 2A, which suggests the presence of an elevated groundwater. Monitoring well 1A has exhibited second phase organic fluid. No second phase organic fluid was observed in utility well 13. In addition, total C-2 and C-1 compound

concentrations in the groundwater at the utility well were 0.675 ppm and 0.014 ppm, respectively, which would appear to be orders of magnitude lower than observed at monitoring well 2A. Consequently, based upon the available data, the SPA Line 58 appears not to be a passageway for contaminant transport off-site.

The bedding/underlying material of sandy gravelly silty clay contained 3.35 ppm of C-2 compounds and 0.027 ppm of C-1 compounds. These levels are higher than those measured in the utility well, which may indicate that these compounds are being retained by the clay fraction.

SUMMARY AND CONCLUSIONS

In summary, based upon the data available, regarding the level of contamination in the underlying material, the bedding material and the groundwater, coupled with an assessment of the groundwater flow directions between the manmade passageways and the adjacent overburden, conclusions regarding the potential of the manmade passageway to act as a pathway for contaminant transport have been drawn. Based upon these available data and the subsequent analyses, the following location is likely a pathway:

- The Adams Avenue Sewer (location 1).

The data are not conclusive with regard to the following pathways:

- The Adams Avenue Sewer lateral east of Chemical Road (location 2);
- The Alundum Road Sewer near the intersection of Adams Avenue (location 4);
- The Gill Creek Outfall 006 (location 5); and
- A State Power Authority line near the southern fenceline of the site (location 10).

The remainder of the manmade passageways investigated do not appear to be pathways for contaminant transport off-site.

To assess more conclusively whether the utilities at location 2, 4, 5 and 10 are pathways for contaminant transport and to assess contaminant flux conditions at location 1, would require additional utility wells to establish hydraulic gradients and water quality. Note that no visible second phase organics were observed in any of the test pits or well installations. It is concluded that, with the additional data described herein, the estimates of contaminant loading provided in our report dated December 23, 1983 would be expected to remain essentially unchanged.

LIMITATIONS

The findings and conclusions presented in this report are based upon the interpretations developed from the available geologic, subsurface and groundwater chemistry data. These findings and conclusions are subject to confirmation and/or revision as additional information becomes available. Factors which influence the utilization of the data have been discussed in this report and local anamolies should be expected. Note that estimates of groundwater flow and contaminant loading should be considered "order of magnitude" and could be expected to vary from the estimates provided.

Tables

TABLE 1

INDICATOR PARAMETERS FOR CHEMICAL ANALYSIS

Soils	Water
Benzene	Benzene
Chlorobenzene	Chlorobenzene
Chloroform	Chloroform
Trans-1,2-dichloroethylene	Trans-1,2-dichloroethylene
Methylene Chloride	Methylene Chloride
1,1,2,2,-tetrachloroethane	1,1,2,2-tetrachloroethane
Tetrachloroethylene	Tetrachloroethylene
Trichloroethylene	Trichloroethylene
Vinyl chloride	Vinyl chloride
α BHC	α BHC
β BHC	β BHC
δ BHC	δ BHC
γ BHC	γ BHC
PCB - 1016, 1221, 1232	PCB - 1016, 1221, 1232
1242, 1248, 1254, 1260	1242, 1248, 1254, 1260
Total Copper	Total organic carbon
Total Recoverable Phenolics	Total Recoverable Phenolics
Total Cyanide	Total Cyanide
	Soluble Barium
	Soluble Copper

TABLE 2
ANALYTICAL RESULTS FOR BEDDING MATERIAL
MANMADE PASSAGEWAYS
DUPONT - NIAGARA FALLS PLANT

Compound	Locations 1	2	3	4	5	6	7	8	9	10	11	12	13	
Benzene	ND	ND	ND	ND	ND	ND	ND	ND	ND	31	ND	ND	ND	µg/kg
Chlorobenzene	ND	BMDL	ND	BMDL	ND	BMDL	ND	5.6	ND	22	ND	ND	ND	µg/kg
Chloroform	130	280	6.7	1200	9.8	ND	ND	ND	ND	120	ND	8	5	µg/kg
trans-1,2 dichloroethylene	110	52	ND	99	1200	14	400	ND	ND	3600	110	100	720	µg/kg
methylene chloride	100	36	4.0	170	4.5	ND	ND	65	ND	95	20	110	22	µg/kg
1,1,2,2-tetrachloroethane	ND	ND	BMDL	32	ND	10	BMDL	ND	BMDL	21	BMDL	81	ND	µg/kg
tetrachloroethylene	34	1400	50	1900	98	5.8	ND	ND	6.9	200	20	600	130	µg/kg
trichloroethylene	50	960	49	1600	570	15	10	20	57	480	120	480	2500	µg/kg
vinyl chloride	42	ND	ND	ND	18	BMDL	74	ND	ND	1500	15	ND	BMDL	µg/kg
α-BHC	<.02	0.51	<.03	16.5	<.05	<.05	<.05	<.03	<.05	<.05	<.05	<.05	<.01	µg/g
β-BHC	<.02	0.87	<.03	0.16	<.05	<.05	<.05	<.03	<.05	<.05	<.05	<.05	<.01	µg/g
δ-BHC	<.02	<0.1	<.03	<0.3	<.05	<.05	<.05	<.03	<.05	<.05	<.05	<.05	<.01	µg/g
γ-BHC	<.02	0.29	<.03	<0.2	<.05	<.05	<.05	<.03	<.05	<.05	<.05	<.05	<.01	µg/g
PCB-1016	<0.2	<0.3	<0.1	< 2	<0.2	< 1	<0.1	<0.1	<0.1	< 1	< 0.3	< 0.1	< 0.1	µg/g
PCB-1221	<0.2	<0.6	<0.2	< 4	<0.4	< 2	<0.2	<0.2	<0.2	< 2	< 0.6	< 0.2	< 0.2	µg/g
PCB-1232	<0.2	<0.6	<0.2	< 4	<0.4	< 2	<0.2	<0.2	<0.2	< 2	< 0.6	< 0.2	< 0.2	µg/g
PCB-1242	<0.2	<0.3	<0.1	< 2	<0.2	< 1	<0.1	<0.1	<0.1	1.5	< 0.3	< 0.1	< 0.1	µg/g
PCB-1248	<0.2	<0.3	<0.1	< 2	<0.2	0.43	<0.1	<0.1	<0.1	< 2	< 0.3	< 0.1	< 0.1	µg/g
PCB-1254	<0.2	<0.3	<0.1	< 1	<0.2	< 0.5	<0.1	<0.1	<0.1	0.67	0.26	< 0.1	< 0.1	µg/g
PCB-1260	<0.2	<0.3	<0.1	< 1	<0.2	0.53	<0.1	<0.1	<0.1	< 1	< 0.3	< 0.1	< 0.1	µg/g
Total Copper	7.7	63	20	43	97	19	37	12	22	935	7.5	41	13	µg/g
Total Cyanide	<0.5	2.5	0.5	19	39	< 0.5	2.3	6.3	190	52	280	5.9	190	µg/g
Total Recoverable Phenolics	0.35	0.45	42	0.4	6.0	0.4	11	2.9	0.4	4.8	1.2	0.15	0.33	µg/g

ND - Not Detected

BMDL - Below method detection limit

<xx working detection limit for the given sample and/or parameter

TABLE 3
ANALYTICAL RESULTS FOR UNDERLYING MATERIAL
MANMADE PASSAGEWAYS
DUPONT - NIAGARA FALLS PLANT

Compound	5	7	10	11	12	
Benzene	ND	ND	4.7	ND	ND	µg/kg
Chlorobenzene	ND	ND	ND	BMDL	ND	µg/kg
Chloroform	ND	ND	5.0	ND	36	µg/kg
trans 1,2-dichloroethylene	250	41	300	1200	540	µg/kg
methylene chloride	ND	ND	32	30	7.3	µg/kg
1,1,2,2 tetrachloroethane	ND	BMDL	BMDL	BMDL	ND	µg/kg
tetrachloroethylene	BMDL	BMDL	180	370	2600	µg/kg
trichloroethylene	30	180	180	280	1800	µg/kg
vinyl chloride	100	ND	29	31	ND	µg/kg
α-BHC	<.01	<.01	<.01	<.05	<.01	µg/g
β-BHC	<.01	<.01	<.01	<.05	<.01	µg/g
δ-BHC	<.01	<.01	<.01	<.05	<.01	µg/g
γ-BHC	<.01	<.01	<.01	<.05	<.01	µg/g
PCB 1016	<0.1	<0.2	<0.1	<0.1	<0.1	µg/g
PCB 1221	<0.1	<0.4	<0.2	<0.2	<0.2	µg/g
PCB 1232	<0.2	<0.4	<0.2	<0.2	<0.2	µg/g
PCB 1242	<0.1	<0.2	<0.1	<0.1	<0.1	µg/g
PCB 1248	<0.1	<0.2	<0.1	<0.1	<0.1	µg/g
PCB 1254	<0.1	<0.2	<0.1	<0.1	<0.1	µg/g
PCB 1260	<0.1	<0.2	<0.1	<0.1	<0.1	µg/g
Total Copper	23	13	11	14	17	µg/g
Total Recoverable Phenolics	2.1	15	0.17	0.42	0.72	µg/g

Note: Location Number 1, 2, 3, 4, 6, 8 and 9 were not sampled as underlying material.
Location Number 13, bedding/underlying material the same

ND - Not Detected
BMDL - Below method detection limit
<xx working detection limit for the given sample and/or parameter

TABLE 4
ANALYTICAL RESULTS FOR GROUNDWATER
MANMADE PASSAGEWAYS
DUPONT NIAGARA FALLS PLANT

Compound	Locations												Detection Limit	
	1	2	5	6	7	8	9	10	11	12	13		Others	#1
Benzene	ND	BMDL	BMDL	ND	ND	ND	BMDL	9.9	ND	ND	ND	µg/l	4.4	110
Chlorobenzene	ND	ND	ND	ND	ND	BMDL	ND	ND	ND	ND	ND	µg/l	6.0	150
Chloroform	240,000	18	BMDL	ND	ND	ND	ND	120	ND	48	14	µg/l	1.6	40
trans-1,2 dichloroethylene	990	18	180	ND	56	ND	79	170	140	57	240	µg/l	1.6	40
methylene chloride	17,000	ND	ND	ND	ND	ND	ND	4,500	ND	ND	ND	µg/l	2.8	70
1,1,2,2-tetrachloroethane	380	ND	BMDL	BMDL	BMDL	ND	7.7	22	7.9	34	11	µg/l	6.9	170
tetrachloroethylene	6,200	60	6.6	13	BMDL	ND	5.1	290	7.7	14	12	µg/l	4.1	100
trichloroethylene	12,000	97	160	10	72	8.4	40	1800	120	86	400	µg/l	1.9	48
Vinyl chloride	BMDL	ND	BMDL	ND	18	ND	BMDL	68	ND	ND	12	µg/l	10.0	250
αBHC	0.06	0.38	.02	6.1	< .01	.03	.06	.05	< .01	< .01	< .01	µg/l		
βHC	0.27	0.05	.03	< .01	< .01	.10	< .01	<.01	< .01	< .01	< .01	µg/l		
δBHC	<.01	<.01	<.01	< .01	< .01	< .01	0.02	.03	< .01	< .01	< .01	µg/l		
γBHC	0.02	0.17	<.01	1.9	< .01	< .01	< .01	.03	< .01	< .01	< .01	µg/l		
PCB-1016	<.1	<.1	< .1	< .1	< .1	<.1	< .1	<.1	< .1	< .1	< .1	µg/l		
PCB-1221	<.2	<.2	< .2	< .2	< .2	<.2	< .2	<.2	< .2	< .2	< .2	µg/l		
PCB-1232	<.2	<.2	< .2	< .2	< .2	<.2	< .2	<.2	< .2	< .2	< .2	µg/l		
PCB-1242	<.1	<.1	< .1	< .1	< .1	<.1	< .1	<.1	< .1	< .1	< .1	µg/l		
PCB-1248	<.1	<.1	< .1	< .1	< .1	<.1	< .1	<.1	< .1	< .1	< .1	µg/l		
PCB-1254	<.1	<.1	< .1	< .1	< .1	<.1	< .1	<.1	< .1	< .1	< .1	µg/l		
PCB-1260	<.1	<.1	< .1	< .1	< .1	<.1	< .1	<.1	< .1	< .1	< .1	µg/l		
Total Organic Carbon	19	24	5.5	7.0	15	6.0	6.5	110	1.0	<1	4.0	mg/l		
Total Recoverable Phenolics	15	.018	<.01	15	.021	< .01	< .01	3.6	< .01	<.01	<.01	mg/l		
Total Cyanide	19	.029	0.18	<.01	.012	< .01	1.8	.086	3.8	<.01	< .01	mg/l		
Soluble Barium	0.31	0.55	0.13	0.31	.23	0.26	0.45	3,530	450	.30	.27	mg/l		
Soluble Copper	8.2	.067	< .008	.019	.014	0.015	0.015	.098	.014	.015	.022	mg/l		

NOTE: ND - Not detected
BMDL - Below method detection limit
Utility well Nos. 3 and 4 were dry, no sample analyzed

<xx working detection limit for the given sample and/or parameter

TABLE 5
SUMMARY OF DEPTH OF MATERIALS ENCOUNTERED IN TEST PITS

Location	Surf. Elev.	Depth Fill (Feet)	Depth Clay/Till (Feet)	Depth (Elevation) Bedrock (Feet)	Total Depth (Feet)	Water Level Below G.S. (Feet)	Water Elevation	Bedding Material	Underlying Material
1	569.4	0 - 1.5	1.5 - 8.0	8.0 (561.4)	14.5	8.5	560.9	Gravelly sandy silty clay under shotrock	Bedrock
2	568.5	0 - 8.0	N. Enc.	8.0 (560.5)	9.3	3.1	565.4	Shotrock	Bedrock
3	570.3	0 - 0.7	0.7 - 3.5	3.5 (566.8)	10.1	Dry	-	Silty clay/clayey silt with rock fragment and cemented slag	Bedrock
4	568.0	0 - 6.0	N. Enc.	6.0 (562.0)	9.0	3.3' (Orig.) Dry (Final)	564.7 -	Grouted shotrock	Bedrock
5	569.3	0 - 6.0	6.0 - 8.3	N. Enc.	8.3	5.8	563.5	Cemented and with very open structure	Silty clay
6	569.0	0 - 10.0	N. Enc.	10.0 (559.0)	10.3	3.4	565.6	Silty clay/clayey silt	Bedrock
7	567.9	0 - 5.5	5.5 - 10.0	N. Enc.	10.0	6.5	561.4	Sandy silty clay/clayey silt	Sandy clayey silt
8	570.0	0 - 16.0 ±	N. Enc.	16.0 ± (554.0 ±)(1)	16.0 ±	10.9	559.1	Shotrock	Bedrock
9	569.0	0 - 8.0	N. Enc.	8.0 (561.0)	8.3	1.8	567.2	Shotrock	Bedrock
10	570.7	0 - 7	N. Enc.	N. Enc.	7.0	0.2	570.5	Silty clay with stone, ashes	Gravelly sandy silty clay
11	569.8	0 - 8.7	N. Enc.	N. Enc.	8.7	3.4	566.4	Silty sand	Gravelly sandy silty clay
12	569.4	0 - 8.4	N. Enc.	N. Enc.	8.4	3.2	566.2	Silty sand	Gravelly sandy silty clay
13	569.9	0 - 4.3	N. Enc.	N. Enc.	4.3	3.1	566.8	Sandy gravelly silty clay	Sandy gravelly silty clay

N. Enc. - Not Encountered

(1) ± Approximate depths (elevations) due to water in the excavation

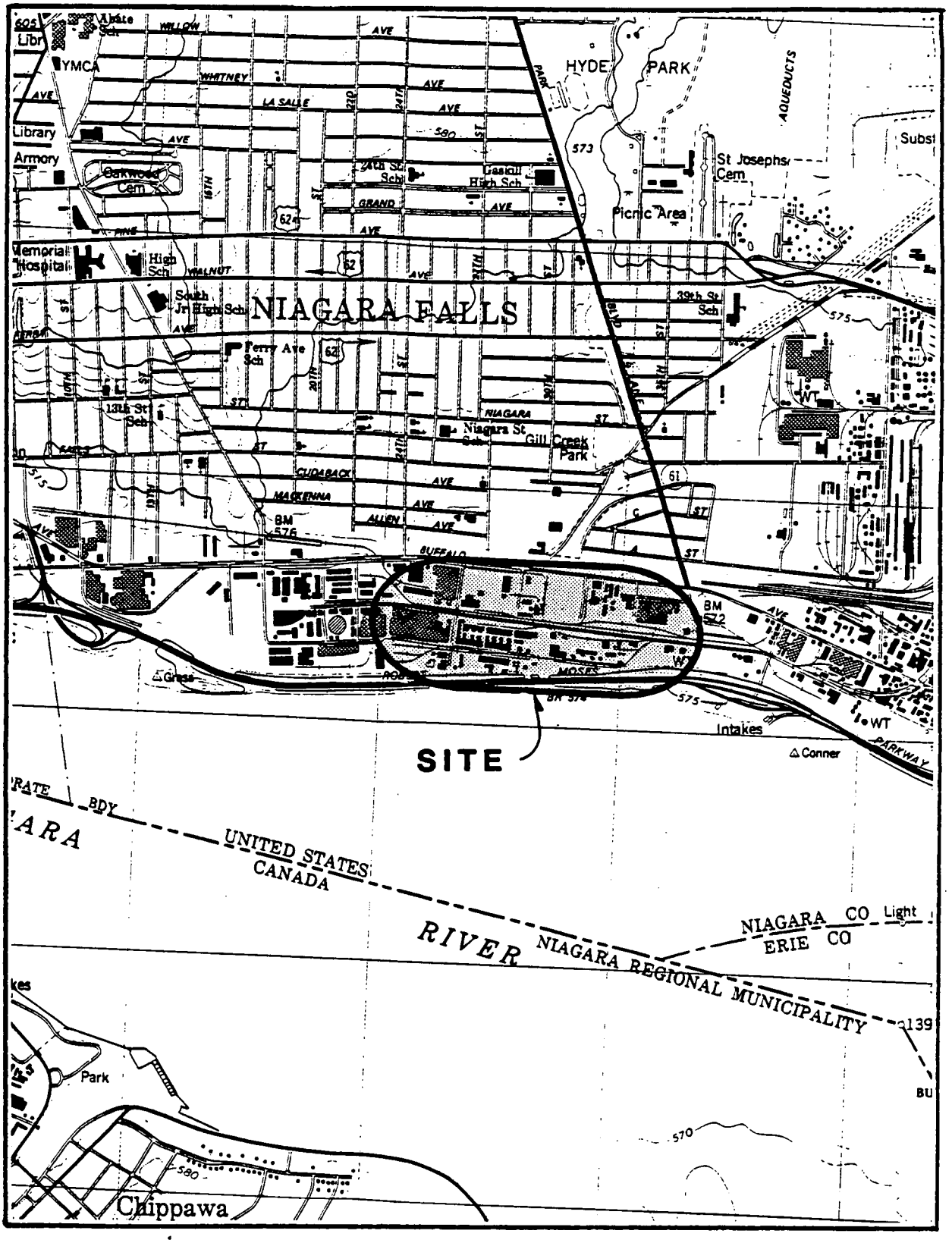
TABLE 6

RELATIVE CONTAMINANT CONCENTRATION LEVELS IN UNDERLYING MATERIAL, BEDDING MATERIAL, GROUNDWATER

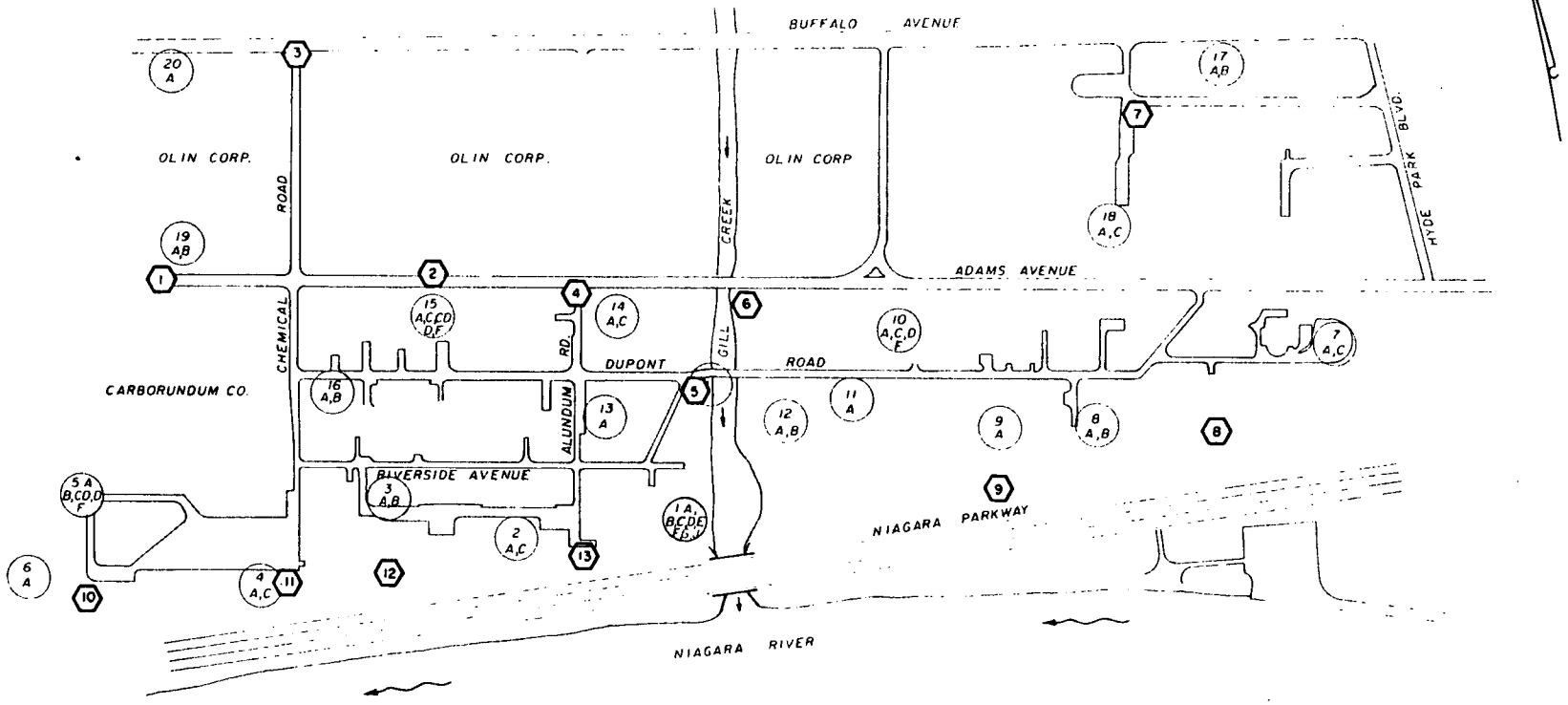
Location		DuPont Related Volatile Organic Compounds							DuPont Related Inorganic Compounds	
		Chloroform	Trans 1,2-dichloro ethylene	Methylene chloride	1,1,2,2-tetrachloro ethane	Tetrachloro-ethylene	Trichloro-ethylene	Vinyl chloride	Copper	Cyanide
1	Underlying	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)
	Bedding	L	L	L	L	L	L	H	L	L
	Groundwater	H	H	H	H	H	H	L	H	H
2	Underlying	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)
	Bedding	H	H	H	ND	H	H	ND	H	H
	Groundwater	L	L	L	ND	L	L	ND	L	L
3	Underlying	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)
	Bedding	H	ND	H	ND	H	H	ND	H	H
	Groundwater	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)
4	Underlying	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)
	Bedding	H	H	H	H	H	H	ND	H	H
	Groundwater	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)
5	Underlying	ND	I	ND	ND	L	L	H	I	I
	Bedding	H	H	H	ND	H	H	I	H	H
	Groundwater	ND	L	ND	ND	I	I	L	L	L
6	Underlying	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)
	Bedding	ND	H	ND	H	L	H	ND	H	H
	Groundwater	ND	L	ND	L	H	L	ND	L	L
7	Underlying	ND	L	ND	ND	ND	H	L	I	I
	Bedding	ND	H	ND	ND	ND	L	H	H	H
	Groundwater	ND	I	ND	ND	ND	I	I	L	L
8	Underlying	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)
	Bedding	ND	ND	H	ND	ND	H	ND	H	H
	Groundwater	ND	ND	L	ND	ND	L	ND	L	L
9	Underlying	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)
	Bedding	ND	L	ND	L	H	H	ND	H	H
	Groundwater	ND	H	ND	H	L	L	ND	L	L
10	Underlying	L	I	L	L	L	L	L	I	I
	Bedding	H*	H	I	I	I	I	H	H	H
	Groundwater	H*	L	H	H	H	H	I	L	L
11	Underlying	ND	H	H	ND	H	H	H	H	H
	Bedding	ND	L	I	ND	I	L*	I	I	I
	Groundwater	ND	I	L	H	L	L*	L	L	L
12	Underlying	L	H	I	L	H	H	ND	I	I
	Bedding	I	I	H	H	I	I	ND	H	H
	Groundwater	H	L	L	I	L	L	ND	L	L
13	Underlying	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)
	Bedding	L	H	H	L	H	H	L	H	H
	Groundwater	H	L	L	H	L	L	H	L	L

Notes (-) No sample; ND - Not detected; * - Equal values

Plates



REGIONAL LOCATION PLAN



LEGEND:

17 A,B — WELL CLUSTER NUMBER (NO.) / WELL TYPE (LETTER)

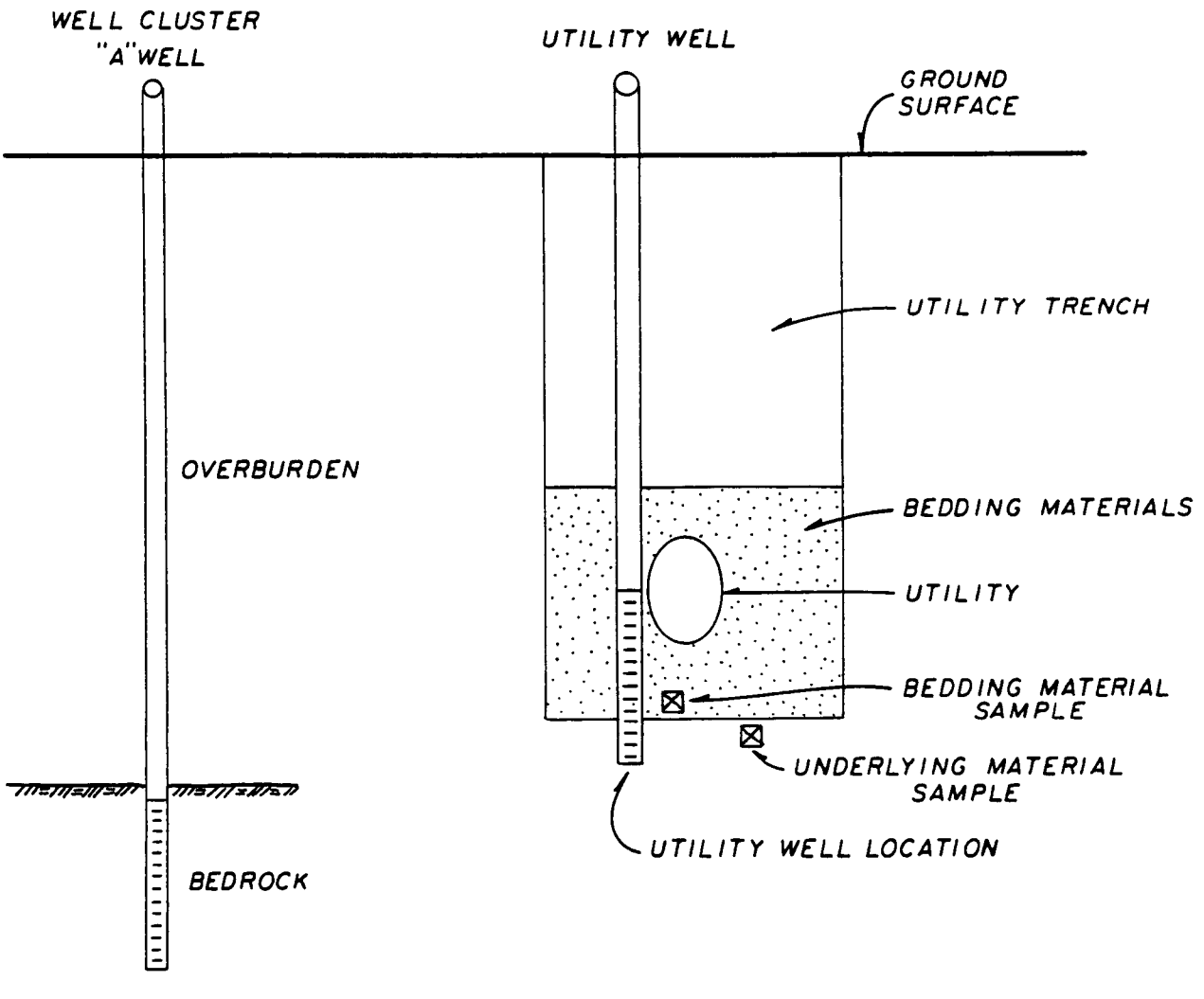
(1) TEST PIT / UTILITY WELL LOCATION

TEST PIT / UTILITY WELL PLAN
NIAGARA PLANT
E. I. DUPONT DE NEMOURS & CO.

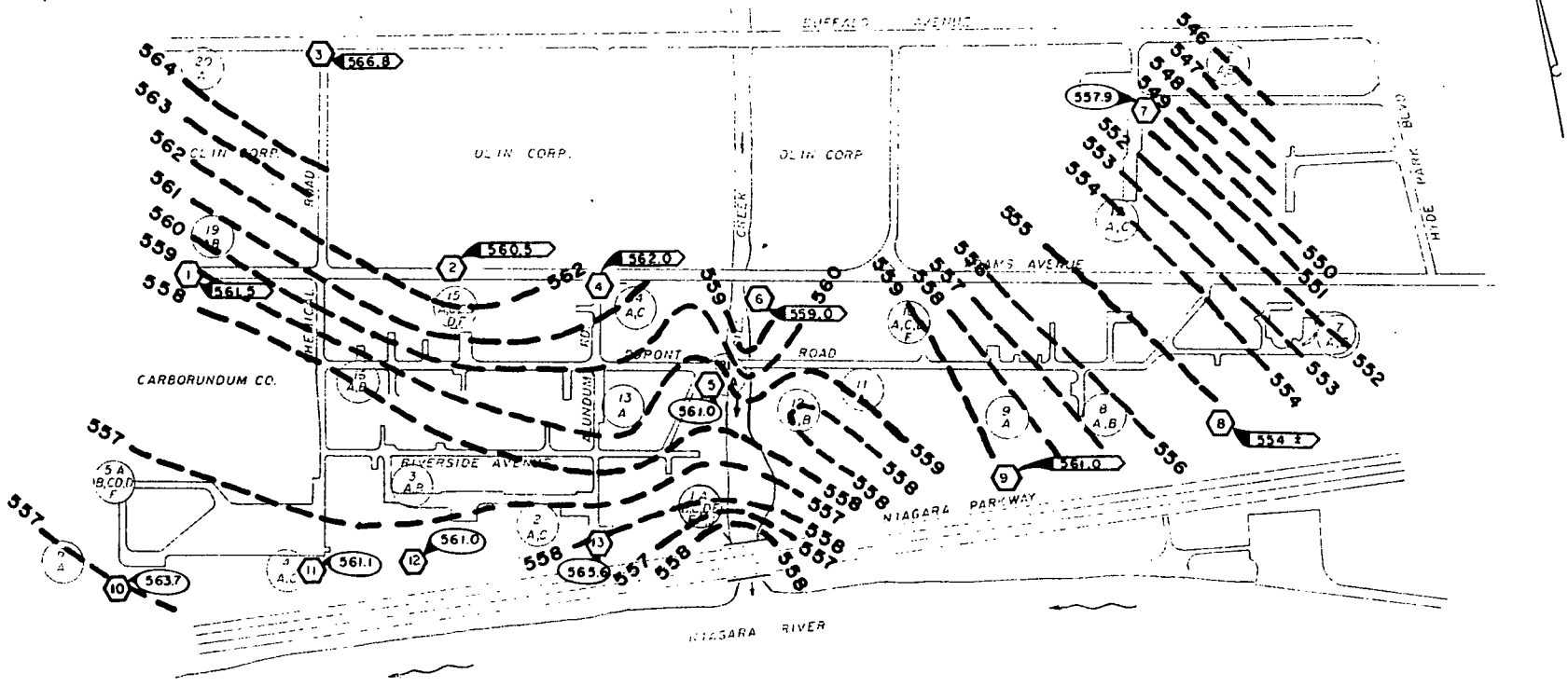
WOODWARD-CLYDE CONSULTANTS
CONSULTING ENGINEERS, GEOLOGISTS AND ENVIRONMENTAL SCIENTISTS

DRAWN BY: T.P.	SCALE in FEET 0 300	DATE: 2/9/84
CHECKED: J.C.E.		JOB: 83C2236

PLATE 2



SCHEMATIC DIAGRAM OF UTILITY WELLS
AND "A" WELLS
NIAGARA PLANT
E. I. DUPONT DE NEMOURS & CO.



LEGEND:

(17 / A,B) WELL CLUSTER NUMBER (NO.) / WELL TYPE (LETTER)

(X) UTILITY WELL NUMBER

(XXX.X) SPOT ELEVATION OF BEDROCK AT TEST PIT

(XXX.X) ELEVATION OF BOTTOM OF TEST PIT — NO ROCK ENCOUNTERED

—557— ELEVATION OF TOP OF BEDROCK

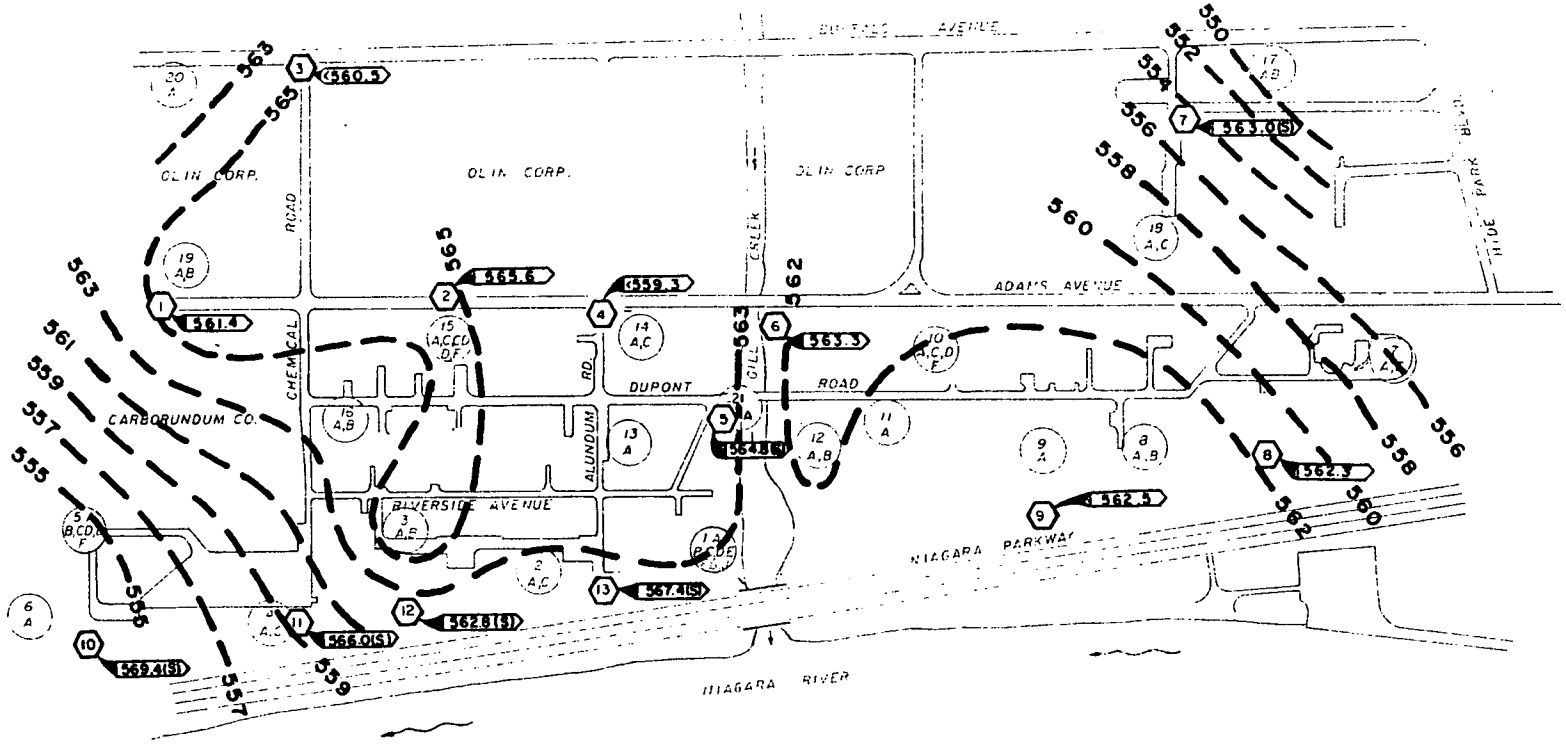
CONTOUR INTERVAL = 1 FOOT

TOP OF BEDROCK STRUCTURE CONTOUR MAP
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: 2/6/84
CHECKED: J.C.E.		JOB #: 83C2236

PLATE 4



DECEMBER 19, 1983

LEGEND:

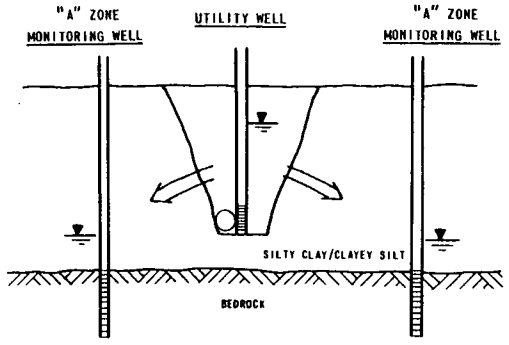
- 17 A,B — WELL CLUSTER NUMBER (NO.) / WELL TYPE (LETTER)
- ⬡ — TEST PIT/ UTILITY WELL LOCATION
- XXX.X — WATER ELEVATION AT UTILITY WELL
- (S) — UTILITY WELL IN SOIL, OTHERWISE ROCK

"A" ZONE GROUNDWATER CONTOURS
NIAGARA PLANT
E. I. DUPONT DE NEMOURS & CO.

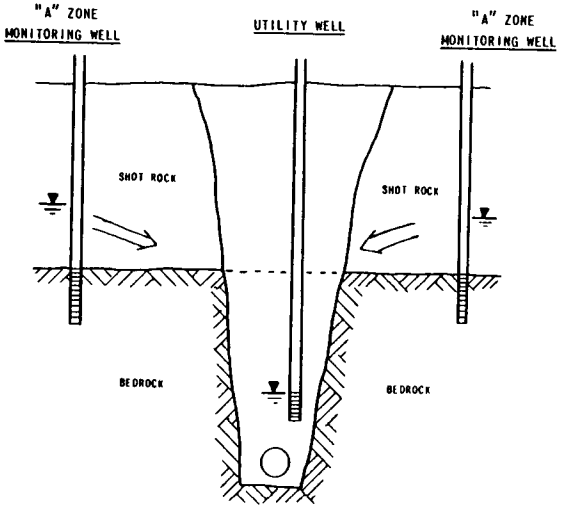
WOODWARD-CLYDE CONSULTANTS
CONSULTING ENGINEERS, GEOLOGISTS AND ENVIRONMENTAL SCIENTISTS

DRAWN BY: T.P.	SCALE in FEET 0 300	DATE: 2/6/84
CHECKED : J.C.E.		JOB : 83C2236

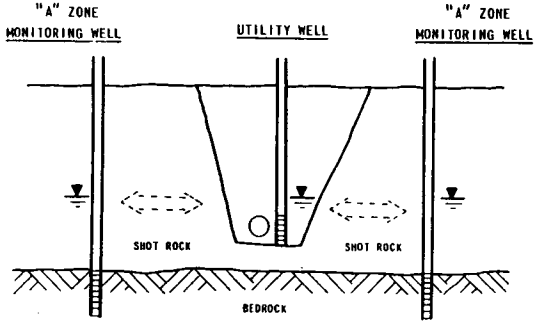
PLATE 5



PERCHED GROUNDWATER



LOWERED GROUNDWATER ELEVATION



SIMILAR GROUNDWATER ELEVATION

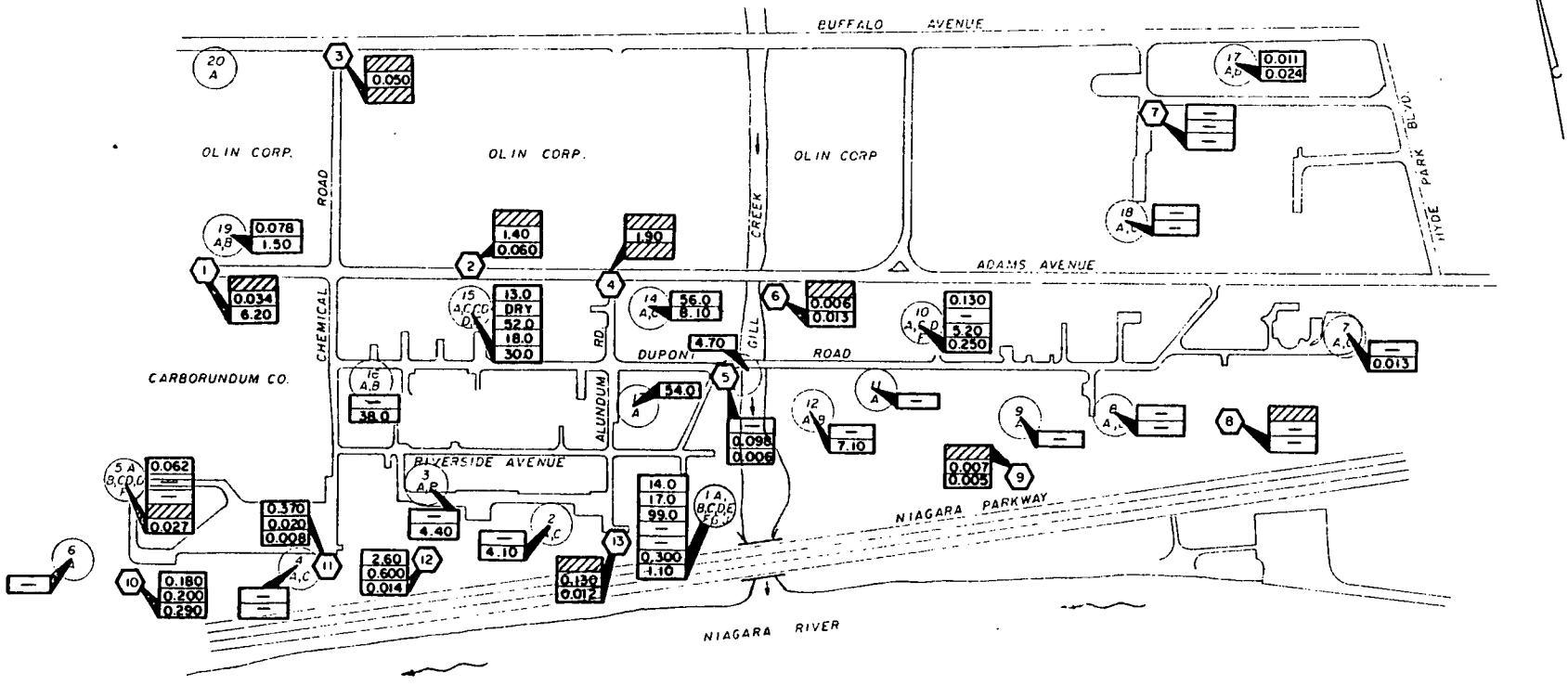
LEGEND:
"A" ZONE MONITORING WELL - REPRESENTING WELL CLUSTERS 1-21
UTILITY WELL - REPRESENTING ANY UTILITY WELL 1-13
GROUNDWATER LEVEL AT WELL
UTILITY LOCATION AT WELL
NO PREFERRED PATHWAY FOR MOVEMENT OF CONTAMINATED GROUNDWATER
PREFERRED PATHWAY FOR MOVEMENT OF CONTAMINATED GROUNDWATER

SCHEMATIC OF GROUNDWATER CONDITIONS
NIAGARA PLANT
E.I. DUPONT DE NEMOURS & CO.

WOODWARD-CLYDE CONSULTANTS
CONSULTING ENGINEERS, GEOLOGISTS AND ENVIRONMENTAL SCIENTISTS

DRAWN BY: D.W.B.	SCALE in FEET NTS	DATE: 2/16/84
CHECKED: R.M.C.		JOB: 83C2236-7

PLATE 6



LEGEND:

17 A,B — WELL CLUSTER NUMBER (NO.) / WELL TYPE (LETTER)

SAMPLE FROM INCREASING DEPTH (i.e. - "A" WELL, "B" WELL, ETC.)

OCT./NOV. 1983 SAMPLING

40 — CONCENTRATION IN PPM

— NOT DETECTED

NO DATA / NO SAMPLE

CONCENTRATIONS FOR UTILITY WELLS

- UNDERLYING MATERIALS
- BEDDING MATERIALS
- GROUNDWATER

DECEMBER 1983 SAMPLING

12 — UTILITY WELL LOCATION

TETRACHLOROETHYLENE CONCENTRATIONS

NIAGARA PLANT

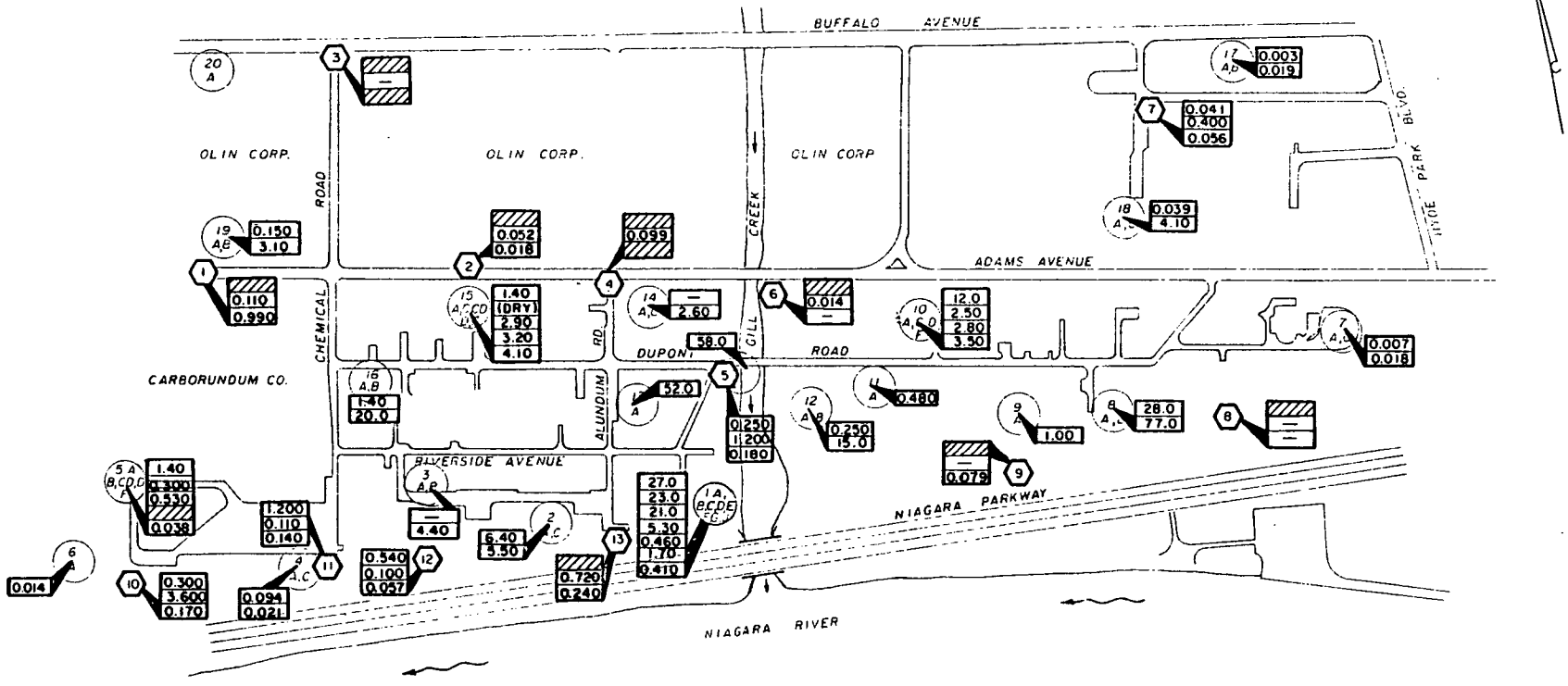
E. I. DUPONT DE NEMOURS & CO.

WOODWARD-CLYDE CONSULTANTS

CONSULTING ENGINEERS, GEOLOGISTS AND ENVIRONMENTAL SCIENTISTS

DRAWN BY: T.P.	SCALE in FEET 0 300	DATE: 2/9/84
CHECKED: J.C.E.		JOB: 83C2236

PLATE 7



LEGEND:

- 17 (A,B) — WELL CLUSTER NUMBER (NO.) / WELL TYPE (LETTER)
- SAMPLE FROM INCREASING DEPTH (i.e. - "A" WELL, "B" WELL, ETC.) OCT. /NOV. 1983 SAMPLING
- 40 — CONCENTRATION IN PPM
- — NOT DETECTED
- NO DATA / NO SAMPLE

CONCENTRATIONS FOR UTILITY WELLS

- UNDERLYING MATERIALS
- BEDDING MATERIALS
- GROUNDWATER

DECEMBER 1983 SAMPLING

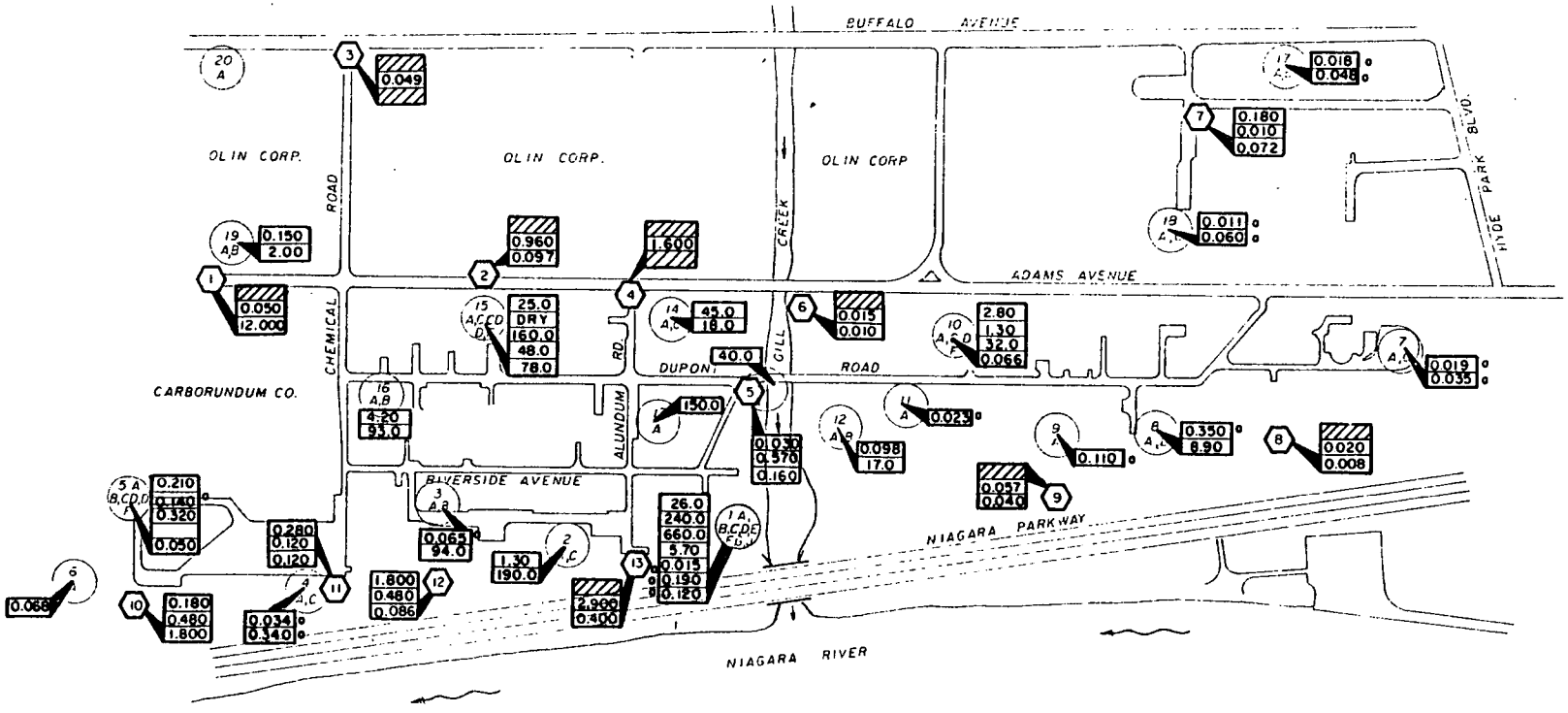
(12) UTILITY WELL LOCATION

TRANS-1,2-DICHLOROETHYLENE CONCENTRATIONS
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: 2/9/84
CHECKED: J.C.E.		JOB: 83C2236

PLATE 8



LEGEND:

17 A,B — WELL CLUSTER NUMBER (NO.) / WELL TYPE (LETTER)

SAMPLE FROM INCREASING DEPTH (i.e. - "A" WELL, "B" WELL, ETC.)

OCT./NOV. 1983 SAMPLING

40 — CONCENTRATION IN PPM

— — NOT DETECTED

NO DATA / NO SAMPLE

CONCENTRATIONS FOR UTILITY WELLS

- UNDERLYING MATERIALS
- BEDDING MATERIALS
- GROUNDWATER

DECEMBER 1983 SAMPLING

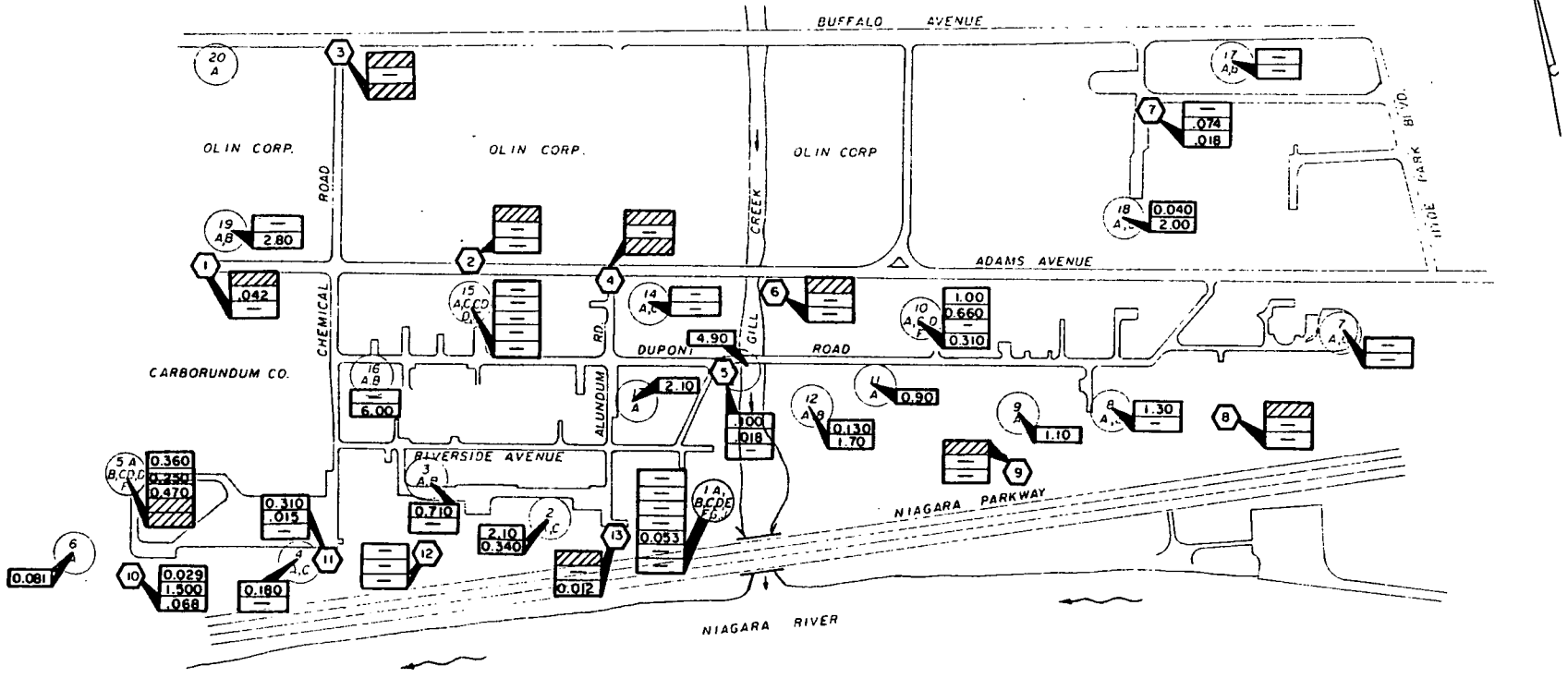
12 — UTILITY WELL LOCATION

TRICHLOROETHYLENE CONCENTRATIONS
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: 2/9/84
CHECKED: J.C.E.		JOB: 83C2236

PLATE 9



LEGEND:

17 A,B — WELL CLUSTER NUMBER (NO.) / WELL TYPE (LETTER)

SAMPLE FROM INCREASING DEPTH (i.e. - "A" WELL, "B" WELL, ETC.)

OCT./NOV. 1983 SAMPLING

40 — CONCENTRATION IN PPM

— NOT DETECTED

NO DATA / NO SAMPLE

CONCENTRATIONS FOR UTILITY WELLS

- UNDERLYING MATERIALS
- BEDDING MATERIALS
- GROUNDWATER

DECEMBER 1983 SAMPLING

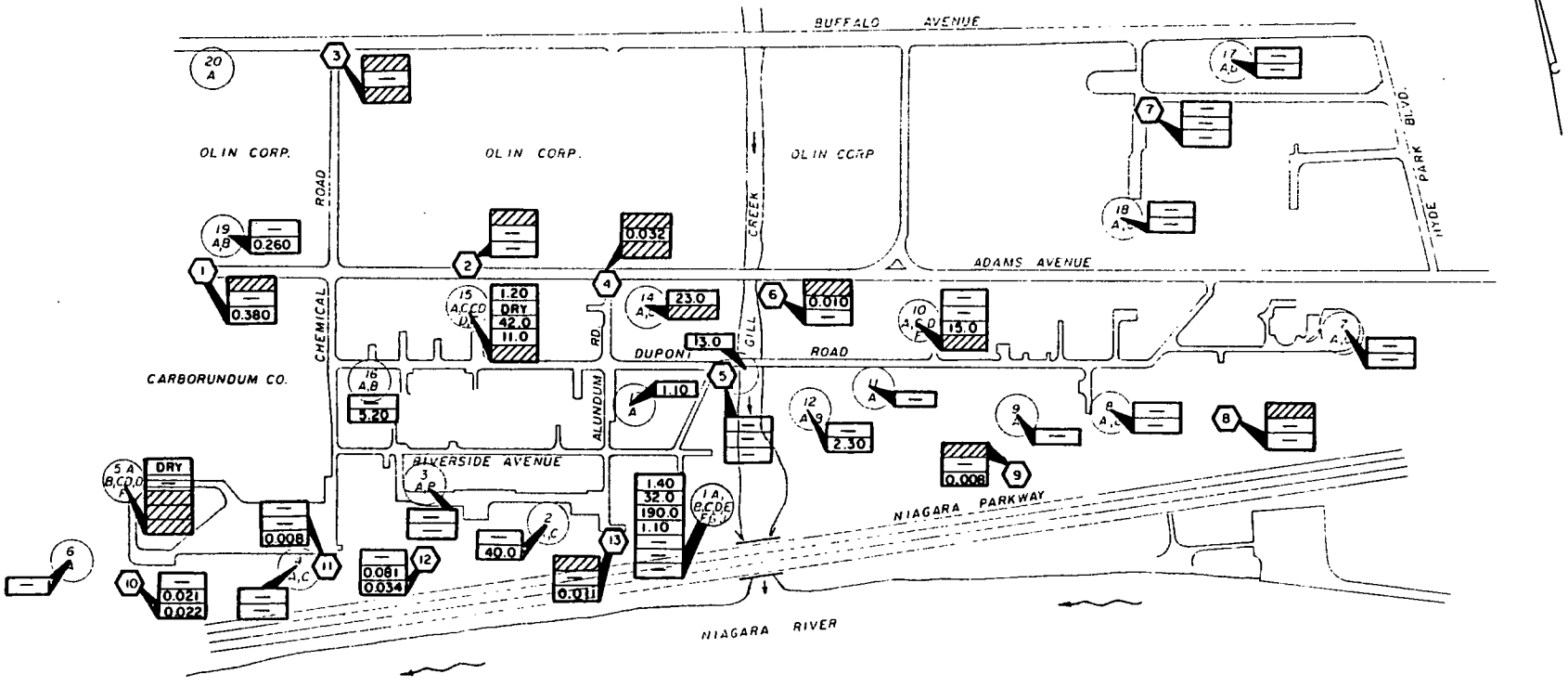
12 — UTILITY WELL LOCATION

VINYL CHLORIDE CONCENTRATIONS
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: 2/9/84
CHECKED: J.C.E.		JOB: 83C2236

PLATE 10



LEGEND:

- 17 / A,B — WELL CLUSTER NUMBER (NO.) / WELL TYPE (LETTER)
- SAMPLE FROM INCREASING DEPTH (i.e. - "A" WELL, "B" WELL, ETC.)
- OCT./NOV. 1983 SAMPLING
- 40 — CONCENTRATION IN PPM
- — NOT DETECTED
- NO DATA / NO SAMPLE

CONCENTRATIONS FOR UTILITY WELLS

- UNDERLYING MATERIALS
- BEDDING MATERIALS
- GROUNDWATER

DECEMBER 1983 SAMPLING

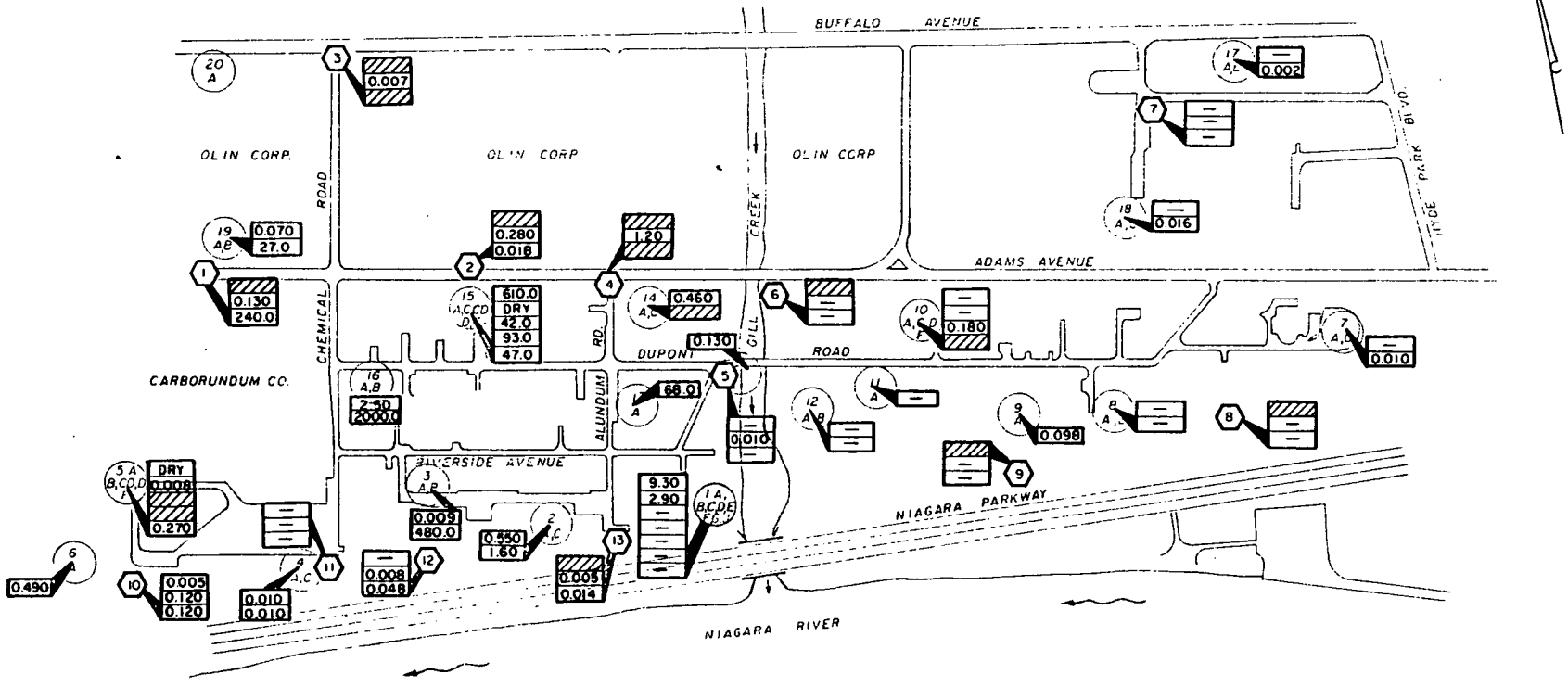
12 — UTILITY WELL LOCATION

1,1,2,2-TETRACHLOROETHANE CONCENTRATIONS
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: 2/6/84
CHECKED: J.C.E.		JOB: 83C2236

PLATE 11



LEGEND:

- 17 A,B — WELL CLUSTER NUMBER (NO.) / WELL TYPE (LETTER)
- SAMPLE FROM INCREASING DEPTH (i.e. - "A" WELL, "B" WELL, ETC.)
- OCT./NOV. 1983 SAMPLING
- 40 — CONCENTRATION IN PPM
- — NOT DETECTED
- NO DATA / NO SAMPLE

CONCENTRATIONS FOR UTILITY WELLS

- UNDERLYING MATERIALS
- BEDDING MATERIALS
- GROUNDWATER

DECEMBER 1983 SAMPLING

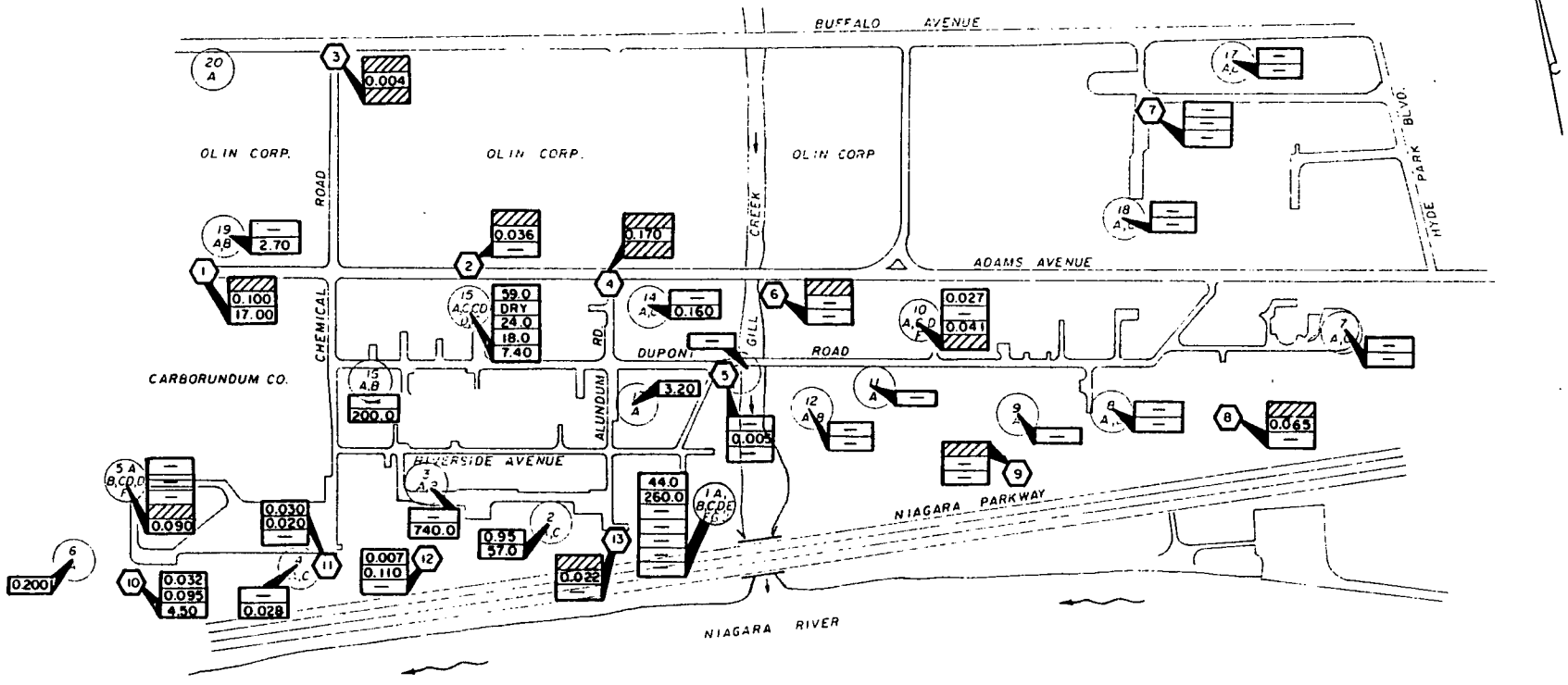
12 — UTILITY WELL LOCATION

CHLOROFORM CONCENTRATIONS
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: 2/9/84
CHECKED: J.C.E.		JOB: 83C2236

PLATE 12



LEGEND:

- WELL CLUSTER NUMBER (NO.) / WELL TYPE (LETTER) — e.g. 17 A,B
- SAMPLE FROM INCREASING DEPTH (i.e. "A" WELL, "B" WELL, ETC.)
- OCT./NOV. 1983 SAMPLING
- 40 — CONCENTRATION IN PPM
- NOT DETECTED
- NO DATA / NO SAMPLE

CONCENTRATIONS FOR UTILITY WELLS

- UNDERLYING MATERIALS
- BEDDING MATERIALS
- GROUNDWATER

DECEMBER 1983 SAMPLING

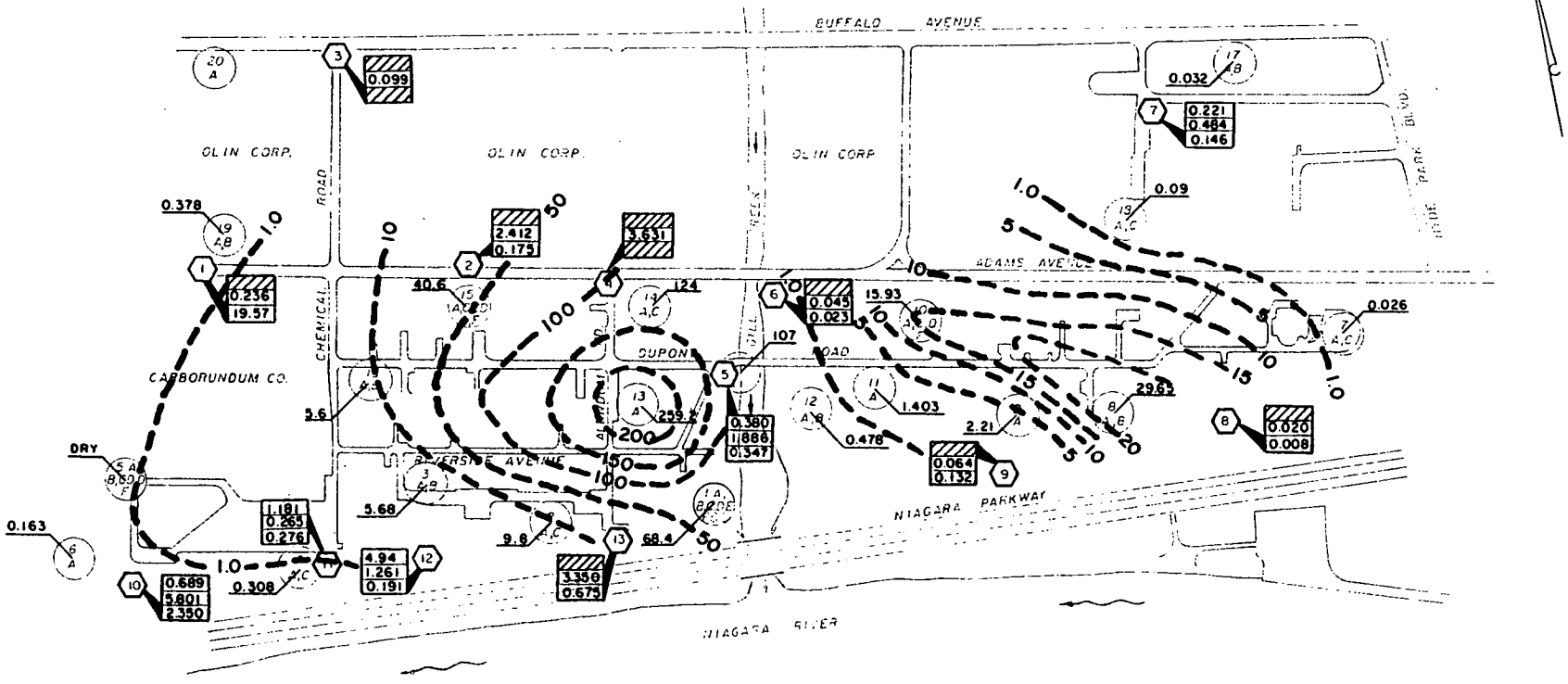
(12) UTILITY WELL LOCATION

METHYLENE CHLORIDE CONCENTRATIONS
NIAGARA PLANT
E. I. DUPONT DE NEMOURS & CO.

WOODWARD-CLYDE CONSULTANTS
CONSULTING ENGINEERS, GEOLOGISTS AND ENVIRONMENTAL SCIENTISTS

DRAWN BY: T.P.	SCALE IS FEET 0 300	DATE: 2/9/84
CHECKED: J.C.E.		JOB: 83C2236

PLATE 13



LEGEND:

17 A,B — WELL CLUSTER NUMBER (NO.)
WELL TYPE (LETTER)
COMPOUND CONCENTRATION
CONTOUR INTERVAL AS NOTED

40 — CONCENTRATION IN PPM

— NOT DETECTED

NO DATA / NO SAMPLE

CONCENTRATIONS FOR UTILITY WELLS
- UNDERLYING MATERIALS
- BEDDING MATERIALS
- GROUNDWATER

DECEMBER 1983 SAMPLING

(12) UTILITY WELL LOCATION

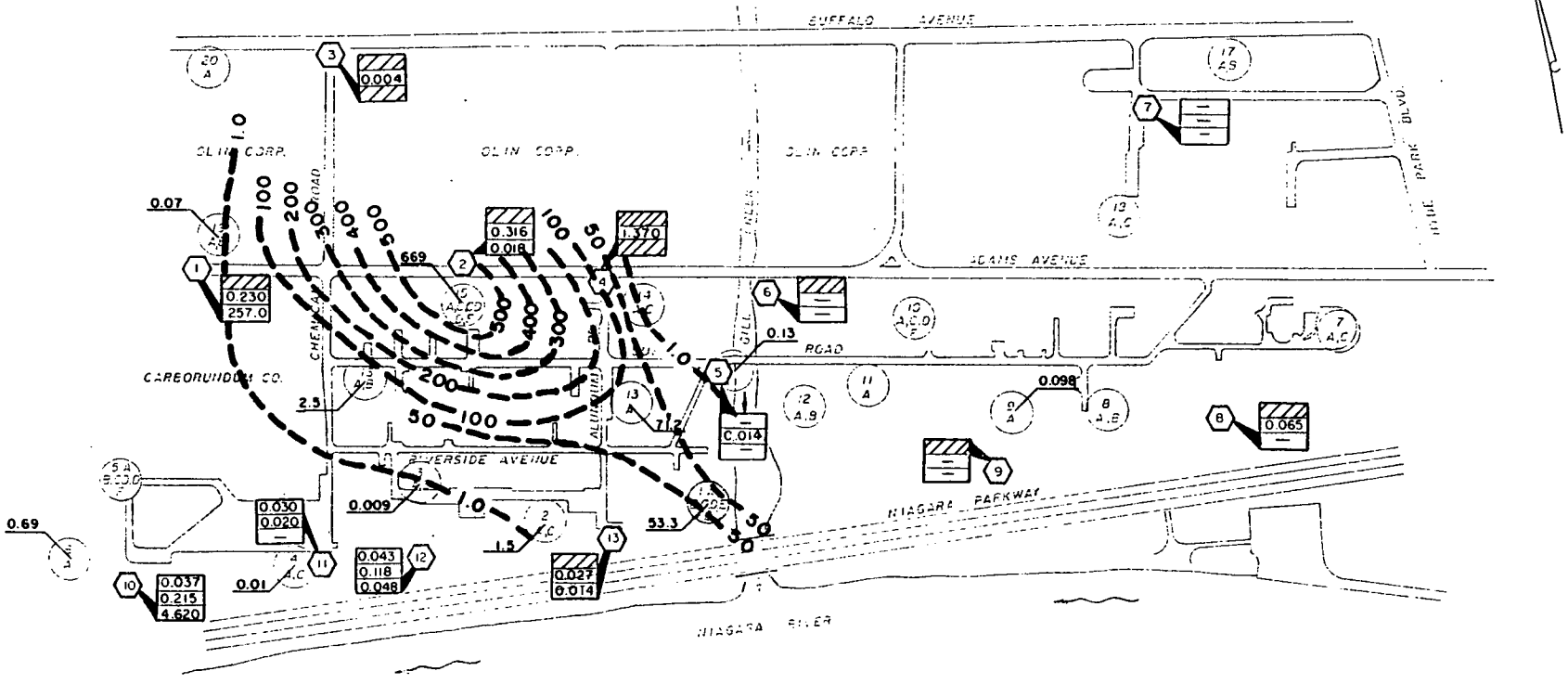
NOTE: CONCENTRATION CONTOURS HAVE BEEN INTERPOLATED TO ILLUSTRATE AREAS OF RELATIVE CONTAMINATION AND ARE NOT INTENDED TO REPRESENT ACTUAL GROUNDWATER QUALITY CONDITIONS FOR OCTOBER 1983 SAMPLING OF "A" WELLS

C-2 COMPOUND CONCENTRATIONS
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: 2/9/84
CHECKED: J.C.E.		JOB: 83C2236

PLATE 14



LEGEND:

- 17 A,B — WELL CLUSTER NUMBER (NO.) / WELL TYPE (LETTER) / COMPOUND CONCENTRATION
- CONTOUR INTERVAL AS NOTED
- 40 — CONCENTRATION IN PPM
- — NOT DETECTED
- //// — NO DATA / NO SAMPLE

CONCENTRATIONS FOR UTILITY WELLS

- UNDERLYING MATERIALS
- BEDDING MATERIALS
- GROUNDWATER

DECEMBER 1983 SAMPLING

(12) UTILITY WELL LOCATION

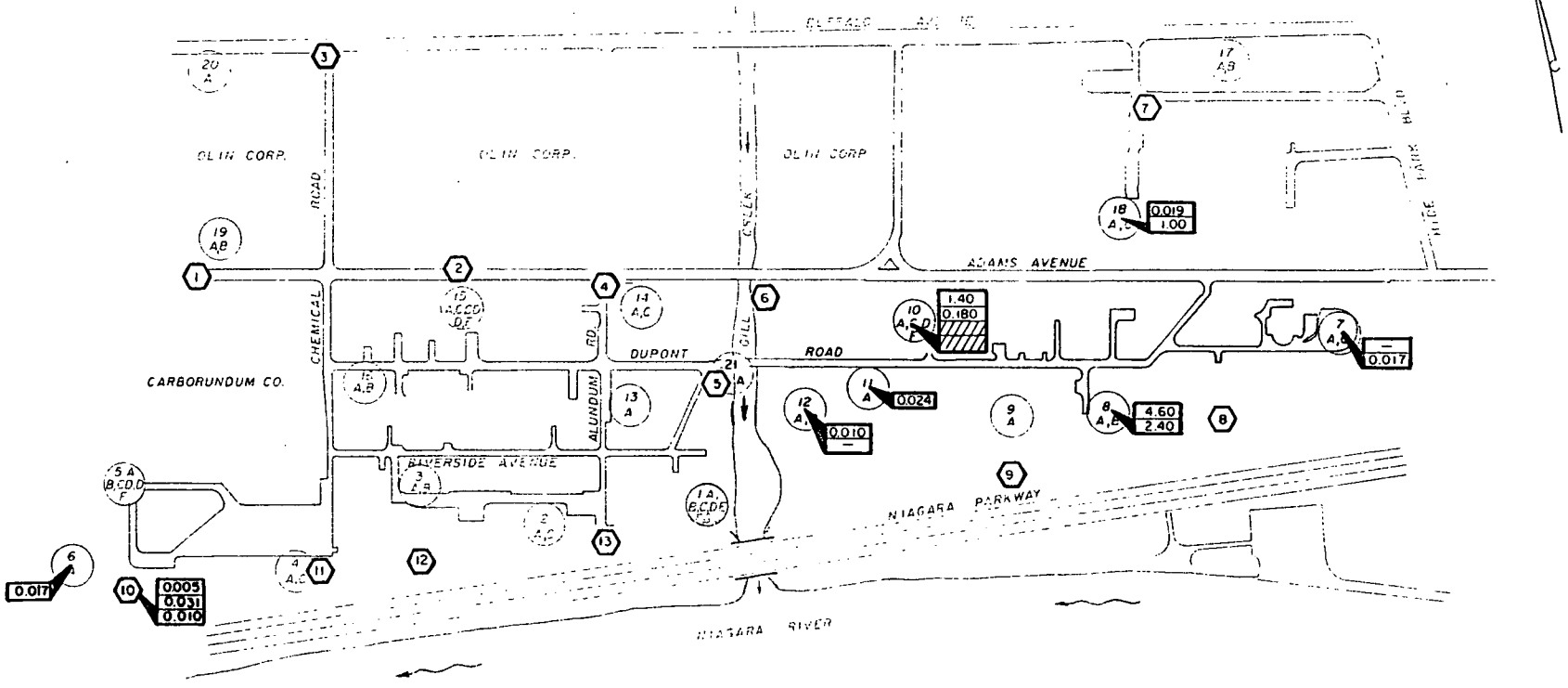
NOTE: CONCENTRATION CONTOURS HAVE BEEN INTERPOLATED TO ILLUSTRATE AREAS OF RELATIVE CONTAMINATION AND ARE NOT INTENDED TO REPRESENT ACTUAL GROUNDWATER QUALITY CONDITIONS FOR OCTOBER 1983 SAMPLING OF "A" WELLS

C-1 COMPOUND CONCENTRATIONS
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: 2/9/84
CHECKED: J.C.E.		JOB: 83C2236

PLATE 15



LEGEND:

- WELL CLUSTER NUMBER (NO.) / WELL TYPE (LETTER)
- 40 — CONCENTRATION IN PPM
- — — NOT DETECTED
- NO DATA / NO SAMPLE
- CONCENTRATIONS FOR UTILITY WELLS: - UNDERLYING MATERIALS; - BEDDING MATERIALS; - GROUNDWATER
- SAMPLE FROM INCREASING DEPTH (i.e. - "A" WELL, "B" WELL, ETC.)
- OCTOBER 1983 SAMPLINGS
- DECEMBER 1983 SAMPLING
- (12) UTILITY WELL LOCATION

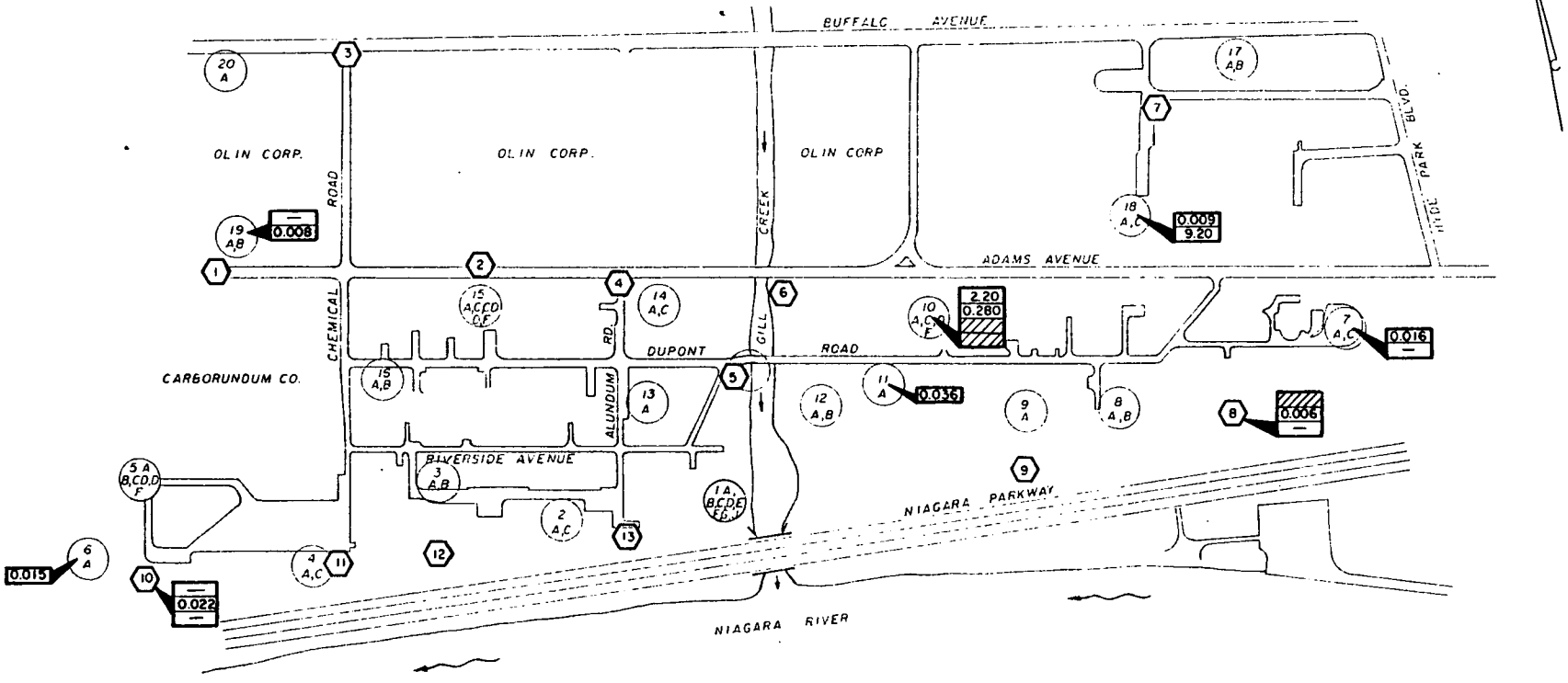
NOTE: RESULTS SHOWN ONLY WHERE COMPOUND WAS DETECTED

BENZENE CONCENTRATIONS
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: 2/6/84
CHECKED: J.C.E.		JOB: 83C2236

PLATE 16



LEGEND:

- WELL CLUSTER NUMBER (NO.) / WELL TYPE (LETTER)
- SAMPLE FROM INCREASING DEPTH (i.e. - "A" WELL, "B" WELL, ETC.) FOR OCTOBER 1983 SAMPLINGS
- 40 — CONCENTRATION IN PPM
- — NOT DETECTED
- NO DATA / NO SAMPLE

CONCENTRATIONS FOR UTILITY WELLS

- UNDERLYING MATERIALS
- BEDDING MATERIALS
- GROUNDWATER

DECEMBER 1983 SAMPLING

(12) UTILITY WELL LOCATION

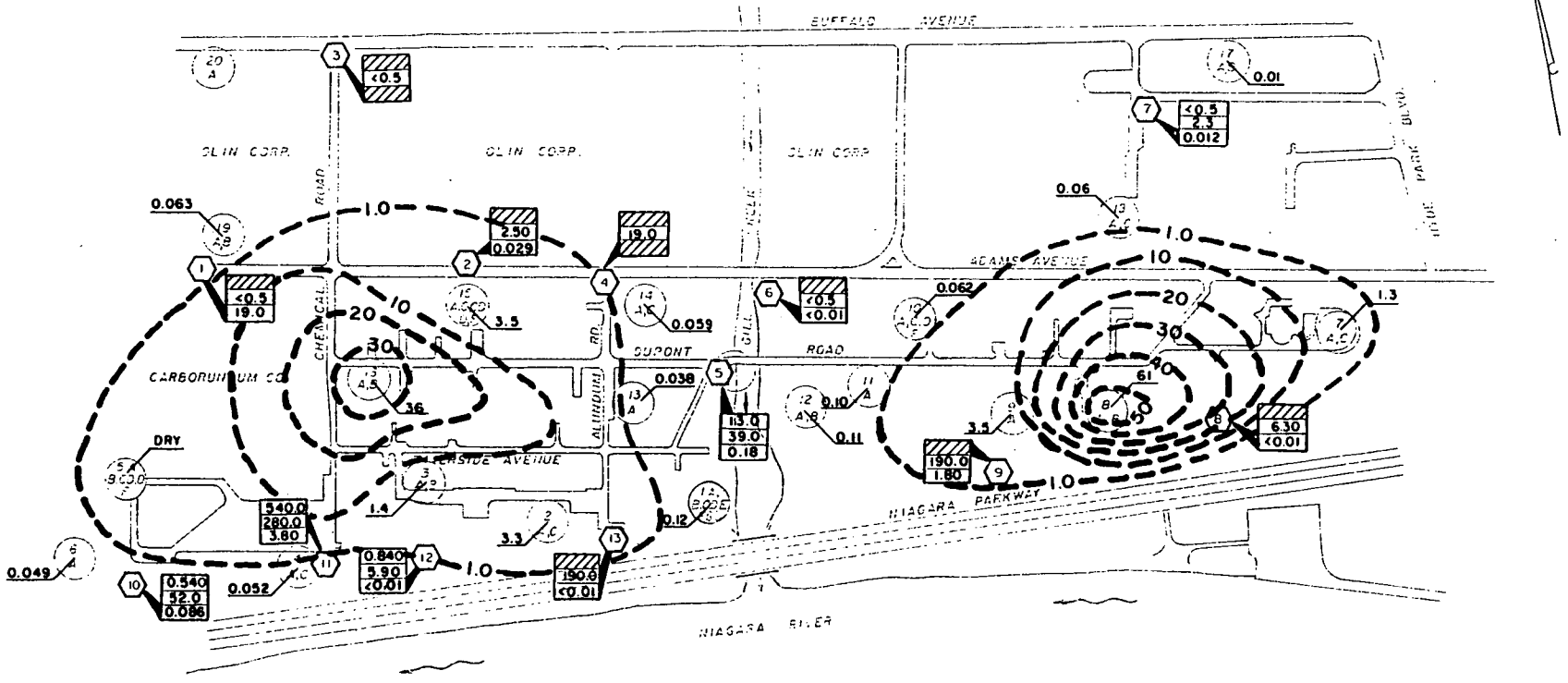
NOTE: RESULTS SHOWN ONLY WHERE COMPOUND WAS DETECTED

CHLOROBENZENE CONCENTRATIONS
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: 2/9/84
CHECKED: J.C.E.		JOB: 83C2236-5

PLATE 17



LEGEND:

17 A,B — WELL CLUSTER NUMBER (NO.); WELL TYPE (LETTER); COMPOUND CONCENTRATION

CONTOUR INTERVAL AS NOTED

40 — CONCENTRATION IN PPM

— NOT DETECTED

NO DATA / NO SAMPLE

CONCENTRATIONS FOR UTILITY WELLS

- UNDERLYING MATERIALS
- BEDDING MATERIALS
- GROUNDWATER

DECEMBER 1983 SAMPLING

(12) UTILITY WELL LOCATION

NOTE: CONCENTRATION CONTOURS HAVE BEEN INTERPOLATED TO ILLUSTRATE AREAS OF RELATIVE CONTAMINATION AND ARE NOT INTENDED TO REPRESENT ACTUAL GROUNDWATER QUALITY CONDITIONS FOR OCTOBER 1983 SAMPLING OF "A" WELLS

TOTAL CYANIDE

NIAGARA PLANT

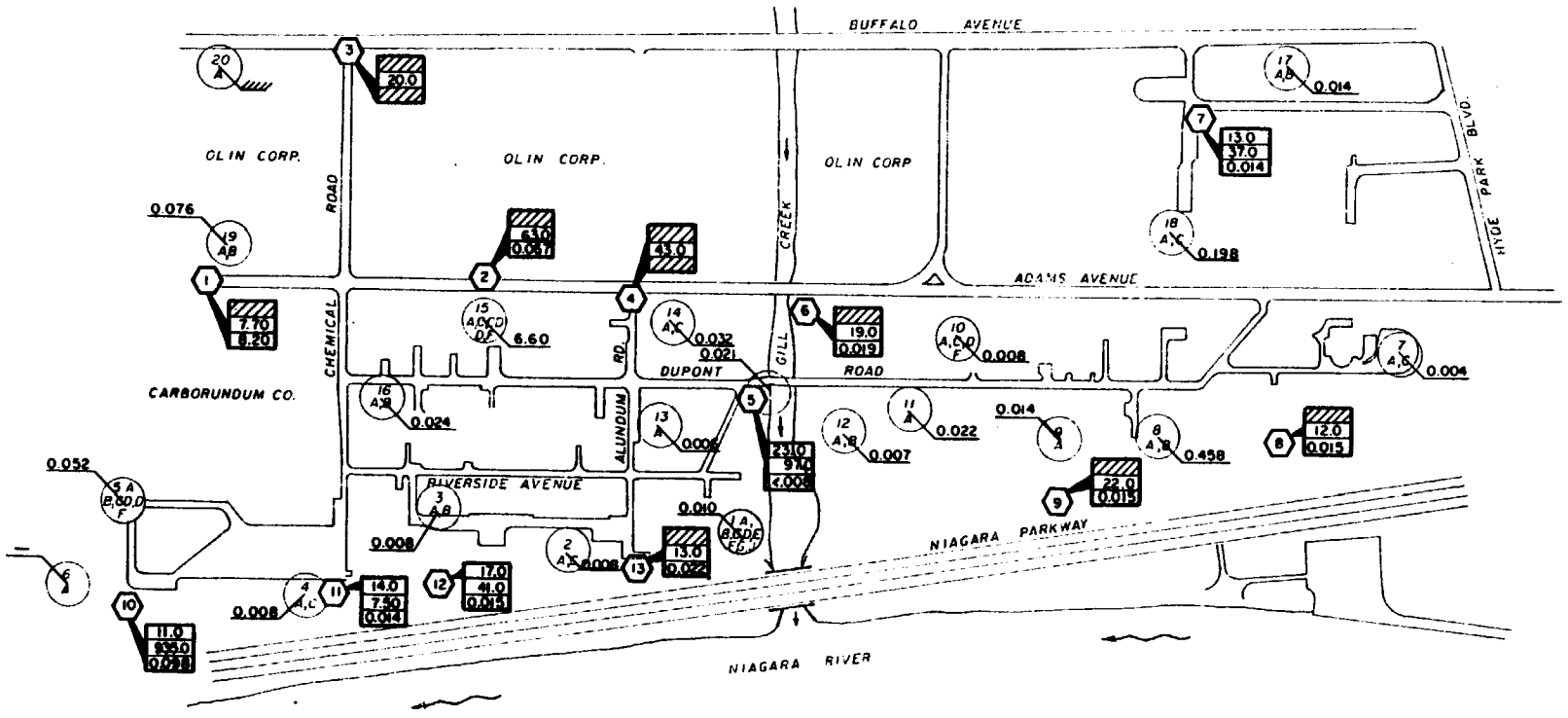
E. I. DUPONT DE NEMOURS & CO.

WOODWARD-CLYDE CONSULTANTS

CONSULTING ENGINEERS, GEOLOGISTS AND ENVIRONMENTAL SCIENTISTS

DRAWN BY: T.P.	SCALE in FEET 0 300	DATE: 2/9/84
CHECKED: J.C.E.		JOB: 83C2236

PLATE 18



LEGEND:

17 A,B — WELL CLUSTER NUMBER (NO.)
A,B — WELL TYPE (LETTER)
0.014 — COPPER CONCENTRATIONS

AUGUST 1983 SAMPLING

40 — CONCENTRATION IN PPM

— NOT DETECTED

NO DATA / NO SAMPLE

CONCENTRATIONS FOR UTILITY WELLS

- UNDERLYING MATERIALS
- BEDDING MATERIALS
- GROUNDWATER

DECEMBER 1983 SAMPLING
SOIL SAMPLE – TOTAL COPPER
WATER SAMPLE - SOLUBLE COPPER

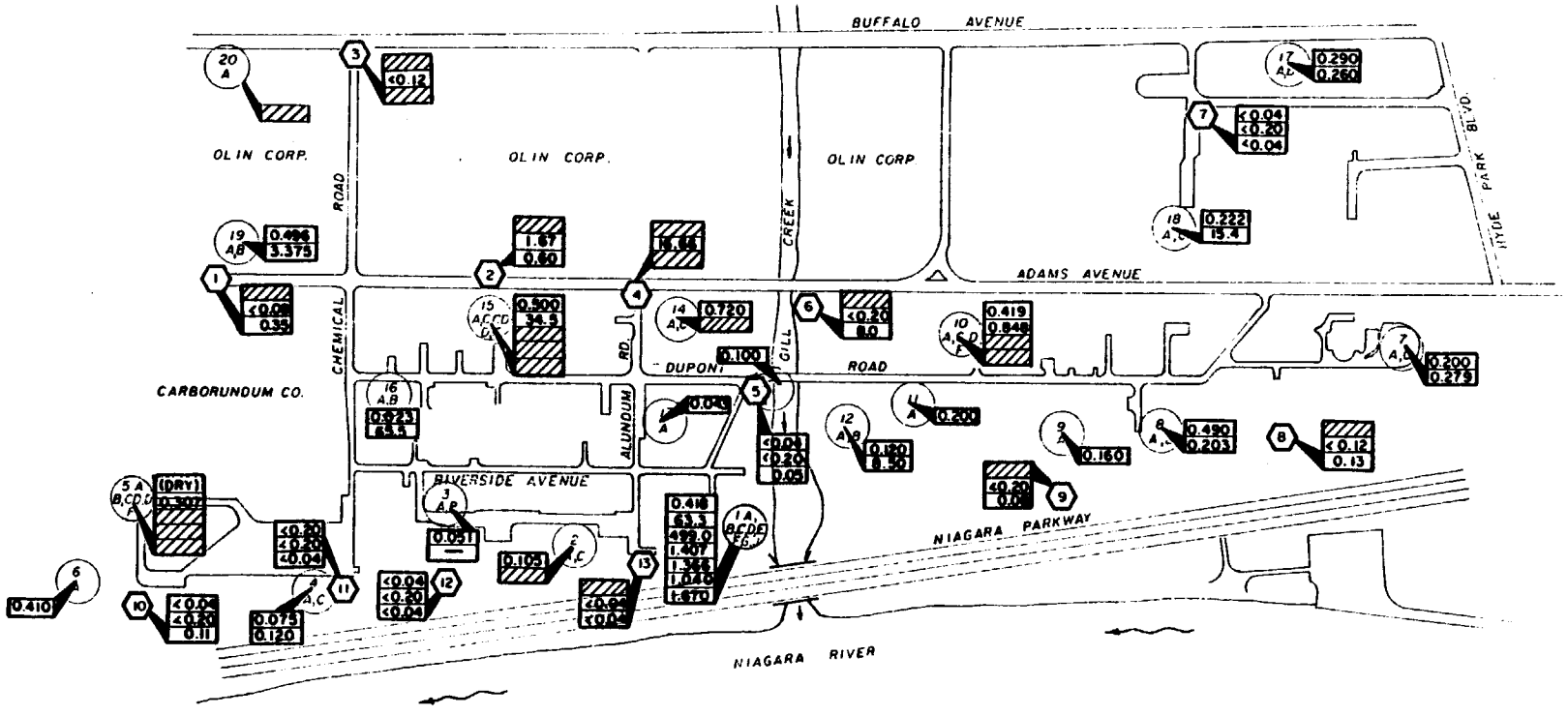
12 — UTILITY WELL LOCATION

COPPER CONCENTRATIONS
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: 2/9/84
CHECKED: J.C.E.		JOB: 83C2236

PLATE 19



LEGEND:

17 A,B — WELL CLUSTER NUMBER (NO.) / WELL TYPE (LETTER)

SAMPLE FROM INCREASING DEPTH (i.e. - "A" WELL, "B" WELL, ETC.)

FOR OCTOBER 1983 SAMPLING

40 — CONCENTRATION IN PPB

— NOT DETECTED

NO DATA / NO SAMPLE

CONCENTRATIONS FOR UTILITY WELLS

- UNDERLYING MATERIALS
- BEDDING MATERIALS
- GROUNDWATER

DECEMBER 1983 SAMPLING

SOIL SAMPLES - ppm

WATER SAMPLE - ppb

12 — UTILITY WELL LOCATION

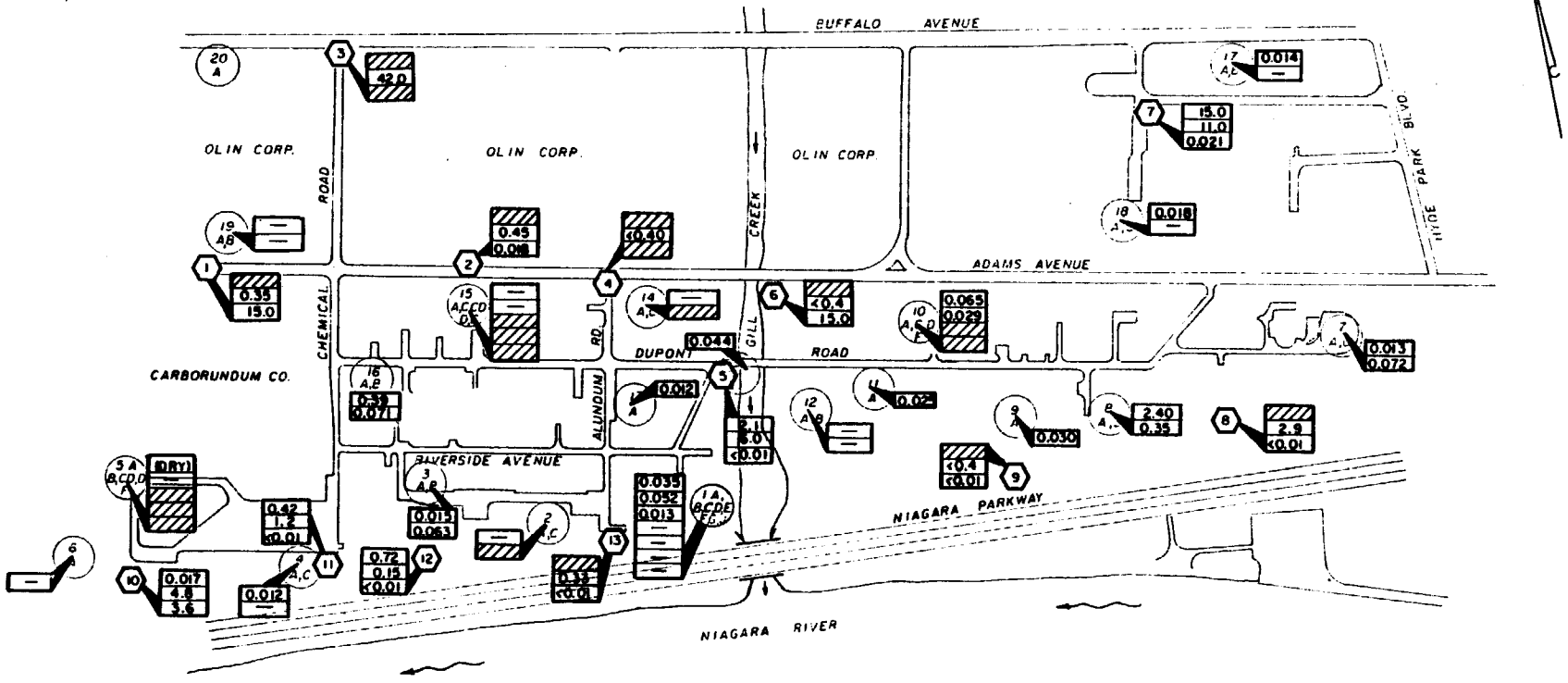
TOTAL BHC CONCENTRATIONS
NIAGARA PLANT
E. I. DUPONT DE NEMOURS & CO.

WOODWARD-CLYDE CONSULTANTS

CONSULTING ENGINEERS, GEOLOGISTS AND ENVIRONMENTAL SCIENTISTS

DRAWN BY: T.P.	SCALE in FEET 0 — 300	DATE: 2/9/84
CHECKED: J.C.E.		JOB: 83C2236

PLATE 20



LEGEND:

- (17 A,B) — WELL CLUSTER NUMBER (NO.) / WELL TYPE (LETTER)
- SAMPLE FROM INCREASING DEPTH (i.e. - "A" WELL, "B" WELL, ETC.)
- OCTOBER 1983 SAMPLING
- 40 — CONCENTRATION IN PPM
- — NOT DETECTED
- NO DATA / NO SAMPLE

CONCENTRATIONS FOR UTILITY WELLS

- - UNDERLYING MATERIALS
- - BEDDING MATERIALS
- - GROUNDWATER

DECEMBER 1983 SAMPLING

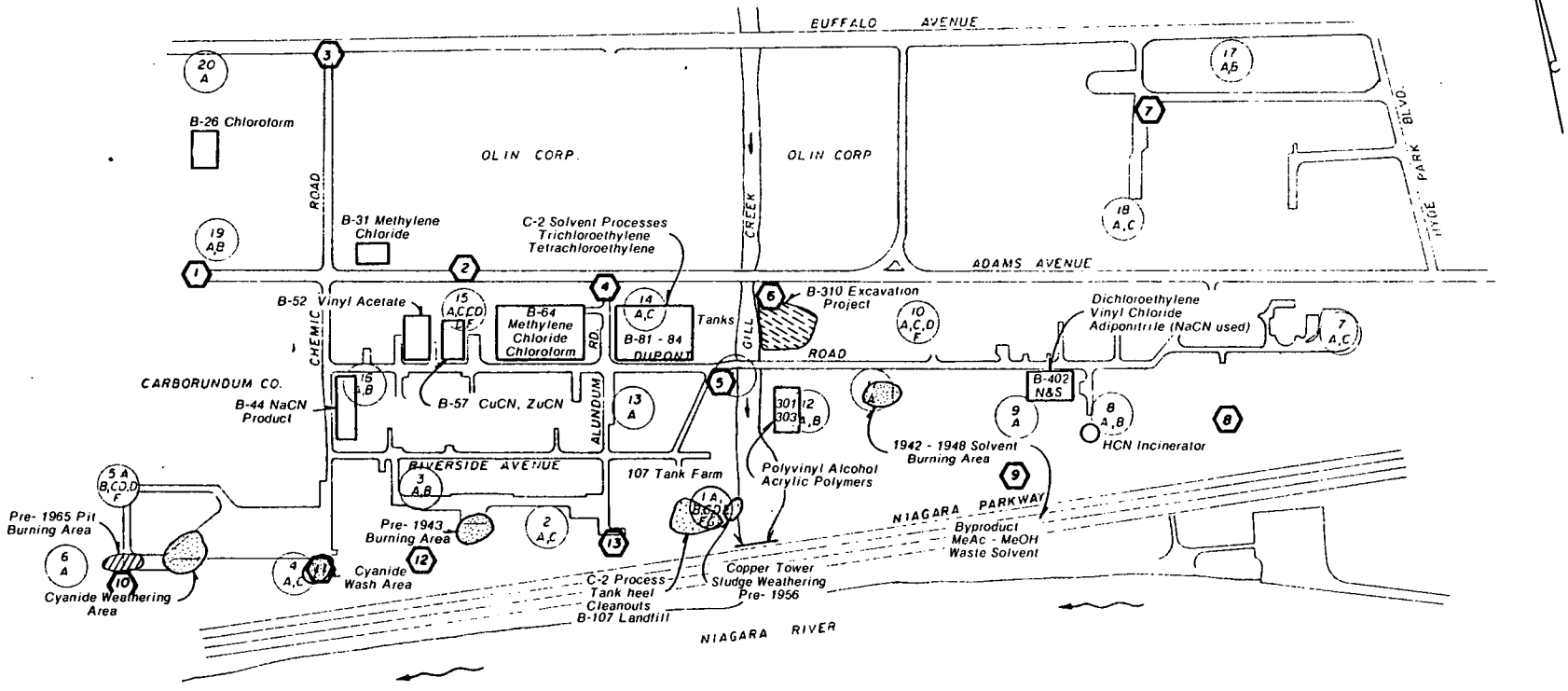
(12) UTILITY WELL LOCATION

TOTAL RECOVERABLE PHENOLICS CONCENTRATIONS
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: 2/9/84
CHECKED: J.C.E.		JOB: 83C223E

PLATE 21



LEGEND:

17 A,B — WELL CLUSTER NUMBER (NO.)
WELL TYPE (LETTER)

(12) UTILITY WELL LOCATION

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 0 300	DATE: 2/9/84
CHECKED: J.C.E.		JOB: 83C2236

PLATE 22

Appendix A

APPENDIX A

The subsurface investigation and utility well installation for the manmade passageways consisted of 13 test pits and utility wells installed at utility lines crossing the boundary of DuPont's Niagara Plant. The location of the Test Pits/Utility Wells are shown on Plate 2. The test pits were excavated and the utility wells installed by Sicoli and Massaro of Niagara Falls, New York under contract to DuPont. The test pit excavation and utility well installation commenced October 24 and was completed December 9, 1983.

Soil samples for visual identification were taken as grab samples from the backhoe bucket for field identification and classification. Subsequent samples of bedding material and underlying material were obtained, where possible, for chemical analysis.

A "Key to Soil Symbols and Terms" used in this report is presented on Page A-2. Logs of the test pits are presented on Pages A-4 through A-16. The ground surface and brass ring (top of riser pipe) elevations are presented on Page A-3.

KEY TO SOIL SYMBOLS AND TERMS

Terms used in this report for describing soils according to their texture or grain size distribution are in accordance with the Unified Soil Classification System, as described in Technical Memorandum No. 3-357, Waterways Experiment Station, March 1953.

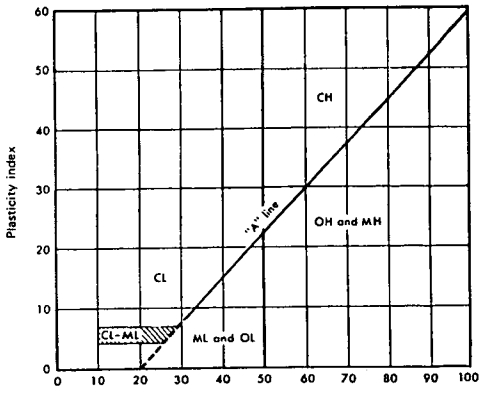
Major Divisions			Group symbols	Typical names
Coarse-grained soils (More than half of material is larger than No. 200 sieve size)	Gravels (More than half of coarse fraction is larger than No. 4 sieve size)	Clean gravels (Little or no fines)	GW	Well-graded gravels, gravel-sand mixture, little or no fines
			GP	Poorly graded gravels, gravel-sand mixtures, little or no fines
		Gravels with fines (Appreciable amount of fines)	GM* d / u	Silty gravels, gravel-sand-silt mixtures
			GC	Clayey gravels, gravel-sand-clay mixtures
	Sands (More than half of coarse fraction is smaller than No. 4 sieve size)	Clean sands (Little or no fines)	SW	Well-graded sands, gravelly sands, little or no fines
			SP	Poorly graded sands, gravelly sands, little or no fines
		Sands with fines (Appreciable amount of fines)	SM* d / u	Silty sands, sand-silt mixtures
			SC	Clayey sands, sand-clay mixtures
Fine-grained soils (More than half of material is smaller than No. 200 sieve)	Silts and clays (Liquid limit less than 50)		ML	Inorganic silts and very fine sands, rock flour, silty or clayey fine sands or clayey silts with slight plasticity
			CL	Inorganic clays of low to medium plasticity, gravelly clays, sandy clays, silty clays, lean clays
			OL	Organic silts and organic silty clays of low plasticity
	Silts and clays (Liquid limit greater than 50)		MH	Inorganic silts, micaceous or diatomaceous fine sandy or silty soils, elastic silts
			CH	Inorganic clays of high plasticity, fat clays
			OH	Organic clays of medium to high plasticity, organic silts
	Highly organic soils		Pt	Peat and other highly organic soils

Laboratory classification criteria

Determine percentages of sand and gravel from grain-size curve. Depending on percentage of fines (fraction smaller than No. 200 sieve size), coarse-grained soils are classified as follows:

- Less than 5 per cent ..... GW, GP, SW, SP
- More than 12 per cent ..... GM, GC, SM, SC
- 5 to 12 per cent ..... *Borderline* cases requiring dual symbols**

$C_u = \frac{D_{60}}{D_{10}}$ greater than 4; $C_c = \frac{(D_{30})^2}{D_{10} \times D_{60}}$ between 1 and 3	
Not meeting all gradation requirements for GW	
Atterberg limits below "A" line or P.I. less than 4	Above "A" line with P.I. between 4 and 7 are *borderline* cases requiring use of dual symbols
Atterberg limits above "A" line with P.I. greater than 7	
$C_u = \frac{D_{60}}{D_{10}}$ greater than 6; $C_c = \frac{(D_{30})^2}{D_{10} \times D_{60}}$ between 1 and 3	
Not meeting all gradation requirements for SW	
Atterberg limits below "A" line or P.I. less than 4	Limits plotting in hatched zone with P.I. between 4 and 7 are *borderline* cases requiring use of dual symbols.
Atterberg limits above "A" line with P.I. > than 7	



Plasticity Chart

Particle Size		Material
Sieve Size	mm	
	<#200	Silt or Clay
#200 To #40	0.074 To 0.42	Sand
# 40 To #10	0.42 To 2.00	Fine
# 10 To # 4	2.00 To 4.76	Med.
		Coarse

Particle Size		Material
Sieve	mm	
#4 To 3/4 in.	4.76 To 19.1	Gravel
3/4 In. To 3 In.	19.1 To 76.2	Fine
		Coarse
3 In. To 12 In.	76.2 To 304.8	Cobbles
12 In. To 36 In.	304.8 To 914.4	Boulders

TERMS DESCRIBING CONSISTENCY OR CONDITION

COARSE GRAINED SOILS (major portion retained on No. 200 sieve): Includes (1) clean gravels and (2) silty or clayey gravels and sands. Condition is rated according to relative density[1] as determined by laboratory tests or standard penetration resistance tests.

Descriptive Term	Relative Density
Very loose	0 to 15%
Loose	15 to 35%
Medium dense	35 to 65%
Dense	65 to 85%
Very dense	85 to 100%

FINE GRAINED SOILS (major portion passing No. 200 sieve): Includes (1) inorganic and organic silts and clays, (2) gravelly, sandy, or silty clays, and (3) clayey silts. Consistency is rated according to shearing strength, as indicated by penetrometer readings or by unconfined compression tests.

Descriptive Term	Unconfined Compression Strength, tons/sq. ft.
Very soft	less than 0.25
Soft	0.25 to 0.50
Firm	0.50 to 1.00
Stiff	1.00 to 2.00
Very stiff	2.00 to 4.00
Hard	4.00 and higher

TEST AND SAMPLE IDENTIFICATION

15 — 15 – The number of blows (15) of a 140-pound hammer falling 30 inches used to drive a 2" O. D. split-barrel sampler for the last 12 inches of penetration.

50/2 — 50/2 – Number of blows (50) used to drive the split-barrel a certain number of inches (2).

P — P – Thin-wall tube sample.

P/250 — P250 – Thin-wall tube pushed hydraulically, using a certain pressure (250 psi) to push the last 6 inches.

C_1 – Denison or Pitcher-Type – core-barrel sample.

Ps — Ps – Piston sample.

A – Augar sample.

NX/65 — BX – Rock cored with BX core barrel, which obtains a 1-5/8" diameter core.
NX – Rock cored with NX core barrel, which obtains a 2-1/8" diameter core.
65% – Percentage (65) of rock core recovered.

20 — 20% – Rock Quality Designation (RQD)[2]

VS — VS – Vane Shear Test.

Sample Recovered

C – Consolidation and specific gravity tests.
D – Maximum & minimum density.
DS – Direct Shear test.
G – Specific gravity test.
K – Permeability test.
M – Mechanical (sieve or hydrometer) analysis.
T – Triaxial compression test
U – Unconfined compression test.
W – Unit weight & natural moisture content.
X – Special tests performed – see Laboratory test results.

Sample Not Recovered

Laboratory Test Performed

*Division of GM and SM groups into subdivisions of d and u are for roads and airfields only. Subdivision is based on Atterberg limits; suffix d used when L.L. is 28 or less and the P.I. is 6 or less; the suffix u used when L.L. is greater than 28.

**Borderline classifications, used for soils possessing characteristics of two groups, are designated by combinations of group symbols. For example: GW-GC, well-graded gravel-sand mixture with clay binder.

(2) $RQD = \frac{\sum \text{Core Segments} > 4 \text{ Inches}}{\text{Core Interval}} \times 100$

Where Segmentation Is Not Caused By Drilling Effects

(1) ASTM 2049-69

January 12, 1984

Note- Elevations shown are Edward Dean Adams Station Datum per DuPont Electrochemicals Dept. Engineering Division Drawing EE 40-2749, sheets 1 & 2. Co-ordinates shown are DuPont Niagara Plant Co-ordinate System per Drawing EE 40-2719.

EXCAVATION WELL DATA

Well Designation	Ground Elevation	Elevation Top of Brass Ring	Co-ordinates North	East
1	569.4	568.93	1951.9	964.1
2	568.5	568.23	1968.6	1689.0
3	570.3	570.02	2568.3	1276.4
4	568.0	567.80	1920.8	2097.4
5	569.3	569.03	1675.6	2443.9
6	569.0	572.25	1838.2	2561.5
7	567.9	567.81	2452.7	3711.1
8	570.0	573.51	1518.2	3950.2
9	569.0	573.42	1384.1	3354.2
10	570.7	573.91	996.9	691.6
11	569.8	573.37	1089.7	1267.7
12	569.4	573.34	1106.5	1557.0
13	569.9	573.50	1170.0	2108.8

LOG of TEST PIT No. TP-1

DATE 11/11-16/83 SURFACE ELEVATION 569.4 LOCATION See Plate 2

DEPTH, ft. / SAMPLES	POCKET PENETROM. READING (tsf)	DESCRIPTION	ELEVATION
0		Crushed STONE (1 inch max) with fines for roadway base	567.9
		Tan brown silty clayey medium to fine SAND	566.4
5		Stiff to very stiff red-brown, occasionally gray coarse to fine sandy and gravelly silty CLAY/clayey SILT (Till)	561.4
10		Grey broken DOLOMITE (sewer trench cut into rock probably drilled and shot)	554.9
15		24 inch pipe (pipe not exposed sufficiently to examine) • top of pipe about 14.1 feet below grade • pipe was bedded in silty CLAY/clayey SILT with coarse to fine sand and gravel size rock fragments. The pipe trench backfill is predominantly shot rock and more permeable than the surrounding material.	

Completion Depth 14.3 Feet Water Depth 8.3 Feet Date 11/15/83

Project Name DuPont, Man Made Passageways Investigation Project Number 83C2236-5

LOG of TEST PIT No. TP-2

DATE 11/7-9/83 SURFACE ELEVATION 568.5 LOCATION See Plate 2

DEPTH, ft.	SAMPLES	POCKET PENETROM. READING (tsf)	DESCRIPTION	ELEVATION
0			Crushed STONE (1 inch max) with fines for parking area	567.8
			Shot Rock Fill consisting of dolomite fragments from 1" to 12", sand, silt, clay, ashes, occasional pieces of brick and tile	
5				560.5
			Grey fractured Dolomite	559.2
10			No sewer line was located in the alignment that was supposed to carry the 12 inch line	

Completion Depth 9.3 Feet Water Depth 4.9 Feet Date 11/9/83

Project Name DuPont, Man Made Passageways Investigation Project Number 83C2236-5

Woodward-Clyde Consultants

LOG of TEST PIT No. TP-3

DATE 12/2-6/83 SURFACE ELEVATION 570.3 LOCATION See Plate 2

DEPTH, ft. / SAMPLES	POCKET PENETROM. READING (tsf)	DESCRIPTION	ELEVATION
0		Asphalt Pavement (0.3 ft.) and Reinforced Concrete (0.4 ft.)	569.6
		Fill(?) Red-brown silty CLAY/clayey SILT with gravel and cobble size rock fragments	566.8
5		Very broken and fractured grey Dolomite (probably broken and fractured from prior construction activities)	560.2
10		15 inch pipe • buried in bedrock excavation • top of pipe is about 9.9 ft. below grade • bedding material is silty CLAY/clayey SILT with rock fragment and slag which is cemented and hard	
15			

Completion Depth 10.1 Feet Water Depth Dry Feet Date 12/6/83

Project Name DuPont, Man Made Passageways Investigation Project Number 83C2236-5

Woodward-Clyde Consultants

LOG of TEST PIT No. TP-4

DATE 12/7-9/83 SURFACE ELEVATION 568.0 LOCATION See Plate 2

DEPTH, ft. / SAMPLES	POCKET PENETROM. READING (tsf)	DESCRIPTION	ELEVATION
0		Asphalt Pavement	567.4
		Fill consisting of stone, slag, cinders and sand	566.5
5		Fill consisting of shot rock, pieces of clay pipe, wood, brick, little sand (loose)	562.0
		Broken fractured Dolomite	558.9
10		18 inch pipe • bedding material is shot rock grading to sand • pipe not uncovered as trench found at depth of 6' was hard at 9.0', probably from the result of grouting south of Location #4	
15			

Completion Depth 9.1 Feet Water Depth 7.5 Feet Date 12/9/83

Project Name DuPont, Man Made Passageways Investigation Project Number 83C2236-5

Woodward-Clyde Consultants

LOG of TEST PIT No. TP-5

DATE 11/28/83 SURFACE ELEVATION 569.3 LOCATION See Plate 2

DEPTH, ft.	SAMPLES	POCKET PENETROM. READING (tsf)	DESCRIPTION	ELEVATION
0			Asphalt	569.1
			Fill consisting of sand, silt, cinders, occasional pieces of brick, concrete, wood and steel	
5				563.3
			Soft dark gray-black silty CLAY	561.0
10			24 inch clay tile pipe • top of pipe about 4 ft. below grade • pipe bedded in yellow-brown sand that was partially cemented and very open structure • pipe laid on wood on top silty CLAY	

Completion Depth 8.3 Feet Water Depth 6.0 Feet Date 11/28/83

Project Name DuPont, Man Made Passageways Investigation Project Number 83C2236-5

Woodward-Clyde Consultants

LOG of TEST PIT No. TP-6

DATE 11/18/83 SURFACE ELEVATION 569.0 LOCATION See Plate 2

DEPTH, ft.	SAMPLES	POCKET PENETROM. READING (tsf)	DESCRIPTION	ELEVATION
0			Crushed stone (1" max) with some screenings	568.7
5			Firm brown, red-brown, gray silty CLAY/clayey SILT with occasional rock fragments (Fill)	
10				559.0
			Dark gray Dolomite, badly fractured	558.7
15			24 inch pipe • pipe cradled in bedrock and covered with concrete • top of pipe about 9 ft. below grade • there was no bedding material around one pipe only one fill material	

Completion Depth 10.3 Feet Water Depth 5.5 Feet Date 11/21/83

Project Name DuPont, Man Made Passageways Investigation Project Number 83C2236-5

LOG of TEST PIT No. TP-7

DATE 11/23/83 SURFACE ELEVATION 567.9 LOCATION See Plate 2

DEPTH, ft.	SAMPLES	POCKET PENETROM. READING (tsf)	DESCRIPTION	ELEVATION
0			Crushed stone	567.4
			Fill consisting of brown-black clayey SILT/silty CLAY, sand, brick, tile, cobbles and organics	
5				562.4
			Tan-brown sandy silty CLAY/clayey SILT	561.9
			Red-brown sandy clayey SILT	557.9
10			15 inch clay tile pipe • no bedding material around pipe • pipe encountered at a depth of about 6.5 ft.	

Completion Depth 10.0 Feet Water Depth 6.0 Feet Date 11/28/83

Project Name DuPont, Man Made Passageways Investigation Project Number 83C2236-5

LOG of TEST PIT No. TP-8

DATE 11/29-12/1/83 SURFACE ELEVATION 570.0 LOCATION See Plate 2

DEPTH, ft.	SAMPLES	POCKET PENETROM. READING (tsf)	DESCRIPTION	ELEVATION
0			Silty CLAY	569.7
5			Shot rock well chocked with red-brown silty clay/clayey silt. Maxium size of rock about ½ cy (Fill)	562.0
10			Shot rock very poorly chocked, relatively open structure (Fill)	554.0
15			78 inch reinforced concrete pipe • pipe encountered at a depth of about 9 feet • no apparent bedding material around pipe • pipe is believed to be on a shallow bed of sand/stone just over bedrock	

Completion Depth 16.0 Feet Water Depth 6.0 Feet Date 12/1/83

Project Name DuPont, Man Made Passageways Investigation Project Number 83C2236-5

LOG of TEST PIT No. TP-9

DATE 11/22/83 SURFACE ELEVATION 569.0 LOCATION See Plate 2

DEPTH, ft.	SAMPLES	POCKET PENETROM. READING (tsf)	DESCRIPTION	ELEVATION
0			Brown silty CLAY/clayey SILT	568.5
5			Gray shot rock, relatively well graded from about 8 inches to sand size with occasional pieces of rock about 1-2 CF in size	561.0
			Gray broken Dolonite	560.7
10			3.0 H x 5.0 W box culvert • top of box culvert at depth of 2.6 ft. • bottom of box culvert at depth of 7.1 ft. • material surrounding box culvert was shot rock as described above	

Completion Depth 8.3 Feet Water Depth 6.6 Feet Date 11/22/83

Project Name DuPont, Man Made Passageways Investigation Project Number 83C2236-5

Woodward-Clyde Consultants

LOG of TEST PIT No. TP-10

DATE 10/24-25/83 SURFACE ELEVATION 570.7 LOCATION See Plate 2

DEPTH, ft.	SAMPLES	POCKET PENETROM. READING (tsf)	DESCRIPTION	ELEVATION
0			Fill consisting of crushed stone, silt, ashes, concrete, silty clay over and around the VCP	
5				565.4
			Red-brown coarse to fine gravelly, sandy silty CLAY/ clayey SILT with occasional cobbles (Fill?)	563.7
10			15 inch Vetrified clay pipe • top of pipe about 3.5 ft. below grade • pipe was broken during excavation and was found to be plugged with silt and sand • no repair of pipe prior to backfill	

Completion Depth 7.0 Feet Water Depth 2.2 Feet Date 10/24/83

Project Name DuPont, Man Made Passageways Investigation Project Number 83C2236-5

Woodward-Clyde Consultants

LOG of TEST PIT No. TP-11

DATE 10/25-26/83 SURFACE ELEVATION 569.8 LOCATION See Plate 2

DEPTH, ft. / SAMPLES	POCKET PENETROM. READING (tsf)	DESCRIPTION	ELEVATION
0		Crushed stone with fines and screenings	568.8
5		Red-brown coarse to fine gravelly sandy silty CLAY/ clayey SILT with occasional cobbles and brick (Fill)	561.1
10		15 inch R.C.P. ● top of pipe about 4.5 feet below grade ● pipe is bedded in brown silty medium to fine sand	

Completion Depth 8.7 Feet Water Depth 7.0 Feet Date 10/26/83

Project Name DuPont, Man Made Passageways Investigation Project Number 83C2236-5

LOG of TEST PIT No. TP-12

DATE 10/27/83 SURFACE ELEVATION 569.4 LOCATION See Plate 2

DEPTH, ft.	SAMPLES	POCKET PENETROM. READING (tsf)	DESCRIPTION	ELEVATION
0			Crushed stone with screenings	568.8
5			Red-brown coarse to fine sandy gravelly silty CLAY/ clayey SILT with occasional cobbles, brick, tile and cinders (Fill)	561.0
10			18 inch cast iron pipe ● top of pipe about 5.0 feet below grade ● pipe bedded in brown silty medium to fine sand ● manhole No. 613 contained several pieces of wood	

Completion Depth 8.4 Feet Water Depth 7.1 Feet Date 11/22/83

Project Name DuPont, Man Made Passageways Investigation Project Number 83C2236-5

Woodward-Clyde Consultants

LOG of TEST PIT No. TP-13

DATE 10/28/83 SURFACE ELEVATION 569.9 LOCATION See Plate 2

DEPTH, ft.	SAMPLES	POCKET PENETROM. READING (tsf)	DESCRIPTION	ELEVATION
0			Crushed stone and screening	569.4
			Fill: Red-brown silty CLAY/clayey SILT with cobbles, boulders, sand and gravel and occasional cinders and brick	565.6
5			8 inch steel pipe ● top of pipe about 2 feet below grade ● no bedding around pipe	
10				

Completion Depth 4.4 Feet Water Depth Dry Feet Date 11/1/83

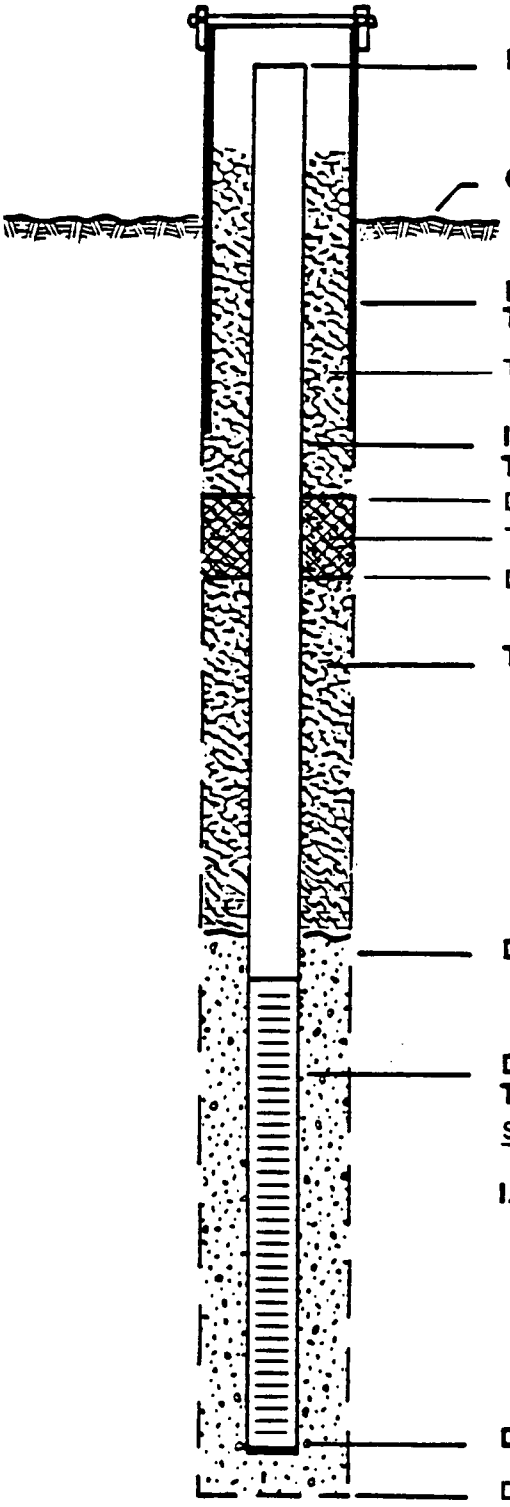
Project Name DuPont, Man Made Passageways Investigation Project Number 83C2236-5

Woodward-Clyde Consultants

Appendix B

APPENDIX B

In order to assess the groundwater conditions in the bedding material at the thirteen test pit locations, utility wells were installed in the test pits to allow water samples to be taken and analyzed. Presented in Appendix B are the utility well installation reports on Pages B-2 through B-14. The gradation for the run of crushed stone used for backfill is included on Page B-15.



Elevation of top of riser pipe 568.93

Ground Elevation 569.4

I.D. of surface casing 8.0 Inch
Type of surface casing Steel with recessed flush cap

Type of Backfill Run of Crusher

I.D. of riser pipe 4.0 Inch
Type of riser pipe Black Pipe

Depth to Top of Clay 5'
Type of Seal Compacted Clay
Depth to Top of Run of Crusher 7'

Type of backfill Run of Crusher

Depth to top of sand pack 11.1'

Depth to top of screen 12.3'
Type of screened section
Stainless Steel # 10 Slot

I.D. of screened section 4.0 Inch

Depth to bottom of well 14.3'

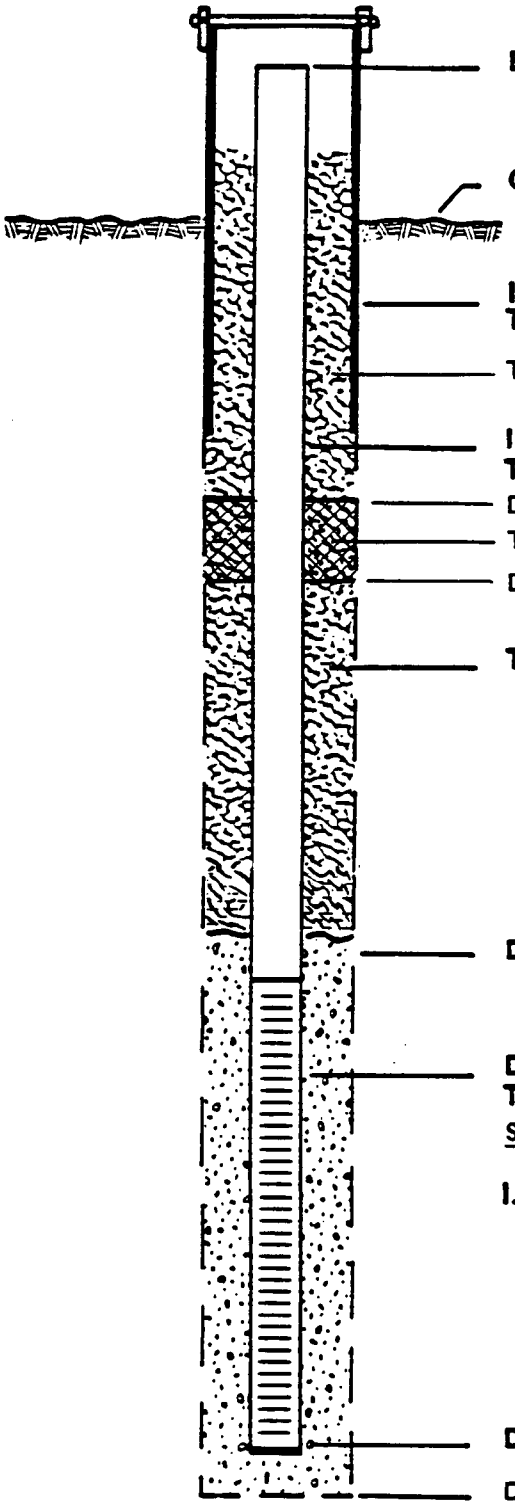
Depth of Test Pit 14.5'

REPORT OF MONITORING WELL UW-1

DRAWN BY: R.M.C.	CHECKED BY: R.M.C.	PROJECT NO: 83C2236-5	DATE: 1/23/84	FIGURE NO:

WOODWARD-CLYDE CONSULTANTS

CONSULTING ENGINEERS, GEOLOGISTS AND ENVIRONMENTAL SCIENTISTS



Elevation of top of riser pipe 568.23

Ground Elevation 568.5

I.D. of surface casing 8.0 Inch
Type of surface casing Steel with recessed flush cap

Type of Backfill Run of Crusher

I.D. of riser pipe 4.0 Inch
Type of riser pipe Black Pipe

Depth to Top of Clay 4.0'

Type of Seal Compacted Clay

Depth to Top of Run of Crusher 6.0'

Type of backfill Run of Crusher

Depth to top of sand pack 6.8'

Depth to top of screen 7.3'
Type of screened section
Stainless Steel # 10 Slot

I.D. of screened section 4.0 Inch

Depth to bottom of well 9.3'

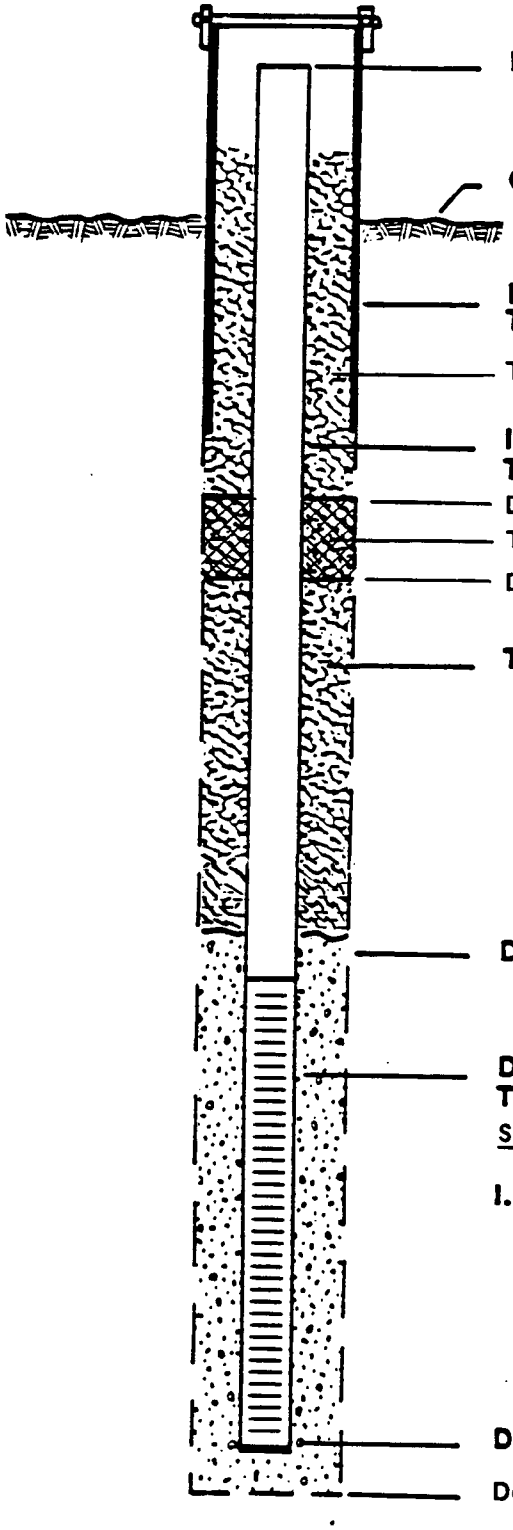
Depth of Test Pit 9.3'

REPORT OF MONITORING WELL UW-2

DRAWN BY: R.M.C.	CHECKED BY: R.M.C.	PROJECT NO: 83C2236-5	DATE: 1/23/84	FIGURE NO:

WOODWARD-CLYDE CONSULTANTS

CONSULTING ENGINEERS, GEOLOGISTS AND ENVIRONMENTAL SCIENTISTS



Elevation of top of riser pipe 570.02

Ground Elevation 570.3

I.D. of surface casing 8.0 Inch
Type of surface casing Steel with recessed flush cap

Type of Backfill Run of Crusher

I.D. of riser pipe 4.0 Inch
Type of riser pipe Black Pipe

Depth to Top of Clay 3.0'

Type of Seal Compacted Clay

Depth to Top of Run of Crusher 5.0'

Type of backfill Run of Crusher

Depth to top of sand pack 7.0'

Depth to top of screen 7.9'
Type of screened section
Stainless Steel # 10 Slot

I.D. of screened section 4.0 Inch

Depth to bottom of well 9.9'

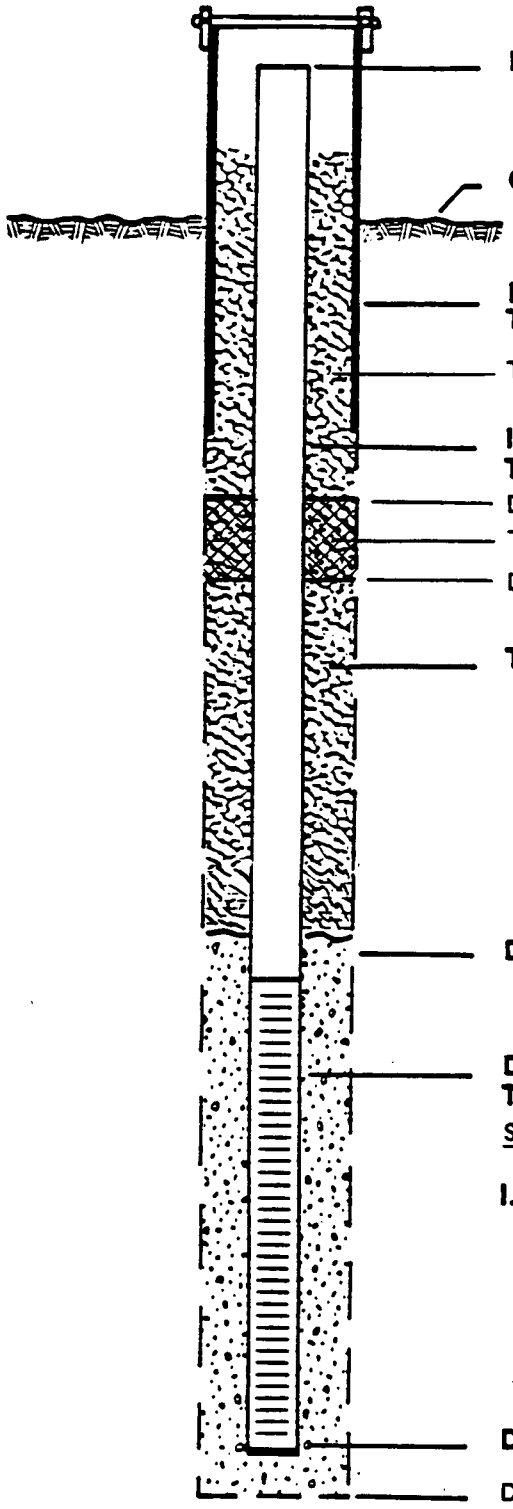
Depth of Test Pit 10.1'

REPORT OF MONITORING WELL UW-3

DRAWN BY: R.M.C.	CHECKED BY: R.M.C.	PROJECT NO: 83C2236-5	DATE: 1/23/84	FIGURE NO:

WOODWARD-CLYDE CONSULTANTS

CONSULTING ENGINEERS, GEOLOGISTS AND ENVIRONMENTAL SCIENTISTS



Elevation of top of riser pipe 567.80

Ground Elevation 568.0

I.D. of surface casing 8.0 Inch
Type of surface casing Steel with recessed flush cap

Type of Backfill Run of Crusher

I.D. of riser pipe 4.0 Inch
Type of riser pipe Black Pipe

Depth to Top of Clay 3.0'

Type of Seal Compacted Clay

Depth to Top of Run of Crusher 5.0'

Type of backfill Run of Crusher

Depth to top of sand pack 6.0'

Depth to top of screen 6.8'
Type of screened section
Stainless Steel # 10 Slot

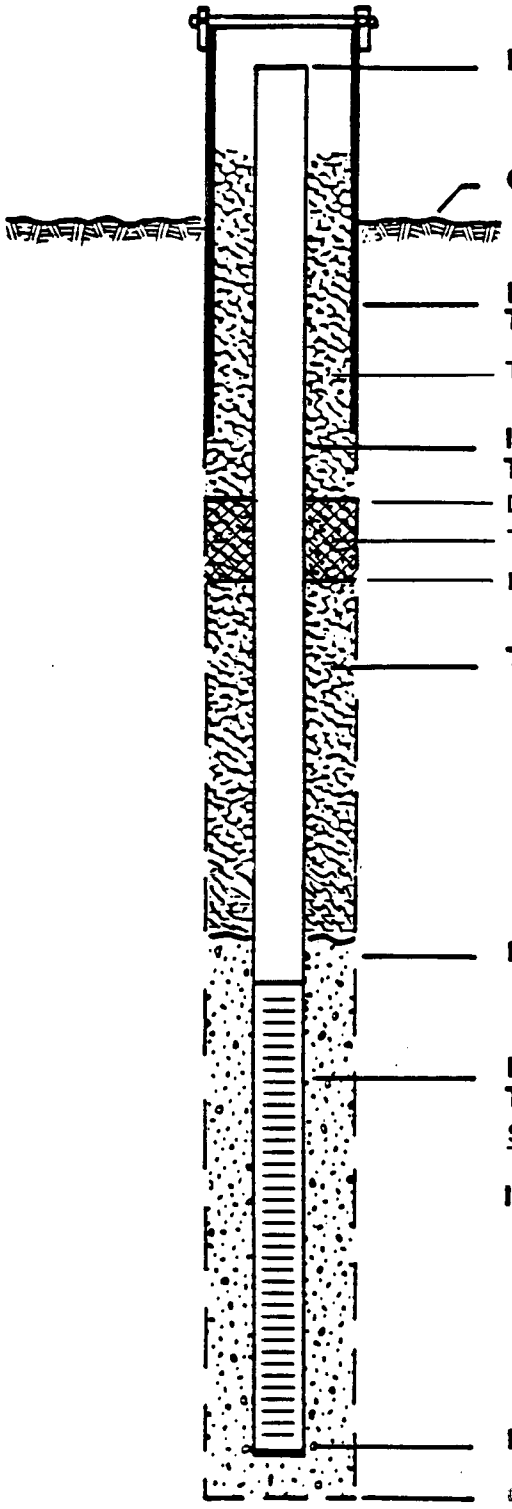
I.D. of screened section 4.0 Inch

Depth to bottom of well 8.8'

Depth of Test Pit 9.0'

REPORT OF MONITORING WELL UW-4

DRAWN BY: R.M.C.	CHECKED BY: R.M.C.	PROJECT NO: 83C2236-5	DATE: 1/23/84	FIGURE NO:



Elevation of top of riser pipe 569.03

Ground Elevation 569.3

I.D. of surface casing 8.0 Inch

Type of surface casing Steel with recessed flush cap

Type of Backfill Run of Crusher

I.D. of riser pipe 4.0 Inch

Type of riser pipe Black Pipe

Depth to Top of Clay 1.5'

Type of Seal Compacted Clay

Depth to Top of Run of Crusher 3.5'

Type of backfill Run of Crusher

Depth to top of sand pack 4.5'

Depth to top of screen 6.1'

Type of screened section

Stainless Steel # 10 Slot

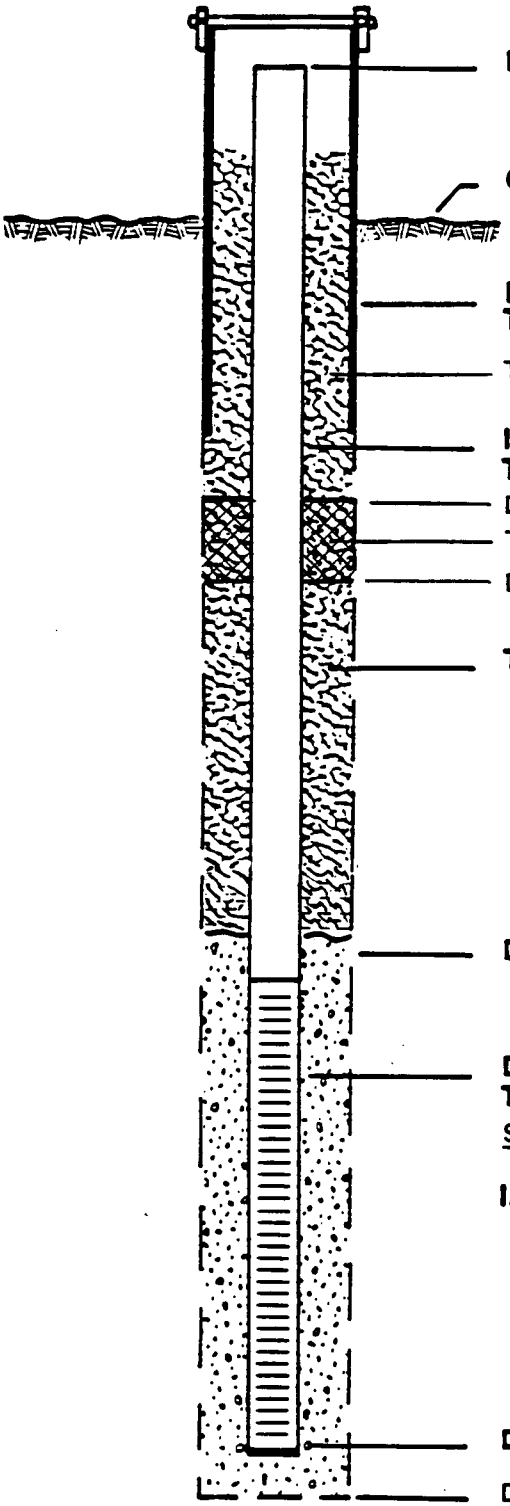
I.D. of screened section 4.0 Inch

Depth to bottom of well 8.1'

Depth of Test Pit 8.3'

REPORT OF MONITORING WELL UW-5

DRAWN BY: R.M.C.	CHECKED BY: R.M.C.	PROJECT NO: 83C2236-5	DATE: 1/23/84	FIGURE NO:



Elevation of top of riser pipe 572.25

Ground Elevation 569.0

I.D. of surface casing none
Type of surface casing none

Type of Backfill Run of Crusher

I.D. of riser pipe 4.0 Inch
Type of riser pipe Black Pipe

Depth to Top of Clay 5.0'

Type of Seal Compacted Clay

Depth to Top of Run of Crusher 7.0'

Type of backfill Run of Crusher

Depth to top of sand pack 7.5'

Depth to top of screen 8.0'
Type of screened section
Stainless Steel # 10 Slot

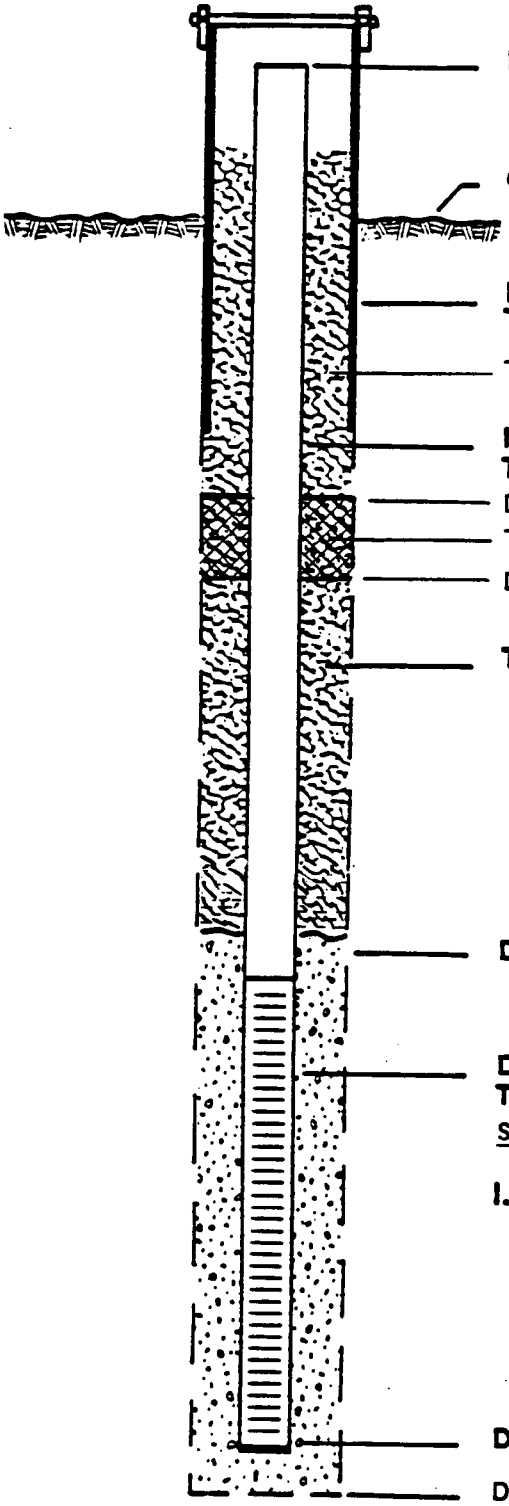
I.D. of screened section 4.0 Inch

Depth to bottom of well 10.0'

Depth of Test Pit 10.3'

REPORT OF MONITORING WELL UW-6

DRAWN BY: R.M.C.	CHECKED BY: R.M.C.	PROJECT NO: 83C2236-5	DATE: 1/23/84	FIGURE NO:



Elevation of top of riser pipe 567.81

Ground Elevation 567.9

I.D. of surface casing 8.0 Inch
Type of surface casing Steel with recessed flush cap

Type of Backfill Run of Crusher

I.D. of riser pipe 4.0 Inch
Type of riser pipe Black Pipe

Depth to Top of Clay 3.0'

Type of Seal Compacted Clay

Depth to Top of Run of Crusher 5.0'

Type of backfill Run of Crusher

Depth to top of sand pack 6.5'

Depth to top of screen 7.5'
Type of screened section
Stainless Steel # 10 Slot

I.D. of screened section 4.0 Inch

Depth to bottom of well 9.5'

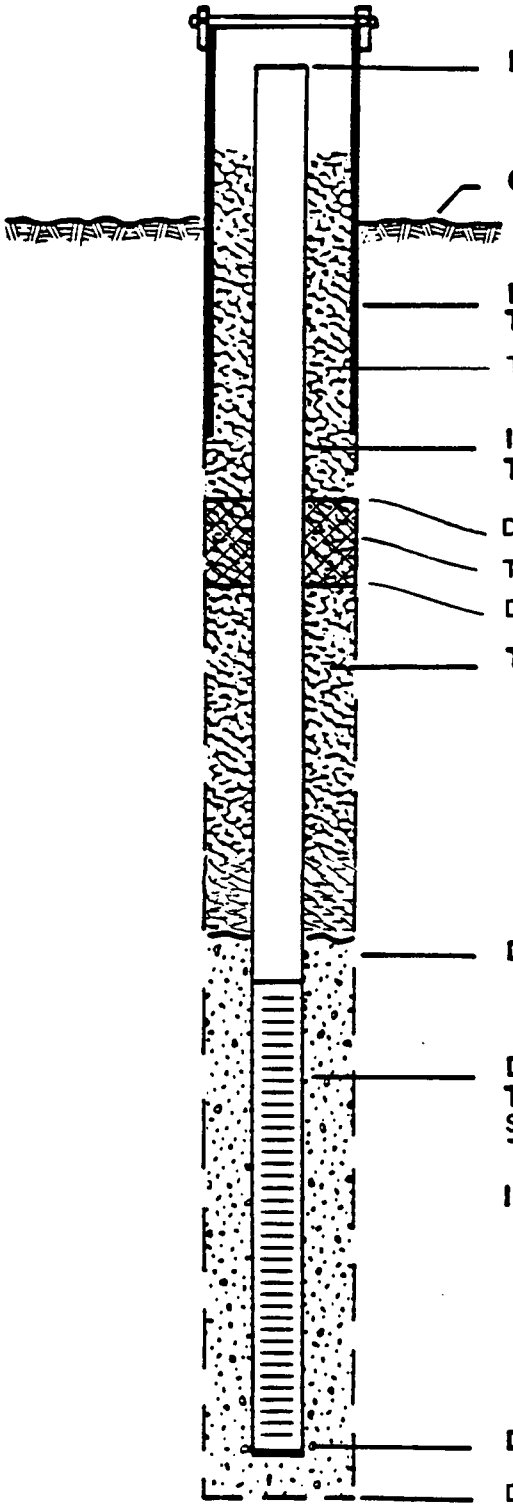
Depth of Test Pit 10.0'

REPORT OF MONITORING WELL UW-7

DRAWN BY: R.M.C.	CHECKED BY: R.M.C.	PROJECT NO: 83C2236-5	DATE: 1/23/84	FIGURE NO:

WOODWARD-CLYDE CONSULTANTS

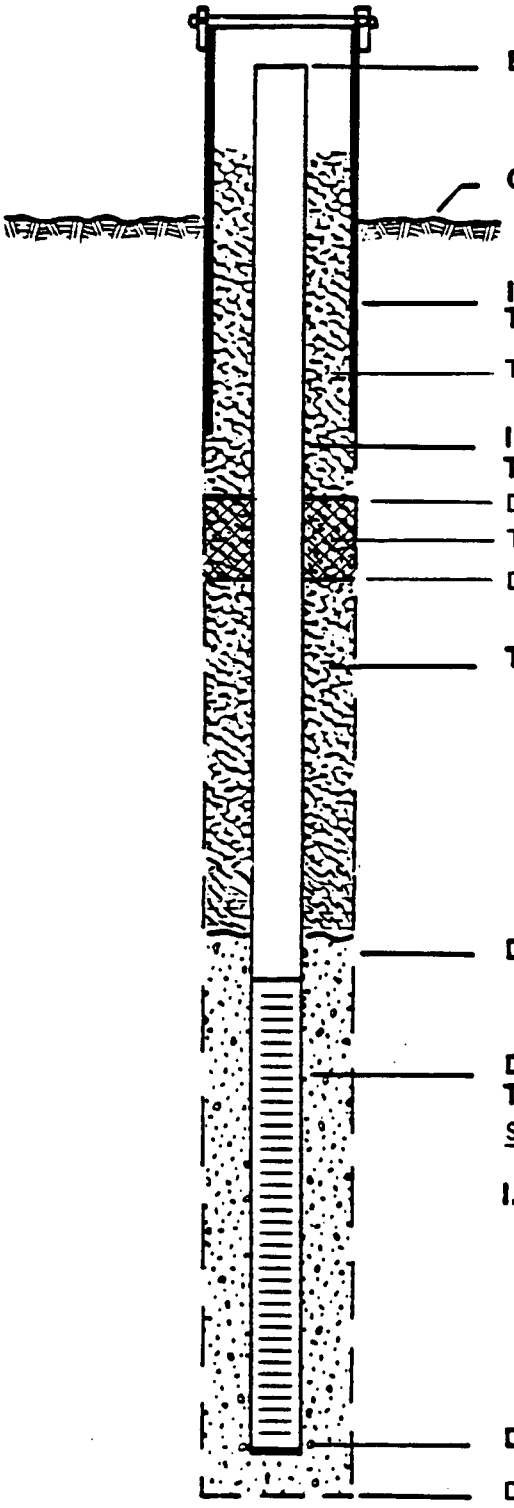
CONSULTING ENGINEERS, GEOLOGISTS AND ENVIRONMENTAL SCIENTISTS



Elevation of top of riser pipe	573.51
Ground Elevation	570.0
I.D. of surface casing	None
Type of surface casing	None
Type of Backfill	Compacted Clay
I.D. of riser pipe	4 Inch
Type of riser pipe	black pipe
Depth to Top of # 4 and # 5 Stone	2.0'
Type of back fill	#4 and #5 Stone
Depth to top of Run of Crusher	7.6'
Type of backfill	Run of crusher
Depth to top of sand pack	10.6'
Depth to top of screen	13.6'
Type of screened section	Stainless Steel # 10 Slot
I.D. of screened section	4 Inch
Depth to bottom of well	15.6'
Depth of Test Pit	16.0'

REPORT OF MONITORING WELL UW-8

DRAWN BY: R.M.C.	CHECKED BY: R.M.C.	PROJECT NO: 83C2236-7	DATE: 1/24/84	FIGURE NO:



Elevation of top of riser pipe 573.42

Ground Elevation 569.0

I.D. of surface casing none
Type of surface casing none

Type of Backfill Run of Crusher

I.D. of riser pipe 4.0 Inch
Type of riser pipe Black Pipe

Depth to Top of Clay 2.0'

Type of Seal Compacted Clay

Depth to Top of Run of Crusher 4.0'

Type of backfill Run of Crusher

Depth to top of sand pack 5.3'

Depth to top of screen 6.0'
Type of screened section
Stainless Steel # 10 Slot

I.D. of screened section 4.0 Inch

Depth to bottom of well 8.0'

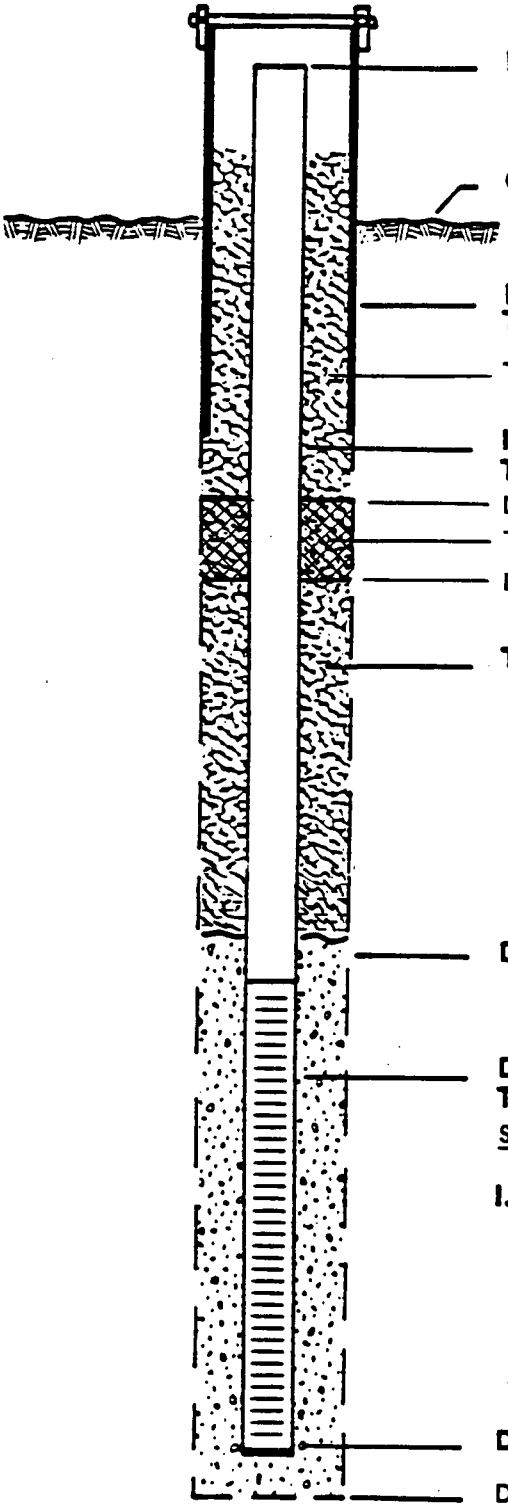
Depth of Test Pit 8.3'

REPORT OF MONITORING WELL UW-9

DRAWN BY: R.M.C.	CHECKED BY: R.M.C.	PROJECT NO: 83C2236-5	DATE: 1/23/84	FIGURE NO:

WOODWARD-CLYDE CONSULTANTS

CONSULTING ENGINEERS, GEOLOGISTS AND ENVIRONMENTAL SCIENTISTS



Elevation of top of riser pipe 573.91

Ground Elevation 570.7

I.D. of surface casing none
Type of surface casing none

Type of Backfill Run of Crusher

I.D. of riser pipe 4.0 Inch
Type of riser pipe Black Pipe

Depth to Top of Clay 1.5'

Type of Seal Compacted Clay

Depth to Top of Run of Crusher 3.0'

Type of backfill Run of Crusher

Depth to top of sand pack 3.5'

Depth to top of screen 4.9'
Type of screened section
Stainless Steel # 10 Slot

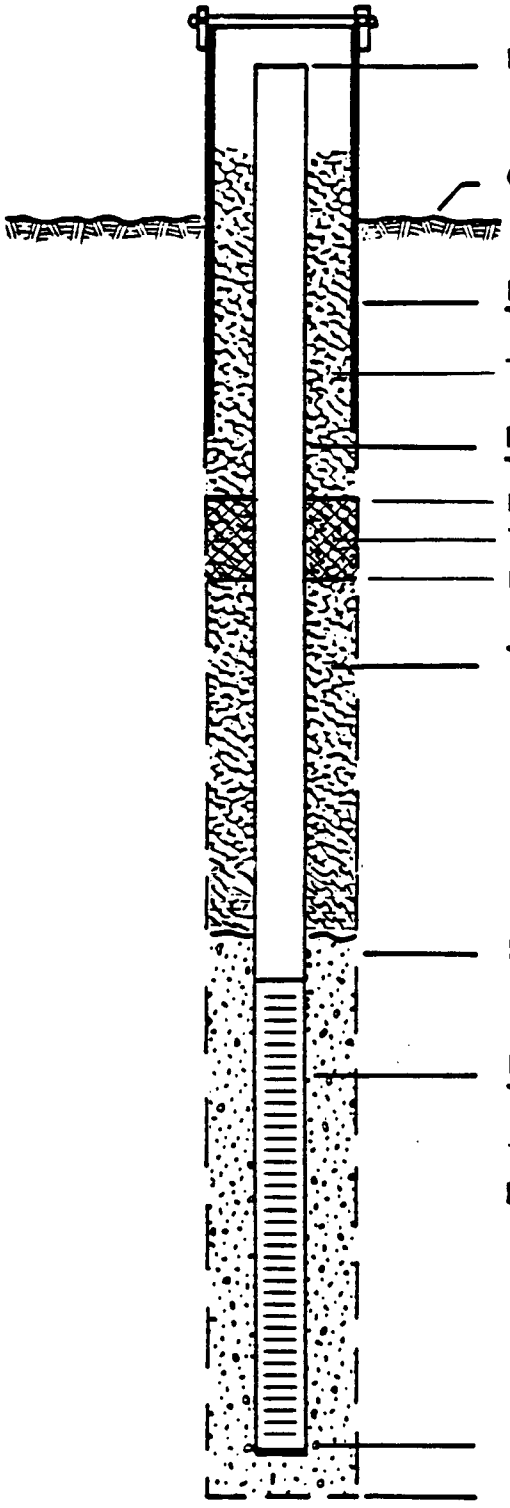
I.D. of screened section 4.0 Inch

Depth to bottom of well 6.9'

Depth of Test Pit 7.0'

REPORT OF MONITORING WELL UW-10

DRAWN BY: R.M.C.	CHECKED BY: R.M.C.	PROJECT NO: 83C2236-5	DATE: 1/23/84	FIGURE NO:



Elevation of top of riser pipe 573.37

Ground Elevation 569.8

I.D. of surface casing none
Type of surface casing none

Type of Backfill Run of Crusher

I.D. of riser pipe 4.0 Inch
Type of riser pipe Black Pipe

Depth to Top of Clay 1.8'

Type of Seal Compacted Clay

Depth to Top of Run of Crusher 3.8'

Type of backfill Run of Crusher

Depth to top of sand pack 4.3'

Depth to top of screen 6.6'
Type of screened section
Stainless Steel # 10 Slot

I.D. of screened section 4.0 Inch

Depth to bottom of well 8.6'

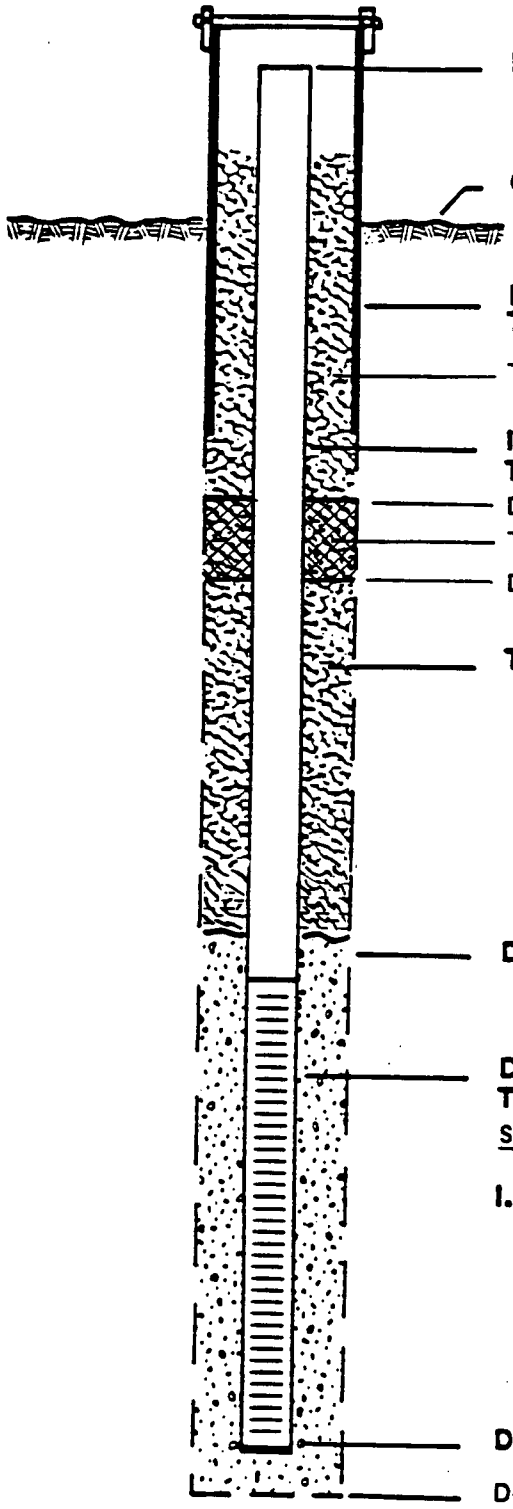
Depth of Test Pit 8.7'

REPORT OF MONITORING WELL UW-11

DRAWN BY: R.M.C.	CHECKED BY: R.M.C.	PROJECT NO: 83C2236-5	DATE: 1/23/84	FIGURE NO:

WOODWARD-CLYDE CONSULTANTS

CONSULTING ENGINEERS, GEOLOGISTS AND ENVIRONMENTAL SCIENTISTS



Elevation of top of riser pipe 573.34

Ground Elevation 569.4

I.D. of surface casing none
Type of surface casing none

Type of Backfill Run of Crusher

I.D. of riser pipe 4.0 Inch
Type of riser pipe Black Pipe

Depth to Top of Clay 2.0'
Type of Seal Compacted Clay
Depth to Top of Run of Crusher 4.0'

Type of backfill Run of Crusher

Depth to top of sand pack 4.3'

Depth to top of screen 6.0'
Type of screened section
Stainless Steel # 10 Slot

I.D. of screened section 4.0 Inch

Depth to bottom of well 8.0'

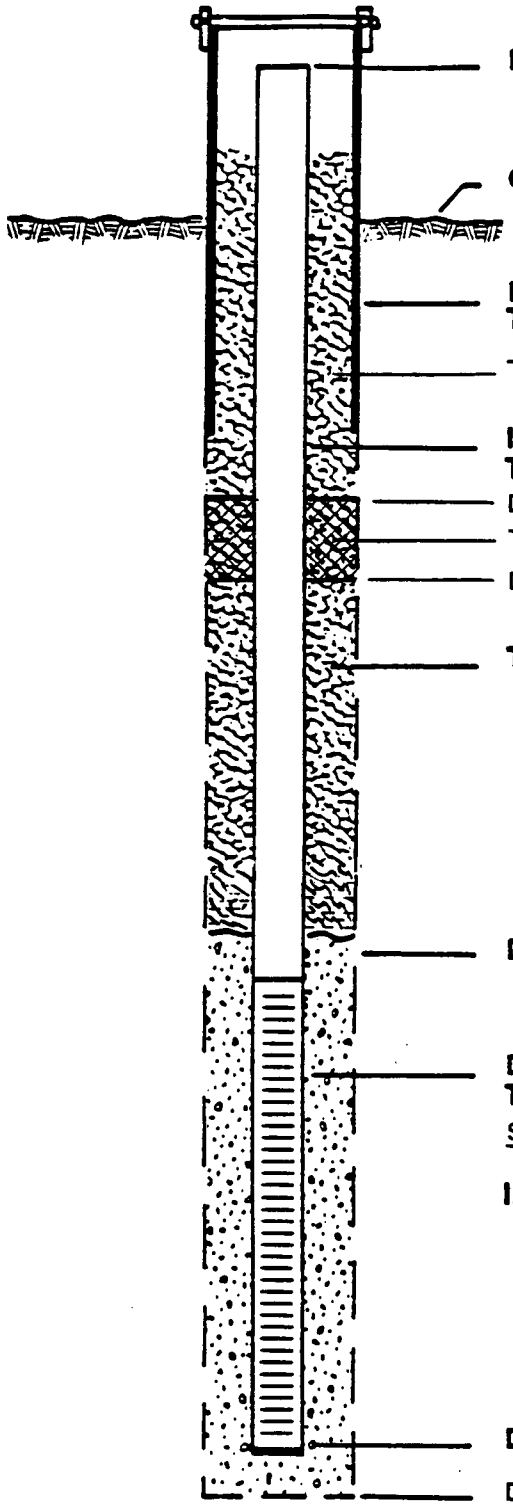
Depth of Test Pit 8.4'

REPORT OF MONITORING WELL UW-12

DRAWN BY: R.M.C.	CHECKED BY: R.M.C.	PROJECT NO: 83C2236-5	DATE: 1/23/84	FIGURE NO:

WOODWARD-CLYDE CONSULTANTS

CONSULTING ENGINEERS, GEOLOGISTS AND ENVIRONMENTAL SCIENTISTS



Elevation of top of riser pipe 573.50

Ground Elevation 569.9

I.D. of surface casing none
Type of surface casing none

Type of Backfill Run of Crusher

I.D. of riser pipe 4.0 inch
Type of riser pipe Black Pipe

Depth to Top of Clay 1.0'

Type of Seal Compacted Clay

Depth to Top of Run of Crusher 2.0'

Type of backfill Run of Crusher

Depth to top of sand pack 2.0'

Depth to top of screen 2.3'
Type of screened section
Stainless Steel # 10 Slot

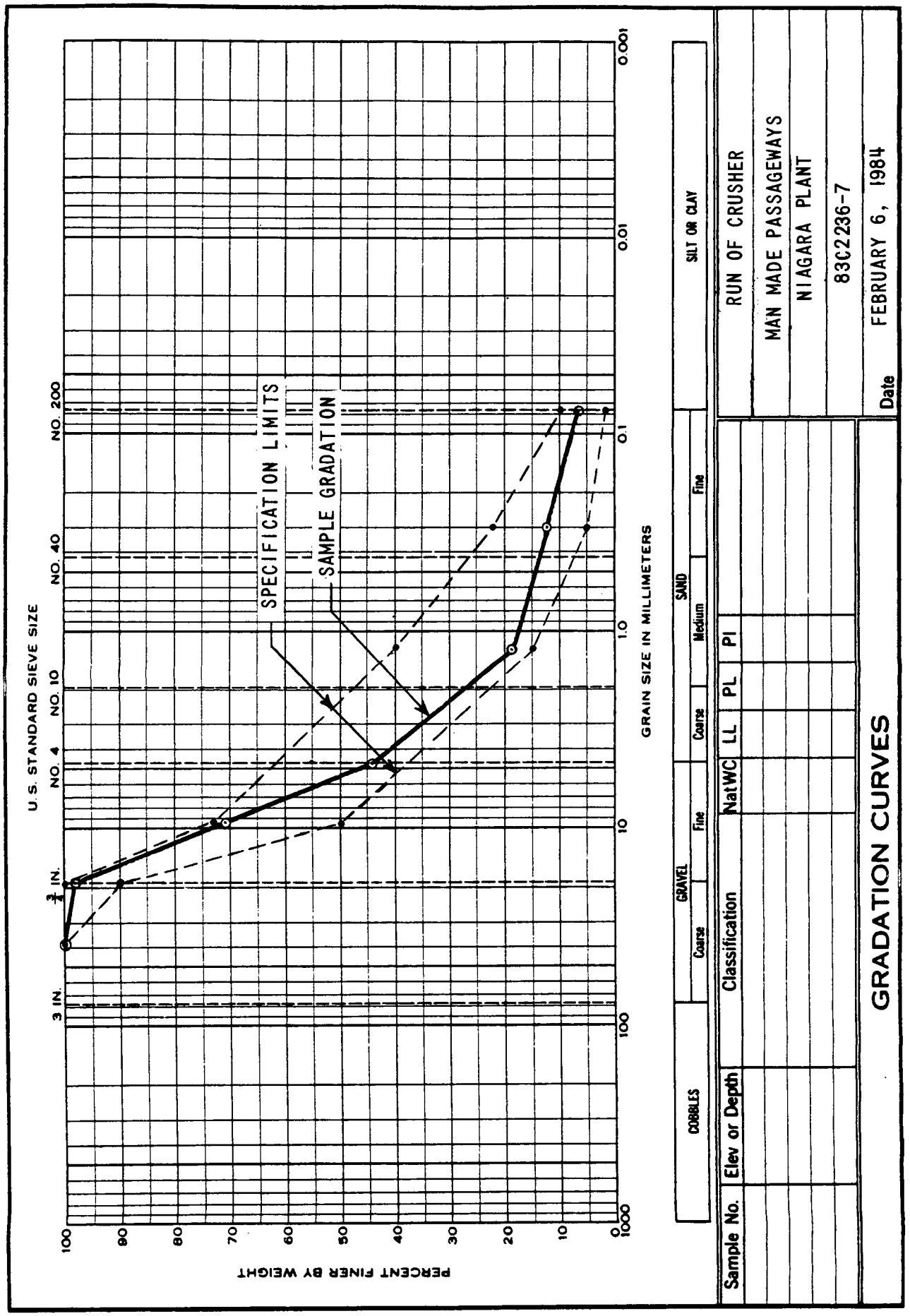
I.D. of screened section 4.0 inch

Depth to bottom of well 4.3'

Depth of Test Pit 4.4'

REPORT OF MONITORING WELL UW-13

DRAWN BY: R.M.C.	CHECKED BY: R.M.C.	PROJECT NO: 83C2236-5	DATE: 1/23/84	FIGURE NO


U.S. STANDARD SIEVE SIZE
3 IN.
½ IN.
NO. 4
NO. 10
NO. 40
NO. 200
SPECIFICATION LIMITS
SAMPLE GRADATION
PERCENT FINER BY WEIGHT
GRAIN SIZE IN MILLIMETERS
COBBLES
GRAVEL
Coarse
Fine
SAND
Coarse
Medium
Fine
SILT OR CLAY
Sample No.
Elev or Depth
Classification
NatWC
LL
PL
PI
RUN OF CRUSHER
MAN MADE PASSAGEWAYS
NIAGARA PLANT
83C2236-7
Date FEBRUARY 6, 1984
GRADATION CURVES

Appendix C

APPENDIX C

The analytical testing of the soil and water samples was conducted by Recra Research, Inc. of Amherst, New York. The soil samples were collected at the time of the test pit excavation with test results dated November 23, 1983 and December 29, 1983. Water samples were collected between December 5 and 14, 1983, with the test results dated January 9, 1984. Copies of the analytical results are presented in this appendix for completion. It is noted that water samples were also taken from some of the well clusters.

FIELD REPORT

ADDITIONAL SAMPLING OF SELECTED GROUNDWATER MONITORING WELLS
AT THE
DUPONT PLANT SITE, NIAGARA FALLS, NEW YORK

This field event included the resampling of well numbers 15CD, 15D, 15F, 15J, 2C, 5CD, 5D, 5F, 10D, 10F and 14C at the Dupont Plant Site on Buffalo Avenue, Niagara Falls, New York. An initial sampling was also done on wells 4J and 8J and 13 excavation wells. This sampling took place between December 1, 1983 and December 14, 1983.

Most wells with a water level depth of less than 25 feet were evacuated and sampled using an ISCO 1580 peristaltic pump and dedicated teflon tubing and silicon rubber pump hose. Most wells with a water level depth greater than 25 feet were sampled with a teflon or a dedicated steel bailer. When the teflon bailer was used it was thoroughly cleaned between wells. It was desirable to remove four well volumes prior to sampling. A number of deep wells required removing very large amounts of water to obtain four volumes. Because we were initially limited to using hand bailers on the deeper wells, it would have been a very time consuming as well as physically taxing endeavor to remove four volumes. For this reason it was decided to use a submersible pump or wells where the volume to be purged was greater than 100 gallons. Between wells, the pump was first thoroughly steam-cleaned, then rigorously cleaned with hot soapy water followed by a hexane wipe, an acetone wipe and a DI water rinse. Method of purge and sampling are listed in Table 1.

Temperature, conductivity and pH were measured in the field using calibrated instrumentation. The results are listed in Table 2.

TABLE 1

WELL INFORMATION

Well	Water Level Below *T-O-C	Well Depth Below *T-O-C	Volume of Standing Water (Gal.)	Volume Purged (Gal.)	Method of Purge	Method of Sampling
2C	16'4"	44'6"	18.9	75.6	Peristaltic Pump	Peristaltic Pump
4J	124'6"	~185'	39.0	35 to near dryness	2" Teflon Bailer	2" Teflon Bailer
5CD	20'6"	50'0"	18.9	75.6	Peristaltic Pump	Peristaltic Pump
5D	19'0"	52'0"	21.5	86.0	Peristaltic Pump	Peristaltic Pump
5F	27'10"	99'0"	46.2	184.8	Submersible Pump	1" Steel Bailer
8J	131'6"	~182'	30.0	25 to near dryness	2" Teflon Bailer	2" Teflon Bailer
10D	20'2"	76'0"	36.6	146.4	Peristaltic Pump	Peristaltic Pump
10F	13'2"	91'0"	51.5	206.0	Submersible Pump	1" Steel Bailer
14C	18'1"	31'11"	9.1	8.0 to near dryness	Peristaltic Pump	Peristaltic Pump
15CD	23'1"	49'0"	15.6	35	2" Teflon Bailer	2' Teflon Bailer
15D	17'5"	53'2"	21.6	55	Peristaltic Pump	Peristaltic Pump
15F	12'8"	102'0"	53.4	95	Peristaltic Pump	Peristaltic Pump
15J	46'1"	~170'	74.4	75	2" Teflon Bailer	2" Teflon Bailer

* Top of Casing

FOR RECRA RESEARCH, INC. _____

DATE _____

TABLE 1 (cont.)

WELL INFORMATION

Well	Water Level Below *T-O-C	Well Depth Below *T-O-C	Volume of Standing Water (Gal.)	Volume Purged (Gal.)	Method of Purge	Method of Sampling
1	7'7"	13'9"	3.9	15.6	Peristaltic Pump	Peristaltic Pump
2	2'8"	9'0"	3.9	15.6	Peristaltic Pump	Peristaltic Pump
3	Dry	9'6"	-	-	-	-
4	Dry	8'6"	-	-	-	-
5	4'1"	7'7"	2.6	10.4	Peristaltic Pump	Peristaltic Pump
6	8'11"	13'2"	2.6	10.4	Peristaltic Pump	Peristaltic Pump
7	4'10"	8'8"	2.6	10.4	Peristaltic Pump	Peristaltic Pump
8	11'3"	18'11"	5.2	20.8	Peristaltic Pump	Peristaltic Pump
9	11'0"	12'10"	1.3	5.2	Peristaltic Pump	Peristaltic Pump
10	3'7"	10'9"	4.6	18.4	Peristaltic Pump	Peristaltic Pump
11	6'3"	12'0"	3.9	15.6	Peristaltic Pump	Peristaltic Pump
12	10'7"	11'11"	0.7	2.8	Peristaltic Pump	Peristaltic Pump
13	6'2"	7'9"	1.3	5.2	Peristaltic Pump	Peristaltic Pump

* Top of Casing

FOR RECRA RESEARCH, INC. _____

DATE _____

TABLE 2

FIELD ANALYSIS AND DESCRIPTION

Well	Sampling Date/Time	pH Standard Units	Conductivity umhos/cm	Temp °C
2C	12-12-83/ 1200	7.05	1,300	11.0
4J	12-06-83/ 1230	12.05	10,000	9.0
5CD	12-08-83/ 1400	8.55	1,180	8.0
5D	12-08-83/ 1420	7.25	2,100	10.0
5F	12-08-83/ 1500	7.70	370	10.0
8J	12-07-83/ 1400	13.00	8,900	10.0
10D	12-13-83/ 1500	6.75	2,650	10.5
10F	12-09-83/ 1410	7.80	1,780	11.0
14C	12-09-83/ 1230	7.60	7,000	9.0
15CD	11-30-83/ 1500	7.25	750	11.0
15D	12-01-83/ 1145	10.75	375	10.0
15F	12-01-83/ 1430	11.35	1,600	11.0
15J	12-01-83/ 1520	13.00	7,000	10.0

FOR RECRA RESEARCH, INC. _____

DATE _____

TABLE 2 (continued)

FIELD ANALYSIS AND DESCRIPTION

Well	Sampling Date/Time	pH Standard Units	Conductivity umhos/cm	Temp °C
1	12-13-83/ 1430	7.40	2450	9.0
2	12-14-83/ 1130	9.15	950	8.0
3	12-13-83/ 1400	Dry	-	-
4	12-14-83/ 1200	Dry	-	-
5	12-14-83/ 1100	10.40	1650	10.0
6	12-13-83/ 1100	7.15	1220	7.0
7	12-14-83/ 1400	6.95	3950	9.0
8	12-13-83/ 1200	7.30	420	5.0
9	12-13-83/ 1230	7.35	650	8.5
10	12-05-83/ 1400	8.35	23,800	8.0
11	12-12-83/ 1530	7.50	4050	8.0
12	12-12-83/ 1450	7.10	495	6.0
13	12-12-83/ 1420	7.50	1380	4.5

FOR RECRA RESEARCH, INC. _____

DATE _____

RECRA ENVIRONMENTAL LABORATORIES
Division of Recra Research, Inc.

November 29, 1983

Mr. Timothy Van Domelen
E. I. Du Pont de Nemours &
Company, Inc.
P.O. Box 787
Niagara Falls, NY 14302

Re: Analytical Results

Dear Mr. Van Domelen:

Please find enclosed results of the analyses of the samples received at our laboratories on October 26, 28, and November 10, 1983.

If you have any questions concerning these data, do not hesitate to contact the undersigned.

Sincerely,

RECRA ENVIRONMENTAL LABORATORIES

James A. Ploscyca
Laboratory Manager

BJK/JAP/jah
Enclosure
cc: Mr. Robert Pedley

I.D. #83-1128
83-1128A-B

4248 Ridge Lea Road, Amherst, New York 14226 Telephone Sales [illegible]
Laboratory [illegible]

RECRA ENVIRONMENTAL LABORATORIES
Division of Recra Research, Inc.

ANALYTICAL RESULTS

E. I. DU PONT DE NEMOURS & COMPANY, INC.
PRIORITY POLLUTANT ANALYSES

Prepared For:

E. I. Du Pont de Nemours &
Company, Inc.
P.O. Box 787
Niagara Falls, NY 14302

Prepared By:

Recra Environmental Laboratories
4248 Ridge Lea Road
Amherst, NY 14226

Report Date: November 29, 1983

ANALYTICAL RESULTS

E. I. DU PONT DE NEMOURS & COMPANY, INC.
PRIORITY POLLUTANT ANALYSES

Report Date: 11/29/83

INTRODUCTION:

On October 26, 28, and November 11, 1983, samples were received at Recra Environmental Laboratories. A request was made by E. I. Du Pont de Nemours & Company, Inc. to have the samples analyzed for nine specific volatile compounds, PCB's and BHC isomers, total copper, total recoverable phenolics, and total cyanide.

This report will address the results of those analyses.

METHODS:

Priority pollutant analyses were conducted according to Environmental Protection Agency (EPA) methodologies where applicable.

The nine specific volatile compounds were analyzed by Gas Chromatography/Mass Spectrometry (GC/MS). PCB's and BHC isomers were analyzed by Gas Chromatography.

RESULTS AND DISCUSSION:

Detection limits for the nine volatile compounds are a function of the amount of sample used for analysis and the samples' dry weight.

Confirmatory analyses for the PCB and BHC isomers was not performed.

The low volatile internal standard recovery for the LOC #2 Bedding Material sample is believed to be sample related. The sample was analyzed in duplicate, with similar low internal standard recoveries obtained from both analyses.

Analyses for BHC isomers and PCB's are based upon the matching of retention times between samples and standards on a single gas chromatographic column.

RESULTS AND DISCUSSION (CONT'D.):

Gas chromatographic values reported as "less than" (<) indicate the working detection limit for the given sample and/or parameter.

Compounds reported as ND are "not detected". Compounds reported as BMDL are confirmed as being present in the sample at a level "below method detection limit".

Respectfully Submitted,

RECRA ENVIRONMENTAL LABORATORIES

Barbara J. Krajewski

Barbara J. Krajewski
GC/MS Analyst

BJK/jah

ANALYTICAL RESULTS

E. I. DU PONT DE NEMOURS & COMPANY, INC.
GAS CHROMATOGRAPHY/MASS SPECTROMETRY
SPECIFIC VOLATILE ANALYSES

Report Date: 11/29/83

COMPOUND	METHOD DETECTION LIMIT (µg/kg dry)	SAMPLE IDENTIFICATION	
		LOC #10 BEDDING	LOC #10 UNDERLYING SOIL
Benzene	2.8	31 µg/kg dry	4.7 µg/kg dry
Chlorobenzene	3.8	22 µg/kg dry	ND
Chloroform	1.0	120 µg/kg dry	5.0 µg/kg dry
trans-1,2-dichloroethylene	1.0	3,600 µg/kg dry	300 µg/kg dry
Methylene chloride	1.8	95 µg/kg dry	32 µg/kg dry
1,1,2,2-tetrachloroethane	4.4	21 µg/kg dry	BMDL
Tetrachloroethylene	2.6	200 µg/kg dry	180 µg/kg dry
Trichloroethylene	1.3	480 µg/kg dry	180 µg/kg dry
Vinyl chloride	6.3	1,500 µg/kg dry	29 µg/kg dry

ADDITIONAL SAMPLE INFORMATION

Sample Date	10/25/83	10/25/83
Analysis Date	11/7/83	11/7/83
Internal Standard - Level	20 µg/kg	20 µg/kg
Bromochloromethane - Recovery	98%	100%
Internal Standard - Level	20 µg/kg	20 µg/kg
2-bromo-1-chloropropane - Recovery	110%	97%
Internal Standard - Level	20 µg/kg	20 µg/kg
1,4-dichlorobutane - Recovery	120%	100%

FOR RECRA ENVIRONMENTAL LABORATORIES Barbara J Kazenski

DATE 11/29/83

RECRA ENVIRONMENTAL LABORATORIES

I.D. #83-1128

ANALYTICAL RESULTS

E. I. DU PONT DE NEMOURS & COMPANY, INC.
GAS CHROMATOGRAPHY/MASS SPECTROMETRY
SPECIFIC VOLATILE ANALYSES

Report Date: 11/29/83

COMPOUND	METHOD DETECTION LIMIT (µg/kg dry)	SAMPLE IDENTIFICATION	
		LOC #11 BEDDING	LOC #11 UNDERLYING SOIL
benzene	2.8	ND	ND
chlorobenzene	3.8	ND	BMDL
chloroform	1.0	ND	ND
trans-1,2-dichloroethylene	1.0	110 µg/kg dry	1,200 µg/kg dry
methylene chloride	1.8	20 µg/kg dry	30 µg/kg dry
1,1,2,2-tetrachloroethane	4.4	BMDL	BMDL
tetrachloroethylene	2.6	20 µg/kg dry	370 µg/kg dry
trichloroethylene	1.3	120 µg/kg dry	280 µg/kg dry
vinyl chloride	6.3	15 µg/kg dry	31 µg/kg dry

ADDITIONAL SAMPLE INFORMATION

Sample Date	10/26/83	10/26/83
Analysis Date	11/8/83	11/8/83
Internal Standard - Level	20 µg/kg	20 µg/kg
bromochloromethane - Recovery	110%	100%
Internal Standard - Level	20 µg/kg	20 µg/kg
2-bromo-1-chloropropane - Recovery	98%	96%
Internal Standard - Level	20 µg/kg	20 µg/kg
1,4-dichlorobutane - Recovery	110%	110%

FOR RECRA ENVIRONMENTAL LABORATORIES Barbara J Kazenski

DATE 11/29/83

ANALYTICAL RESULTS

E. I. DU PONT DE NEMOURS & COMPANY, INC.
GAS CHROMATOGRAPHY/MASS SPECTROMETRY
SPECIFIC VOLATILE ANALYSES

Report Date: 11/29/83

COMPOUND	METHOD DETECTION LIMIT (µg/kg dry)	SAMPLE IDENTIFICATION	
		LOC #12 BEDDING	LOC #12 UNDERLYING SOIL
benzene	2.8	ND	ND
chlorobenzene	3.8	ND	ND
chloroform	1.0	8.2 µg/kg dry	36 µg/kg dry
trans-1,2-dichloroethylene	1.0	100 µg/kg dry	540 µg/kg dry
methylene chloride	1.8	110 µg/kg dry	7.3 µg/kg dry
1,1,2,2-tetrachloroethane	4.4	81 µg/kg dry	ND
tetrachloroethylene	2.6	600 µg/kg dry	2,600 µg/kg dry
trichloroethylene	1.3	480 µg/kg dry	1,800 µg/kg dry
vinyl chloride	6.3	ND	ND

ADDITIONAL SAMPLE INFORMATION

Sample Date	10/27/83	10/27/83
Analysis Date	11/8/83	11/8/83
Internal Standard - Level	20 µg/kg	20 µg/kg
bromochloromethane - Recovery	92%	95%
Internal Standard - Level	20 µg/kg	20 µg/kg
2-bromo-1-chloropropane - Recovery	80%	85%
Internal Standard - Level	20 µg/kg	20 µg/kg
1,4-dichlorobutane - Recovery	85%	90%

FOR RECRA ENVIRONMENTAL LABORATORIES Barbara J. Kagenski

DATE 11/29/83

ANALYTICAL RESULTS

E. I. DU PONT DE NEMOURS & COMPANY, INC.
GAS CHROMATOGRAPHY/MASS SPECTROMETRY
SPECIFIC VOLATILE ANALYSES

Report Date: 11/29/83

COMPOUND	METHOD DETECTION LIMIT (µg/kg dry)	SAMPLE IDENTIFICATION LOC #13 BEDDING
benzene	8.6	ND
chlorobenzene	12	ND
chloroform	3.1	5.1 µg/kg dry
trans-1,2-dichloroethylene	3.1	720 µg/kg dry
methylene chloride	5.5	22 µg/kg dry
1,1,2,2-tetrachloroethane	13	ND
tetrachloroethylene	8.0	130 µg/kg dry
trichloroethylene	3.7	2,500 µg/kg dry
vinyl chloride	20	BMDL

ADDITIONAL SAMPLE INFORMATION

Sample Date	10/28/83
Analysis Date	11/9/83
Internal Standard - Level	20 µg/kg
bromochloromethane - Recovery	93%
Internal Standard - Level	20 µg/kg
2-bromo-1-chloropropane - Recovery	83%
Internal Standard - Level	20 µg/kg
1,4-dichlorobutane - Recovery	90%

FOR RECRA ENVIRONMENTAL LABORATORIES Barbara J Kingsley

DATE 11/29/83

RECRA ENVIRONMENTAL LABORATORIES
I.D. #83-1128

ANALYTICAL RESULTS

E. I. DU PONT DE NEMOURS & COMPANY, INC.
GAS CHROMATOGRAPHY/MASS SPECTROMETRY
SPECIFIC VOLATILE ANALYSES

Report Date: 11/29/83

COMPOUND	METHOD DETECTION LIMIT (µg/kg dry)	SAMPLE IDENTIFICATION LOC #2 BEDDING MATERIAL
benzene	9.9	ND
chlorobenzene	13	BMDL
chloroform	3.6	280 µg/kg dry
trans-1,2-dichloroethylene	3.6	52 µg/kg dry
methylene chloride	6.3	36 µg/kg dry
1,1,2,2-tetrachloroethane	15	ND
tetrachloroethylene	9.2	1,400 µg/kg dry
trichloroethylene	4.3	960 µg/kg dry
vinyl chloride	22	ND

ADDITIONAL SAMPLE INFORMATION

Sample Date	11/9/83
Analysis Date	11/11/83
Internal Standard - Level	20 µg/kg
bromochloromethane - Recovery	60%
Internal Standard - Level	20 µg/kg
2-bromo-1-chloropropane - Recovery	52%
Internal Standard - Level	20 µg/kg
1,4-dichlorobutane - Recovery	70%

FOR RECRA ENVIRONMENTAL LABORATORIES Barbara J Vajgrdi

DATE 11/29/83

RECRA ENVIRONMENTAL LABORATORIES

I.D. #83-1128

ANALYTICAL RESULTS

E. I. DU PONT DE NEMOURS & COMPANY, INC.

Report Date: 11/29/83

PARAMETER	UNITS OF MEASURE	SAMPLE IDENTIFICATION (DATE)	
		LOC #10 BEDDING (10/25/83)	LOC #10 UNDERLYING SOIL (10/25/83)
α-BHC	µg/g dry	<0.05	<0.01
ß-BHC	µg/g dry	<0.05	<0.01
δ-BHC	µg/g dry	<0.05	<0.01
γ-BHC	µg/g dry	<0.05	<0.01
PCB-1016	µg/g dry	<1	<0.1
PCB-1221	µg/g dry	<2	<0.2
PCB-1232	µg/g dry	<2	<0.2
PCB-1242	µg/g dry	1.5	<0.1
PCB-1248	µg/g dry	<2	<0.1
PCB-1254	µg/g dry	0.67	<0.1
PCB-1260	µg/g dry	<1	<0.1
Total Copper	µg/g dry	935	11
Total Cyanide	µg/g dry	52	0.54
Total Recoverable Phenolics	µg/g dry	4.8	0.17
Dry Weight	%	84	93

FOR RECRA ENVIRONMENTAL LABORATORIES Deborah J. Prairie

DATE 11/29/83

RECRA ENVIRONMENTAL LABORATORIES

I.D. #83-1128

ANALYTICAL RESULTS

E. I. DU PONT DE NEMOURS & COMPANY, INC.

Report Date: 11/29/83

PARAMETER	UNITS OF MEASURE	SAMPLE IDENTIFICATION (DATE)		
		LOC #11 BEDDING (10/26/83)	LOC #12 BEDDING (10/27/83)	LOC #13 BEDDING (10/28/83)
α-BHC	µg/g dry	<0.05	<0.05	<0.01
β-BHC	µg/g dry	<0.05	<0.05	<0.01
δ-BHC	µg/g dry	<0.05	<0.05	<0.01
γ-BHC	µg/g dry	<0.05	<0.05	<0.01
PCB-1016	µg/g dry	<0.3	<0.1	<0.1
PCB-1221	µg/g dry	<0.6	<0.2	<0.2
PCB-1232	µg/g dry	<0.6	<0.2	<0.2
PCB-1242	µg/g dry	<0.3	<0.1	<0.1
PCB-1248	µg/g dry	<0.3	<0.1	<0.1
PCB-1254	µg/g dry	0.26	<0.1	<0.1
PCB-1260	µg/g dry	<0.3	<0.1	<0.1
Total Copper	µg/g dry	7.5	41	13
Total Cyanide	µg/g dry	280	5.9	190
Total Recoverable Phenolics	µg/g dry	1.2	0.15	0.33
Dry Weight	%	77	82	93

FOR RECRA ENVIRONMENTAL LABORATORIES Deborah J. Travis

DATE 11/29/83

RECRA ENVIRONMENTAL LABORATORIES

I.D. #83-1128

ANALYTICAL RESULTS

E. I. DU PONT DE NEMOURS & COMPANY, INC.

Report Date: 11/29/83

PARAMETER	UNITS OF MEASURE	SAMPLE IDENTIFICATION (DATE)	
		LOC #11 UNDERLYING SOIL (10/26/83)	LOC #12 UNDERLYING SOIL (10/27/83)
α-BHC	µg/g dry	<0.05	<0.01
β-BHC	µg/g dry	<0.05	<0.01
δ-BHC	µg/g dry	<0.05	<0.01
γ-BHC	µg/g dry	<0.05	<0.01
PCB-1016	µg/g dry	<0.1	<0.1
PCB-1221	µg/g dry	<0.2	<0.2
PCB-1232	µg/g dry	<0.2	<0.2
PCB-1242	µg/g dry	<0.1	<0.1
PCB-1248	µg/g dry	<0.1	<0.1
PCB-1254	µg/g dry	<0.1	<0.1
PCB-1260	µg/g dry	<0.1	<0.1
Total Copper	µg/g dry	14	17
Total Cyanide	µg/g dry	540	0.84
Total Recoverable Phenolics	µg/g dry	0.42	0.72
Dry Weight	%	88	83

FOR RECRA ENVIRONMENTAL LABORATORIES Deborah J. Praris

DATE 11/29/83

RECRA ENVIRONMENTAL LABORATORIES

I.D. #83-1128

ANALYTICAL RESULTS

E. I. DU PONT DE NEMOURS & COMPANY, INC.

Report Date: 11/29/83

PARAMETER	UNITS OF MEASURE	SAMPLE IDENTIFICATION (DATE) LOC #2 BEDDING (11/9/83)
α-BHC	µg/g dry	0.51
β-BHC	µg/g dry	0.87
δ-BHC	µg/g dry	<0.1
γ-BHC	µg/g dry	0.29
PCB-1016	µg/g dry	<0.3
PCB-1221	µg/g dry	<0.6
PCB-1232	µg/g dry	<0.6
PCB-1242	µg/g dry	<0.3
PCB-1248	µg/g dry	<0.3
PCB-1254	µg/g dry	<0.3
PCB-1260	µg/g dry	<0.3
Total Copper	µg/g dry	63
Total Cyanide	µg/g dry	2.5
Total Recoverable Phenolics	µg/g dry	0.45
Dry Weight	%	85

FOR RECRA ENVIRONMENTAL LABORATORIES Deborah J. Praris

DATE 11/29/83

RECRA ENVIRONMENTAL LABORATORIES

I.D. #83-1128

ANALYTICAL RESULTS

E. I. DU PONT DE NEMOURS & COMPANY, INC.
GAS CHROMATOGRAPHY/MASS SPECTROMETRY
SPECIFIC VOLATILE ANALYSES
QUALITY CONTROL

Report Date: 11/29/83

REPLICATE VOLATILE ANALYSIS OF
SAMPLE LOC #12 BEDDING

COMPOUND IDENTIFICATION	UNITS OF MEASURE	VALUE 1	VALUE 2	MEAN	STANDARD DEVIATION	PERCENT COEFFICIENT OF VARIATION
chloroform	µg/kg dry	10	6.5	8.2	2.4	29
trans-1,2-dichloroethylene	µg/kg dry	140	72	100	48	48
methylene chloride	µg/kg dry	140	76	110	45	41
1,1,2,2-tetrachloroethane	µg/kg dry	76	86	81	7.1	8.8
tetrachloroethylene	µg/kg dry	680	510	600	120	20
trichloroethylene	µg/kg dry	560	410	480	110	23

FOR RECRA ENVIRONMENTAL LABORATORIES Barbara J Kuzewski

DATE 11/29/83

ANALYTICAL RESULTS

E. I. DU PONT DE NEMOURS & COMPANY, INC.
GAS CHROMATOGRAPHY/MASS SPECTROMETRY
SPECIFIC VOLATILE ANALYSES
QUALITY CONTROL

Report Date: 11/29/83

REPLICATE VOLATILE ANALYSIS OF
SAMPLE LOC #2 BEDDING MATERIAL

COMPOUND IDENTIFICATION	UNITS OF MEASURE	VALUE 1	VALUE 2	MEAN	STANDARD DEVIATION	PERCENT COEFFICIENT OF VARIATION
chlorobenzene	µg/l	BMDL	BMDL	BMDL	-	-
chloroform	µg/l	280	280	280	0	0
trans-1,2-dichloroethylene	µg/l	54	51	52	2.1	4.0
tetrachloroethylene	µg/l	1,300	1,500	1,400	140	10
trichloroethylene	µg/l	910	1,000	960	64	6.7

FOR RECRA ENVIRONEMTNAL LABORATORIES Richard J Kapinski

DATE 11/29/83

I.D. #83-1128

ANALYTICAL RESULTS

E. I. DU PONT DE NEMOURS & COMPANY, INC.
GAS CHROMATOGRAPHY
QUALITY CONTROL

Report Date: 11/29/83

REPLICATE PESTICIDE/PCB ANALYSIS OF
SAMPLE BEDDING (10/25/83)

COMPOUND IDENTIFICATION	UNITS OF MEASURE	VALUE 1	VALUE 2	MEAN	STANDARD DEVIATION	PERCENT COEFFICIENT OF VARIATION
PCB-1242	µg/g dry	1.1	1.9	1.5	0.57	38
PCB-1254	µg/g dry	0.64	0.70	0.67	0.042	6.3

REPLICATE PESTICIDE/PCB ANALYSIS OF
SAMPLE LOC #2 BEDDING (11/9/83)

COMPOUND IDENTIFICATION	UNITS OF MEASURE	VALUE 1	VALUE 2	MEAN	STANDARD DEVIATION	PERCENT COEFFICIENT OF VARIATION
α-BHC	µg/g dry	0.42	0.60	0.51	0.13	25
β-BHC	µg/g dry	0.88	0.85	0.87	0.021	2.5
δ-BHC	µg/g dry	<0.1	<0.1	<0.1	-	-
γ-BHC	µg/g dry	0.24	0.34	0.29	0.071	24

FOR RECRA ENVIRONMENTAL LABORATORIES Deborah J. Travis

DATE 11/29/83

RECRA ENVIRONMENTAL LABORATORIES

I.D. #83-1128

ANALYTICAL RESULTS

E. I. DU PONT DE NEMOURS & COMPANY, INC.
GAS CHROMATOGRAPHY
QUALITY CONTROL

Report Date: 11/29/83

PESTICIDE RECOVERY ANALYSIS OF
SAMPLE LOC #13 BEDDING

COMPOUND IDENTIFICATION	ng OF SPIKE	ng RECOVERED	% RECOVERY
γ-BHC	0.22	0.23	105

PESTICIDE RECOVERY ANALYSIS OF
METHOD BLANK

COMPOUND IDENTIFICATION	ng OF SPIKE	ng RECOVERED	% RECOVERY
γ-BHC	0.22	0.27	120

PESTICIDE RECOVERY ANALYSIS OF
METHOD BLANK

COMPOUND IDENTIFICATION	ng OF SPIKE	ng RECOVERED	% RECOVERY
γ-BHC	0.22	0.26	120

FOR RECRA ENVIRONMENTAL LABORATORIES Deborah J. Francis

DATE 11/29/83

ANALYTICAL RESULTS

E. I. DU PONT DE NEMOURS & COMPANY, INC.
QUALITY CONTROL

Report Date: 11/29/83

PARAMETER	SAMPLE I.D.	UNITS OF MEASURE	VALUE 1	VALUE 2	MEAN	STANDARD DEVIATION	PERCENT COEFFICIENT OF VARIATION
Total Copper	LOC #2 Bedding	µg/g dry	61.3	65.5	63.4	3.0	4.7
Total Cyanide	LOC #12 Bedding	µg/g dry	5.97	5.85	5.91	0.085	1.4
Total Recoverable Phenolics	LOC #10 Bedding	µg/g dry	0.134	0.201	0.167	0.047	28
	LOC #12 Underlying Soil	µg/g dry	0.763	0.676	0.719	0.062	8.6

FOR RECRA ENVIRONMENTAL LABORATORIES R. V. Finn

DATE 11/29/83

RECRA ENVIRONMENTAL LABORATORIES
I.D. #83-1128

ANALYTICAL RESULTS

E. I. DU PONT DE NEMOURS & COMPANY, INC.
QUALITY CONTROL

Report Date: 11/29/83

RECOVERY ANALYSIS

PARAMETER	SAMPLE IDENTIFICATION	µg OF SPIKE	µg RECOVERED	% RECOVERY
Total Copper	LOC #2 Bedding	2,500	2,525	101
Total Cyanide	LOC #2 Bedding	10	8.9	89
	LOC #12 Underlying Soil	10	6.4	64

FOR RECRA ENVIRONMENTAL LABORATORIES Q. V. Fusco

DATE 11/29/83

RECRA RESEARCH, INC.

CHAIN OF CUSTODY RECORD

PROJECT#: WCC 83C2236-5 PROJECT NAME: DUPONT MAN MADE PASSAGEWAYS

STUDY AREA: _____ SAMPLERS SIGNATURE: Richard M Card

STATION#		DATE	TIME	SUBSAMPLE CODES	TOTAL #OF SAMPLES	REMARKS
Loc #10		10-25-83		#297	2 VOA's	bedding
#10		10-25-83		#298	1-Pt bottle	bedding
#10		10-25-83		#299	2-VOAs	U.L. Soil
#10		10-25-82		#300	1-Pt bottle	U.L. Soil

Relinquished By:	Date/Time:	Received By:	Comments:
Richard M Card	10/26/83 12:20	R Stevens	
Relinquished By:	Date/Time	Received By:	Comments:
Rich Stevens	10/26/83 1500	J Frost	
Method of Shipment	Shipped By:	Received By:	Comments:

Recieved for Laboratory: J. Frost

Job #: 83-1128

Date/Time: 10/27/83

Authorization for Disposal: _____

Type of Disposal: _____

Date of Disposal: _____

RECRA RESEARCH, INC.

CHAIN OF CUSTODY RECORD

PROJECT#: WCC 83C2236-5 PROJECT NAME: DuPont

STUDY AREA: Man Made Passageways SAMPLERS SIGNATURE: Richard M Cook

STATION#		DATE	TIME	SUBSAMPLE CODES	TOTAL #OF SAMPLES	REMARKS
Loc #11		10-26-83		7301	1-UOA	Bedding
#11				7302	1-UOA	bedding
#11				7303	1-Pt bottle	bedding
#11				7304	1-UOA	Underlying Soil
#11				7305	1-UOA	Underlying Soil
Loc #11		10-26-83		7306	1-Pt bottle	Underlying Soil

Relinquished By:	Date/Time:	Received By:	Comments:
Richard M Cook	10-28-83 10⁴⁵	J Daniff	
Relinquished By:	Date/Time	Received By:	Comments:
Jon Daniff	10/28/83 12:30 PM	S. Frost	
Method of Shipment	Shipped By:	Received By:	Comments:

Recieved for Laboratory: S. Frost

Job #: 83-1128A

Date/Time: 10/28/83

Authorization for Disposal: _____

Type of Disposal: _____

Date of Disposal: _____

RECRA RESEARCH, INC.

CHAIN OF CUSTODY RECORD

PROJECT#: WCC 83C2230-5 PROJECT NAME: DuPont

STUDY AREA: MAN MADE PASSAGEWAYS SAMPLERS SIGNATURE: Richard M Cook

STATION#		DATE	TIME	SUBSAMPLE CODES	TOTAL #OF SAMPLES	REMARKS
Loc #12		10-27-83		7312	1-VOA	Bedding
12				7311	1-VOA	1
12				7310	1-Pt bottle	Bedding
12				7309	1-VOA	Underlying Soil
12				7308	1-VOA	1
Loc #12		10-27-83		7307	1-Pt bottle	Underlying Soil

Relinquished By:	Date/Time:	Received By:	Comments:
Richard M Cook	10-27-83 1045	J Paroff	
Relinquished By:	Date/Time	Received By:	Comments:
Jon Paroff	10/28/83 12:30	S. Frost	
Method of Shipment	Shipped By:	Received By:	Comments:

Recieved for Laboratory: S. Frost

Job #: 83-1028A

Date/Time: 10/28/83

Authorization for Disposal: _____

Type of Disposal: _____

Date of Disposal: _____

RECRA RESEARCH, INC.

CHAIN OF CUSTODY RECORD

PROJECT#: WCC 83C2236-5 PROJECT NAME: DuPont

STUDY AREA: Man Made Passageway SAMPLERS SIGNATURE: Richard M Coad

STATION#		DATE	TIME	SUBSAMPLE CODES	TOTAL #OF SAMPLES	REMARKS
Loc #13		10-28-83		7313	1-VOA	bedding
		10-28-83		7314	1-VOA	bedding
Loc #13		10-28-83		7315	1-8-jar	Bedding

Relinquished By:	Date/Time:	Received By:	Comments:
Richard M Coad	10-28-83 10:45 AM	J Paeff	
Relinquished By: J Paeff	Date/Time 10/28/83 12:30 PM	Received By: S. Frost	Comments:
Method of Shipment	Shipped By:	Received By:	Comments:

Recieved for Laboratory: S Frost

Job #: 83-1128A

Date/Time: 10/28/83

Authorization for Disposal:

Type of Disposal:

Date of Disposal:

RECRA RESEARCH, INC.

CHAIN OF CUSTODY RECORD

PROJECT#: WA 83C.2236.5 PROJECT NAME: DuPont

STUDY AREA: Main Middle Passageway SAMPLERS SIGNATURE: Richard M Coad

STATION#		DATE	TIME	SUBSAMPLE CODES	TOTAL #OF SAMPLES	REMARKS
Loc #2		11-9-83	15 ??	# 7316	1-VOA	Bedding Material
1		11-9-83	1	7317	1-VOA	Bedding Material
Loc #2		11-9-83	1	7318	1-pt bottle	Bedding Material

Relinquished By:	Date/Time:	Received By:	Comments:
Richard M Coad	12:45 PM 11-10-83	Albert E. Pribble	
Relinquished By: Albert E. Pribble	Date/Time 1:45 PM 11/10/83	Received By: S. J. Frost	Comments:
Method of Shipment	Shipped By:	Received By:	Comments:

Recieved for Laboratory: S. J. Frost

Job #: 83-1128 R3

Date/Time: 11/10/83

Authorization for Disposal: _____

Type of Disposal: _____

Date of Disposal: _____

RECRA ENVIRONMENTAL LABORATORIES

Division of Recra Research, Inc.

December 29, 1983

Mr. Timothy Van Domelen
E. I. Du Pont de Nemours & Co., Inc.
P.O. Box 787
Niagara Falls, NY 14302

Re: Analytical Results

Dear Mr. Van Domelen:

Please find enclosed results of the analyses of the samples received at our laboratories in November and December 1983.

If you have any questions concerning these data, do not hesitate to contact the undersigned.

Sincerely,

RECRA ENVIRONMENTAL LABORATORIES

James A. Ploscyca
Laboratory Manager

BJK/JAP/df
Enclosure
cc: Mr. Robert Pedley

I.D. #83-1128 C-H

4248 Ridge Lea Road, Amherst, New York 14226

Telephone Sales (716) 838-6200
Laboratory (716) 692-7620

RECRA ENVIRONMENTAL LABORATORIES

Division of Recra Research, Inc.

ANALYTICAL

REPORT

4248 Ridge Lea Road, Amherst, New York 14226

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RECRA ENVIRONMENTAL LABORATORIES

Division of Recra Research, Inc.

ANALYTICAL RESULTS

E. I. DU PONT DE NEMOURS & COMPANY, INC.

Prepared For:

E. I. du Pont de Nemours & Co., Inc.
P.O. Box 787
Niagara Falls, NY 14302

Prepared By:

Recra Environmental Laboratories
4248 Ridge Lea Road
Amherst, NY 14226

Report Date: December 29, 1983

ANALYTICAL RESULTS

E. I. DU PONT DE NEMOURS & COMPANY, INC.

Report Date: 12/29/83

INTRODUCTION:

In November and December 1983, samples were received at Recra Environmental Laboratories. A request was made by E. I. du Pont de Nemours & Company, Inc. to have the samples analyzed for nine specific Volatile compounds, PCB's and BHC isomers, total copper, total recoverable phenolics, and total cyanide.

This report will address the results of those analyses.

METHODS:

Priority pollutant analyses were conducted according to Environmental Protection Agency (EPA) methodologies where applicable.

The nine specific Volatile compounds were analyzed by Gas Chromatography/ Mass Spectrometry (GC/MS). PCB's and BHC Isomers were analyzed by Gas Chromatography.

RESULTS AND DISCUSSION:

Results of the analyses are corrected for moisture content and reported on a dry weight basis.

Detection limits for the nine Volatile compounds are a function of the amount of sample used for analysis and the samples' dry weight.

Confirmatory analyses for the PCB and BHC isomers were not performed.

The low Volatile internal standard recovery for the LOC #5 Underlying Soil sample is believed to be sample related. The sample was analyzed in duplicate with similar low internal standard recoveries obtained from both analyses.

RESULTS AND DISCUSSION: (cont'd.)

Analyses for BHC isomers and PCB's are based upon the matching of retention times, between samples and standards, on a single gas chromatographic column.

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

Compounds reported as ND are "not detected". Compounds reported as BMDL are confirmed as being present in the sample at a level "below method detection limit" and are not subject to reliable quantitation.

Respectfully Submitted,

RECRA ENVIRONMENTAL LABORATORIES

Barbara J. Krajewski
GC/MS Analyst

BJK/df

ANALYTICAL RESULTS

E. I. DU PONT DE NEMOURS & COMPANY, INC.
GAS CHROMATOGRAPHY/MASS SPECTROMETRY
SPECIFIC VOLATILE ANALYSES

Report Date: 12/29/83

COMPOUND	METHOD DETECTION LIMIT (µg/kg dry)	SAMPLE IDENTIFICATION	
		LOC #1 BEDDING MATERIAL	LOC #6 BEDDING MATERIAL
benzene	2.8	ND	ND
chlorobenzene	3.8	ND	BMDL
chloroform	1.0	130 µg/kg dry	ND
trans-1,2-dichloroethylene	1.0	110 µg/kg dry	14 µg/kg dry
methylene chloride	1.8	100 µg/kg dry	ND
1,1,2,2-tetrachloroethane	4.4	ND	10 µg/kg dry
tetrachloroethylene	2.6	34 µg/kg dry	5.8 µg/kg dry
trichloroethylene	1.3	50 µg/kg dry	15 µg/kg dry
vinyl chloride	6.3	42 µg/kg dry	BMDL

ADDITIONAL SAMPLE INFORMATION

Sample Date	11/16/83	11/18/83
Analysis Date	12/13/83	12/10/83
Internal Standard - Level	20 µg/kg	20 µg/kg
bromochloromethane - Recovery	90%	95%
Internal Standard - Level	20 µg/kg	20 µg/kg
2-bromo-1-chloropropane - Recovery	86%	94%
Internal Standard - Level	20 µg/kg	20 µg/kg
1,4-dichlorobutane - Recovery	70%	85%

FOR RECRA ENVIRONMENTAL LABORATORIES Barbara J Krajewski

DATE 12/29/83

ANALYTICAL RESULTS

E. I. DU PONT DE NEMOURS & COMPANY, INC.
GAS CHROMATOGRAPHY/MASS SPECTROMETRY
SPECIFIC VOLATILE ANALYSES

Report Date: 12/29/83

COMPOUND	METHOD DETECTION LIMIT (µg/kg dry)	SAMPLE IDENTIFICATION LOC #5 BEDDING MATERIAL
benzene	5.9	ND
chlorobenzene	7.9	ND
chloroform	2.0	9.8 µg/kg dry
trans-1,2-dichloroethylene	2.0	1,200 µg/kg dry
methylene chloride	3.6	4.5 µg/kg dry
1,1,2,2-tetrachloroethane	8.8	ND
tetrachloroethylene	5.2	98 µg/kg dry
trichloroethylene	2.6	570 µg/kg dry
vinyl chloride	13	18 µg/kg dry

ADDITIONAL SAMPLE INFORMATION

Sample Date	11/28/83
Analysis Date	12/13/83
Internal Standard - Level	20 µg/kg
bromochloromethane - Recovery	110%
Internal Standard - Level	20 µg/kg
2-bromo-1-chloropropane - Recovery	110%
Internal Standard - Level	20 µg/kg
1,4-dichlorobutane - Recovery	130%

FOR RECRA ENVIRONMENTAL LABORATORIES Barbara J. Krupinski

DATE 12/29/83

ANALYTICAL RESULTS

E. I. DU PONT DE NEMOURS & COMPANY, INC.
GAS CHROMATOGRAPHY/MASS SPECTROMETRY
SPECIFIC VOLATILE ANALYSES

Report Date: 12/29/83

COMPOUND	METHOD DETECTION LIMIT (µg/kg dry)	SAMPLE IDENTIFICATION	
		LOC #5 UNDERLYING SOIL	LOC #7 BEDDING MATERIAL
benzene	2.8	ND	ND
chlorobenzene	3.8	ND	ND
chloroform	1.0	ND	ND
trans-1,2-dichloroethylene	1.0	250 µg/kg dry	400 µg/kg dry
methylene chloride	1.8	ND	ND
1,1,2,2-tetrachloroethane	4.4	ND	BMDL
tetrachloroethylene	2.6	BMDL	ND
trichloroethylene	1.3	30 µg/kg dry	10 µg/kg dry
vinyl chloride	6.3	100 µg/kg dry	74 µg/kg dry

ADDITIONAL SAMPLE INFORMATION

Sample Date	11/28/83	11/23/83
Analysis Date	12/10/83	12/10/83
Internal Standard - Level	20 µg/kg	20 µg/kg
bromochloromethane - Recovery	80%	96%
Internal Standard - Level	20 µg/kg	20 µg/kg
2-bromo-1-chloropropane - Recovery	72%	78%
Internal Standard - Level	20 µg/kg	20 µg/kg
1,4-dichlorobutane - Recovery	55%	76%

FOR RECRA ENVIRONMENTAL LABORATORIES Barbara J Krajewski

DATE 12/29/83

RECRA ENVIRONMENTAL LABORATORIES
I.D. #83-1128 C-H

ANALYTICAL RESULTS

E. I. DU PONT DE NEMOURS & COMPANY, INC.
GAS CHROMATOGRAPHY/MASS SPECTROMETRY
SPECIFIC VOLATILE ANALYSES

Report Date: 12/29/83

COMPOUND	METHOD DETECTION LIMIT (µg/kg dry)	SAMPLE IDENTIFICATION	
		LOC #7 UNDERLYING SOIL	LOC #9 BEDDING MATERIAL
benzene	2.8	ND	ND
chlorobenzene	3.8	ND	ND
chloroform	1.0	ND	ND
trans-1,2-dichloroethylene	1.0	41 µg/kg dry	ND
methylene chloride	1.8	ND	ND
1,1,2,2-tetrachloroethane	4.4	BMDL	BMDL
tetrachloroethylene	2.6	BMDL	6.9 µg/kg dry
trichloroethylene	1.3	180 µg/kg dry	57 µg/kg dry
vinyl chloride	6.3	ND	ND

ADDITIONAL SAMPLE INFORMATION

Sample Date	11/23/83	11/22/83
Analysis Date	12/10/83	12/10/83
Internal Standard - Level	20 µg/kg	20 µg/kg
bromochloromethane - Recovery	75%	96%
Internal Standard - Level	20 µg/kg	20 µg/kg
2-bromo-1-chloropropane - Recovery	100%	83%
Internal Standard - Level	20 µg/kg	20 µg/kg
1,4-dichlorobutane - Recovery	100%	90%

FOR RECRA ENVIRONMENTAL LABORATORIES Barbara J Kapustka

DATE 12/29/83

RECRA ENVIRONMENTAL LABORATORIES
I.D. #83-1128 C-H

ANALYTICAL RESULTS

E. I. DU PONT DE NEMOURS & COMPANY, INC.
GAS CHROMATOGRAPHY/MASS SPECTROMETRY
SPECIFIC VOLATILE ANALYSES

Report Date: 12/29/83

COMPOUND	METHOD DETECTION LIMIT (µg/kg dry)	SAMPLE IDENTIFICATION	
		LOC #8 BEDDING MATERIAL	LOC #3 BEDDING MATERIAL
benzene	2.8	ND	ND
chlorobenzene	3.8	5.6 µg/kg dry	ND
chloroform	1.0	ND	6.7 µg/kg dry
trans-1,2-dichloroethylene	1.0	ND	ND
methylene chloride	1.8	65 µg/kg dry	4.0 µg/kg dry
1,1,2,2-tetrachloroethane	4.4	ND	BMDL
tetrachloroethylene	2.6	ND	50 µg/kg dry
trichloroethylene	1.3	20 µg/kg dry	49 µg/kg dry
vinyl chloride	6.3	ND	ND

ADDITIONAL SAMPLE INFORMATION

Sample Date	11/30/83	12/5/83
Analysis Date	12/13/83	12/13/83
Internal Standard - Level	20 µg/kg	20 µg/kg
bromochloromethane - Recovery	100%	100%
Internal Standard - Level	20 µg/kg	20 µg/kg
2-bromo-1-chloropropane - Recovery	80%	86%
Internal Standard - Level	20 µg/kg	20 µg/kg
1,4-dichlorobutane - Recovery	*	100%

*The recovery of 1,4-dichlorobutane could not be determined due to the presence of interfering peaks that were not of interest.

FOR RECRA ENVIRONMENTAL LABORATORIES Barbara J Kagenda

DATE 12/29/83

ANALYTICAL RESULTS

E. I. DU PONT DE NEMOURS & COMPANY, INC.
GAS CHROMATOGRAPHY/MASS SPECTROMETRY
SPECIFIC VOLATILE ANALYSES

Report Date: 12/29/83

COMPOUND	METHOD DETECTION LIMIT (µg/kg dry)	SAMPLE IDENTIFICATION LOC #4 BEDDING MATERIAL
benzene	2.8	ND
chlorobenzene	3.8	BMDL
chloroform	1.0	1,200 µg/kg dry
trans-1,2-dichloroethylene	1.0	99 µg/kg dry
methylene chloride	1.8	170 µg/kg dry
1,1,2,2-tetrachloroethane	4.4	32 µg/kg dry
tetrachloroethylene	2.6	1,900 µg/kg dry
trichloroethylene	1.3	1,600 µg/kg dry
vinyl chloride	6.3	ND

ADDITIONAL SAMPLE INFORMATION

Sample Date	12/8/83
Analysis Date	12/13/83
Internal Standard - Level	20 µg/kg
bromochloromethane - Recovery	98%
Internal Standard - Level	20 µg/kg
2-bromo-1-chloropropane - Recovery	80%
Internal Standard - Level	20 µg/kg
1,4-dichlorobutane - Recovery	95%

FOR RECRA ENVIRONMENTAL LABORATORIES Barbara J. Krajewski

DATE 12/29/83

ANALYTICAL RESULTS

E. I. DU PONT DE NEMOURS & COMPANY, INC.

Report Date: 12/29/83

PARAMETER	UNITS OF MEASURE	SAMPLE IDENTIFICATION (DATE)	
		LOC #5 BEDDING MATERIAL (11/28/83)	LOC #5 UNDERLYING SOIL (11/28/83)
α-BHC	µg/g dry	<0.05	<0.01
β-BHC	µg/g dry	<0.05	<0.01
δ-BHC	µg/g dry	<0.05	<0.01
γ-BHC	µg/g dry	<0.05	<0.01
PCB-1016	µg/g dry	<0.2	<0.1
PCB-1221	µg/g dry	<0.4	<0.2
PCB-1232	µg/g dry	<0.4	<0.2
PCB-1242	µg/g dry	<0.2	<0.1
PCB-1248	µg/g dry	<0.2	<0.1
PCB-1254	µg/g dry	<0.2	<0.1
PCB-1260	µg/g dry	<0.2	<0.1
Total Copper	µg/g dry	97	23
Total Cyanide	µg/g dry	39	13
Total Recoverable Phenolics	µg/g dry	6.0	2.1
Dry Weight	%	37	68

FOR RECRA ENVIRONMENTAL LABORATORIES R. V. Zinn

DATE 12/29/83

RECRA ENVIRONMENTAL LABORATORIES
I.D. #83-1128 C-H

ANALYTICAL RESULTS

E. I. DU PONT DE NEMOURS & COMPANY, INC.

Report Date: 12/29/83

PARAMETER	UNITS OF MEASURE	SAMPLE IDENTIFICATION (DATE)	
		LOC #1 BEDDING MATERIAL (11/16/83)	LOC #6 BEDDING MATERIAL (11/18/83)
α-BHC	µg/g dry	<0.02	<0.05
β-BHC	µg/g dry	<0.02	<0.05
δ-BHC	µg/g dry	<0.02	<0.05
γ-BHC	µg/g dry	<0.02	<0.05
PCB-1016	µg/g dry	<0.2	<1
PCB-1221	µg/g dry	<0.2	<2
PCB-1232	µg/g dry	<0.2	<2
PCB-1242	µg/g dry	<0.2	<1
PCB-1248	µg/g dry	<0.2	0.43
PCB-1254	µg/g dry	<0.2	<0.5
PCB-1260	µg/g dry	<0.2	0.53
Total Copper	µg/g dry	7.7	19
Total Cyanide	µg/g dry	<0.5	<0.5
Total Recoverable Phenolics	µg/g dry	0.35	<0.4
Dry Weight	%	82	79

FOR RECRA ENVIRONMENTAL LABORATORIES R. V. Zinn

DATE 12/29/83

RECRA ENVIRONMENTAL LABORATORIES
I.D. #83-1128 C-H

ANALYTICAL RESULTS

E. I. DU PONT DE NEMOURS & COMPANY, INC.

Report Date: 12/29/83

PARAMETER	UNITS OF MEASURE	SAMPLE IDENTIFICATION (DATE)	
		LOC #7 BEDDING MATERIAL (11/23/83)	LOC #7 UNDERLYING SOIL (11/23/83)
α-BHC	µg/g dry	<0.05	<0.01
β-BHC	µg/g dry	<0.05	<0.01
δ-BHC	µg/g dry	<0.05	<0.01
γ-BHC	µg/g dry	<0.05	<0.01
PCB-1016	µg/g dry	<0.1	<0.2
PCB-1221	µg/g dry	<0.2	<0.4
PCB-1232	µg/g dry	<0.2	<0.4
PCB-1242	µg/g dry	<0.1	<0.2
PCB-1248	µg/g dry	<0.1	<0.2
PCB-1254	µg/g dry	<0.1	<0.2
PCB-1260	µg/g dry	<0.1	<0.2
Total Copper	µg/g dry	37	13
Total Cyanide	µg/g dry	2.3	<0.5
Total Recoverable Phenolics	µg/g dry	11	15
Dry Weight	%	92	95

FOR RECRA ENVIRONMENTAL LABORATORIES R. V. Zinn

DATE 12/29/83

ANALYTICAL RESULTS

E. I. DU PONT DE NEMOURS & COMPANY, INC.

Report Date: 12/29/83

PARAMETER	UNITS OF MEASURE	SAMPLE IDENTIFICATION (DATE)	
		LOC #9 BEDDING MATERIAL (11/22/83)	LOC #8 BEDDING MATERIAL (11/30/83)
α-BHC	µg/g dry	<0.05	<0.03
β-BHC	µg/g dry	<0.05	<0.03
δ-BHC	µg/g dry	<0.05	<0.03
γ-BHC	µg/g dry	<0.05	<0.03
PCB-1016	µg/g dry	<0.1	<0.1
PCB-1221	µg/g dry	<0.2	<0.2
PCB-1232	µg/g dry	<0.2	<0.2
PCB-1242	µg/g dry	<0.1	<0.1
PCB-1248	µg/g dry	<0.1	<0.1
PCB-1254	µg/g dry	<0.1	<0.1
PCB-1260	µg/g dry	<0.1	<0.1
Total Copper	µg/g dry	22	12
Total Cyanide	µg/g dry	190	6.3
Total Recoverable Phenolics	µg/g dry	<0.4	2.9
Dry Weight	%	100	76

FOR RECRA ENVIRONMENTAL LABORATORIES Q. V. Zinn

DATE 12/29/83

RECRA ENVIRONMENTAL LABORATORIES

I.D. #83-1128 C-H

ANALYTICAL RESULTS

E. I. DU PONT DE NEMOURS & COMPANY, INC.

Report Date: 12/29/83

PARAMETER	UNITS OF MEASURE	SAMPLE IDENTIFICATION (DATE)	
		LOC #3 BEDDING MATERIAL (12/5/83)	LOC #4 BEDDING MATERIAL (12/8/83)
α-BHC	µg/g dry	<0.03	16.5
β-BHC	µg/g dry	<0.03	0.16
δ-BHC	µg/g dry	<0.03	<0.3
γ-BHC	µg/g dry	<0.03	<0.2
PCB-1016	µg/g dry	<0.1	<2
PCB-1221	µg/g dry	<0.2	<4
PCB-1232	µg/g dry	<0.2	<4
PCB-1242	µg/g dry	<0.1	<2
PCB-1248	µg/g dry	<0.1	<2
PCB-1254	µg/g dry	<0.1	<1
PCB-1260	µg/g dry	<0.1	<1
Total Copper	µg/g dry	20	43
Total Cyanide	µg/g dry	<0.5	19
Total Recoverable Phenolics	µg/g dry	42	<0.4
Dry Weight	%	82	75

FOR RECRA ENVIRONMENTAL LABORATORIES R. N. Zinn

DATE 12/29/83

ANALYTICAL RESULTS

E. I. DU PONT DE NEMOURS & COMPANY, INC.
GAS CHROMATOGRAPHY/MASS SPECTROMETRY
SPECIFIC VOLATILE ANALYSES
QUALITY CONTROL

Report Date: 12/29/83

REPLICATE VOLATILE ANALYSIS OF
SAMPLE LOC #1 BEDDING MATERIAL

COMPOUND IDENTIFICATION	UNITS OF MEASURE	VALUE 1	VALUE 2	MEAN	STANDARD DEVIATION	PERCENT COEFFICIENT OF VARIATION
chloroform	µg/kg dry	100	160	130	42	32
trans-1,2-dichloroethylene	µg/kg dry	88	140	110	37	34
methylene chloride	µg/kg dry	140	70	100	49	49
tetrachloroethylene	µg/kg dry	33	36	34	2.1	6.2
trichloroethylene	µg/kg dry	31	68	50	26	52
vinyl chloride	µg/kg dry	39	45	42	4.2	10

FOR RECRA ENVIRONMENTAL LABORATORIES Barbara J Krajewski

DATE 12/29/83

ANALYTICAL RESULTS

E. I. DU PONT DE NEMOURS & COMPANY, INC.
GAS CHROMATOGRAPHY/MASS SPECTROMETRY
SPECIFIC VOLATILE ANALYSES
QUALITY CONTROL

Report Date: 12/29/83

REPLICATE VOLATILE ANALYSIS OF
SAMPLE LOC #7 BEDDING MATERIAL

COMPOUND IDENTIFICATION	UNITS OF MEASURE	VALUE 1	VALUE 2	MEAN	STANDARD DEVIATION	PERCENT COEFFICIENT OF VARIATION
trans-1,2-dichloroethylene	µg/kg dry	460	340	400	85	21
1,1,2,2-tetrachloroethane	µg/kg dry	BMDL	BMDL	BMDL	-	-
trichloroethylene	µg/kg dry	11	10	10	0.71	7.1
vinyl chloride	µg/kg dry	100	48	74	37	50

FOR RECRA ENVIRONMENTAL LABORATORIES Barbara J Krajewski

DATE 12/29/83

ANALYTICAL RESULTS

E. I. DU PONT DE NEMOURS & COMPANY, INC.
GAS CHROMATOGRAPHY
QUALITY CONTROL

Report Date: 12/29/83

REPLICATE PESTICIDE/PCB ANALYSIS OF
SAMPLE BEDDING MATERIAL LOC #4

COMPOUND IDENTIFICATION	UNITS OF MEASURE	VALUE 1	VALUE 2	MEAN	STANDARD DEVIATION	PERCENT COEFFICIENT OF VARIATION
α-BHC	µg/g dry	17.45	15.6	16.5	1.308	7.9
β-BHC	µg/g dry	0.10	0.21	0.155	0.078	50.0
δ-BHC	µg/g dry	<0.3	<0.3	<0.3	-	-
γ-BHC	µg/g dry	<0.2	<0.2	<0.2	-	-

FOR RECRA ENVIRONMENTAL LABORATORIES Frederick Bozek

DATE 12/29/83

ANALYTICAL RESULTS

E. I. DU PONT DE NEMOURS & COMPANY, INC.
GAS CHROMATOGRAPHY
QUALITY CONTROL

Report Date: 12/29/83

PCB RECOVERY ANALYSIS OF
SAMPLE LOC #5 UNDERLYING SOIL

COMPOUND IDENTIFICATION	ng OF SPIKE	ng RECOVERED	% RECOVERY
PCB-1221	1.0	1.20	120
PCB-1242	1.0	1.20	120
PCB-1254	1.0	1.16	120

PCB RECOVERY ANALYSIS OF
METHOD BLANK

COMPOUND IDENTIFICATION	ng OF SPIKE	ng RECOVERED	% RECOVERY
PCB-1221	1.0	1.05	105
PCB-1242	1.0	1.05	105
PCB-1254	1.0	0.92	90

FOR RECRA ENVIRONMENTAL LABORATORIES Frederick Bozek

DATE 12/29/83

ANALYTICAL RESULTS

E. I. DU PONT DE NEMOURS & COMPANY, INC.
QUALITY CONTROL

Report Date: 12/29/83

REPLICATE ANALYSES

PARAMETER	SAMPLE IDENTIFICATION	UNITS OF MEASURE	VALUE 1	VALUE 2	MEAN	STANDARD DEVIATION	PERCENT COEFFICIENT OF VARIATION
Total Copper	LOC #9 Bedding Material	µg/g dry	24.2	20.7	22.45	2.47	11
Total Cyanide	LOC #8 Bedding Material	µg/g dry	5.26	7.50	6.38	1.58	25
Total Recoverable Phenolics	LOC #8 Bedding Material	µg/g dry	2.88	2.97	2.93	0.06	2.2
	LOC #4 Bedding Material	µg/g dry	<0.4	<0.4	<0.4	-	-

FOR RECRA ENVIRONMENTAL LABORATORIES R. V. Fmm

DATE 12/29/83

RECRA ENVIRONMENTAL LABORATORIES

I.D. #83-1128 C-H

ANALYTICAL RESULTS

E. I. DU PONT DE NEMOURS & COMPANY, INC.
QUALITY CONTROL

Report Date: 12/29/83

RECOVERY ANALYSES

PARAMETER	SAMPLE IDENTIFICATION	µg OF SPIKE	µg RECOVERED	% RECOVERY
Total Copper	LOC #3 Bedding Material	750	817	109
	LOC #6 Bedding Material	3,000	2,910	97
Total Cyanide	LOC #8 Bedding Material	10	9.9	99
Total Recoverable Phenolics	LOC #5 Underlying Soil	10	10.7	107

FOR RECRA ENVIRONMENTAL LABORATORIES R. V. Finn

DATE 12/29/83

RECRA RESEARCH, INC.

CHAIN OF CUSTODY RECORD

PROJECT#: WCC 83C-2236-5 PROJECT NAME: E. DuPont

STUDY AREA: Mare Made Pits Agency SAMPLERS SIGNATURE: Richard M Coad

STATION#		DATE	TIME	SUBSAMPLE CODES	TOTAL #OF SAMPLES	REMARKS
Loc #1		11-16-83		7319	1-VOA	Bedding Material
1		1		7320	1-VOA	1
Loc #1		11-16-83		7321	1-Pt bottle	Bedding Material

Relinquished By:	Date/Time	Received By:	Comments:
Richard M Coad	1:48 PM 11/17/83	Jeffrey A Barnes	
Relinquished By:	Date/Time 11/17/83 2:30 pm	Received By: S. J. Frost	Comments:
Method of Shipment	Shipped By:	Received By:	Comments:

Recieved for Laboratory: S. J. Frost

Job #: 83-1128C

Date/Time: 11/17/83

Authorization for Disposal: _____

Type of Disposal: _____

Date of Disposal: _____

RECRA RESEARCH, INC.
CHAIN OF CUSTODY RECORD

PROJECT#: WICC 83C2236-5 PROJECT NAME: DuPont

STUDY AREA: Manmade Passageways SAMPLERS SIGNATURE: Richard M Cord

STATION#		DATE	TIME	SUBSAMPLE CODES	TOTAL #OF SAMPLES	REMARKS
Loc #6		11/18/83	—	7322	1-VOA	Bedding Material
1		11/18/83	—	7323	1-VOA	Bedding Material
Loc #6		11/18/83	—	7324	1-pt b=m-	Bedding Material

Relinquished By:	Date/Time:	Received By:	Comments:
Richard M Cord	11/22/83 10:50	Keith Severns	
Relinquished By: Keith Severns	Date/Time 11/22/83 11:16 AM	Received By: S. Frost	Comments:
Method of Shipment	Shipped By:	Received By:	Comments:

Recieved for Laboratory: S. Frost

Job #: 83-11280

Date/Time: 11/22/83

Authorization for Disposal: _____

Type of Disposal: _____

Date of Disposal: _____

RECRA RESEARCH, INC.

CHAIN OF CUSTODY RECORD

PROJECT#: WCC 83C2236-5 PROJECT NAME: DuPont

STUDY AREA: Man Made Passageways SAMPLERS SIGNATURE: Richard M Coad

STATION#		DATE	TIME	SUBSAMPLE CODES	TOTAL #OF SAMPLES	REMARKS
Loc #9		11-22-83		#7325	1-VOA	Bedding Material
1		11-22-83		7326	1-VOA	Bedding Material
Loc #9		11-22-83		7327	1-pt bottle	Bedding material
Samples Refrigerated until	11-28-83 pms					

Relinquished By:	Date/Time:	Received By:	Comments:
Richard M Coad	2:45 11/23	Keith T. Severino	
Relinquished By: Keith T. Severino	Date/Time 3:17 PM 11/28	Received By: S. J. Frost	Comments:
Method of Shipment	Shipped By:	Received By:	Comments:

Recieved for Laboratory: S. J. Frost

Job #: 83-1128FE

Date/Time: 11/28/83

Authorization for Disposal: _____

Type of Disposal: _____

Date of Disposal: _____

RECRA RESEARCH, INC.

CHAIN OF CUSTODY RECORD

PROJECT#: WC-83C2836-5 PROJECT NAME: DuPont

STUDY AREA: Man Made Passageways SAMPLERS SIGNATURE: Richard M Coad

STATION#		DATE	TIME	SUBSAMPLE CODES	TOTAL #OF SAMPLES	REMARKS
Loc #7		11-23-83		7328	1-VOA	Bedding Material
1		11-23-83		7329	1-VOA	Bedding Material
Loc #7		11-23-83		7330	1-pt bome	Bedding Material
Loc #7		11-23-83		7331	1-VOA	Underlying Material
1		11-23-83		7332	1-VOA	Underlying Material
Loc #7		11-23-83		7333	1-pt bome	Underlying Material

Samples refrigerated until 11-28-83

Relinquished By:	Date/Time:	Received By:	Comments:
Richard M Coad	3:45 11/28	Keith Severns	
Relinquished By: Keith Severns	Date/Time 3:15 11/28	Received By: S. Frost	Comments:
Method of Shipment	Shipped By:	Received By:	Comments:

Recieved for Laboratory: S. Frost

Job #: 83-1128D

Date/Time: 11/28/83

Authorization for Disposal: _____

Type of Disposal: _____

Date of Disposal: _____

RECRA RESEARCH, INC.

CHAIN OF CUSTODY RECORD

PROJECT#: WCC - 83C2286-5 PROJECT NAME: DuPont

STUDY AREA: Main Marks Passageway SAMPLERS SIGNATURE: Richard M Cord

STATION#		DATE	TIME	SUBSAMPLE CODES	TOTAL #OF SAMPLES	REMARKS
Loc #5		11-28-83		7334	1-VOA	Bedding Material
1				7335	1-VOA	1
Loc #5				7336	1-pt bottle	Bedding Material
Loc #5				7337	1-VOA	Underlying Material
1				7338	1-VOA	1
Loc #5		11-28-83		7339	1-pt bottle	Underlying Material

Relinquished By:	Date/Time:	Received By:	Comments:
Richard M Cord	2:45 11/28	Keith Severino	
Relinquished By: Keith Severino	Date/Time 3:15 PM 11/28/83	Received By: S. J Frost	Comments:
Method of Shipment	Shipped By:	Received By:	Comments:

Recieved for Laboratory: S. J Frost

Job #: 83-1128E

Date/Time: 11/28/83

Authorization for Disposal: _____

Type of Disposal: _____

Date of Disposal: _____

RECRA RESEARCH, INC.
CHAIN OF CUSTODY RECORD

PROJECT#: WCC 83C2236-5 PROJECT NAME: Du Pont

STUDY AREA: Man Made Passageway SAMPLERS SIGNATURE: Richard M Coad

STATION#		DATE	TIME	SUBSAMPLE CODES	TOTAL #OF SAMPLES	REMARKS
Loc #9		11-30-83		7340	1-VOA	Bedding Material
1		11-30-83		7341	1-VOA	Bedding Material
Loc #9		11-30-83		7342	1-pt bome	Bedding Material

Relinquished By:	Date/Time:	Received By:	Comments:
Richard M Coad	12/1 10:00	Keith Sereno	
Relinquished By: Keith Sereno	Date/Time 12-1-83 1027 AM	Received By:	Comments:
Method of Shipment	Shipped By:	Received By:	Comments:

Recieved for Laboratory: J J Frost

Job #: 83-1128F

Date/Time: 12/1/83

Authorization for Disposal: _____

Type of Disposal: _____

Date of Disposal: _____

RECRA RESEARCH, INC.

CHAIN OF CUSTODY RECORD

PROJECT#: WCC 93C2236-5 PROJECT NAME: DuPont

STUDY AREA: Mon Mode Pasiaccway SAMPLERS SIGNATURE: Richard M Cook

STATION#		DATE	TIME	SUBSAMPLE CODES	TOTAL #OF SAMPLES	REMARKS
Loc #3		12-5-83		7343 7343	1-VOA	Bedding Material
" 1		12-5-83		7344 7344	1-VOA	Bedding Material
Loc #3		12-5-83		7345 7345	1-pt bottle	Bedding Material

Relinquished By: Richard M Cook	Date/Time: 12/6/83 1000	Received By: Dan Kotch	Comments:
Relinquished By:	Date/Time 12/6/83 400 PM	Received By: John L Hoffman	Comments:
Method of Shipment	Shipped By:	Received By:	Comments:

Recieved for Laboratory: _____

Job #: _____

Date/Time: _____

Authorization for Disposal: _____

Type of Disposal: _____

Date of Disposal: _____

RECRA RESEARCH, INC.

CHAIN OF CUSTODY RECORD

PROJECT#: WCC 83C2236-5 PROJECT NAME: DuPont

STUDY AREA: Man Made Pass Accum / SAMPLERS SIGNATURE: Richard M Cook

STATION#		DATE	TIME	SUBSAMPLE CODES	TOTAL #OF SAMPLES	REMARKS
Loc#4		12-8-83		7346	1-VOA	bedding Material
1		12-8-83		7347	1-VOA	1
Loc#4		12-8-83		7348	1-P+bottle	bedding Material
Returned		Cooler, blue Ice				
unused VOA		& pt bottles				

Relinquished By:	Date/Time:	Received By:	Comments:
Richard M Cook	12/8/83 350pm	[signature]	
Relinquished By:	Date/Time	Received By:	Comments:
Method of Shipment	Shipped By:	Received By:	Comments:

Recieved for Laboratory: Jan

Job #: 83-1128H

Date/Time: 12-9-83 900 AM

Authorization for Disposal: _____

Type of Disposal: _____

Date of Disposal: _____

RECRA ENVIRONMENTAL LABORATORIES

Division of Recra Research, Inc.

January 9, 1984

Mr. Timothy Van Domelen
E. I. du Pont de Nemours &
Company, Inc.
P.O. Box 787
Niagara Falls, NY 14302

Re: Analytical Results

Dear Mr. Van Domelen:

Please find enclosed results of the analyses of the samples received at our laboratories from December 5 - 14, 1983.

If you have any questions concerning these data, do not hesitate to contact the undersigned.

Sincerely,

RECRA ENVIRONMENTAL LABORATORIES

James A. Ploscyca
Laboratory Manager

BJK/JAP/mdc
Enclosure
cc: Mr. Robert Pedley

I.D. #83-1303
83-1307
83-1312
83-1321
83-1332
83-1332A
83-1332B

4248 Ridge Lea Road, Amherst, New York 14226

Telephone Sales (716) 838-6200
Laboratory (716) 692-7620

RECRA ENVIRONMENTAL LABORATORIES

Division of Recra Research, Inc.

ANALYTICAL

REPORT

4248 Ridge Lea Road, Amherst, New York 14226

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RECRA ENVIRONMENTAL LABORATORIES

Division of Recra Research, Inc.

ANALYTICAL RESULTS

E. I. DU PONT DE NEMOURS & COMPANY INC.

Prepared For:

E. I. Du Pont de Nemours & Company Inc.
P.O. Box 787
Niagara Falls, NY 14302

Prepared By:

Recra Environmental Laboratories
4248 Ridge Lea Road
Amherst, NY 14226

Report Date:

January 9, 1984

ANALYTICAL RESULTS

E. I. DU PONT DE NEMOURS & COMPANY, INC.

Report Date: 1/9/84

INTRODUCTION:

From December 5 through 14, 1983, samples were received at Recra Environmental Laboratories. A request was made by E. I. Du Pont de Nemours & Company, Inc. to have the samples analyzed for nine specific Volatile compounds, PCB's and BHC isomers, soluble copper and barium, and miscellaneous water quality parameters. For samples received December 7, 1983, analyses for selected fractions of the Environmental Protection Agency decreed priority pollutants and a library search of the fractions analyzed by Gas Chromatography/Mass Spectrometry for the five largest non-priority pollutant peaks, were requested.

This report will address the results of those analyses.

METHODS:

Priority pollutant analyses were conducted according to Environmental Protection Agency (EPA) methodologies where applicable.

Organic priority pollutants and the specific Volatile compounds were analyzed by Gas Chromatography/Mass Spectrometry (GC/MS). Pesticide priority pollutants were analyzed by Gas Chromatography.

RESULTS AND DISCUSSION:

Benzo(b)fluoranthene and benzo(k)fluoranthene could not be distinguished. Therefore, any positive value is reported once and should be interpreted as one and/or both compounds being present.

Detection limits for the Volatile fractions are a function of the amount of sample used in the analysis.

RESULTS AND DISCUSSION (CONT'D.):

No compounds of interest were detected in the Volatile field blank.

Computer library identification for the broad spectrum analyses was derived by a comparison of the sample peak mass spectra to those in the computer's library of mass spectra. None of the compounds listed under the broad spectrum analyses could be confirmed due to the absence of specific standards.

Computer identification was not made for peaks which already were identified as priority pollutants, a computer library match could not be made, or the level of confidence was less than 80%.

Provided with each computer identification is the Chemical Abstracts Service (CAS) Registry number.

Confirmatory analyses for the Pesticides and PCB's were not performed.

Analyses for specific Pesticides/PCB's are based upon the matching of retention times between samples and standards on a single gas chromatographic column. Gas chromatographic, metals and miscellaneous values reported as "less than" (<) indicate the working detection limit for the given sample and/or parameter.

Compounds reported as ND are "not detected". Compounds reported as BMDL are confirmed as being present in the sample at a level "below method detection limit", and are not subject to reliable quantitation.

The presence of an asterisk (*) in the data tables signifies that the particular compound is indicated as being possibly present at a level below the detection limit, meeting some but not all confirmatory criteria.

Respectfully Submitted,

RECRA ENVIRONMENTAL LABORATORIES

Barbara J. Krajewski

Barbara J. Krajewski
GC/MS Analyst

ANALYTICAL RESULTS

E. I. DU PONT DE NEMOURS & COMPANY, INC.
GAS CHROMATOGRAPHY/MASS SPECTROMETRY
PRIORITY POLLUTANT ANALYSES

Report Date: 1/9/84

ACID/PHENOLICS

COMPOUND	METHOD DECTECTION LIMIT (µg/l)	SAMPLE IDENTIFICATION	
		W-4J	W-8J
2-chlorophenol	3.3	ND	ND
2,4-dichlorophenol	2.7	ND	ND
2,4-dimethylphenol	2.7	ND	ND
4,6-dinitro-o-cresol	24	ND	ND
2,4-dinitrophenol	42	ND	ND
2-nitrophenol	3.6	ND	ND
4-nitrophenol	2.4	ND	ND
p-chloro-m-cresol	3.0	ND	ND
pentachlorophenol	3.6	ND	ND
phenol	1.5	ND	ND
2,4,6-trichlorophenol	2.7	ND	ND

ADDITIONAL SAMPLE INFORMATION

Sample Date	12/6/83	12/7/83
Extraction Date	12/10/83	12/10/83
Analysis Date	1/5/84	1/5/84
Internal Standard (IS) - Level	20 µg/l	20 µg/l
deuterated phenanthrene - Recovery	100%	95%
Surrogate Standard (SS1) - Level	160 µg/l	160 µg/l
2-fluorophenol - Recovery	57%	34%
Surrogate Standard (SS2) - Level	110 µg/l	110 µg/l
pentafluorophenol - Recovery	48%	36%

FOR RECRA ENVIRONMENTAL LABORATORIES Barbara J Kazenski

DATE 1/9/84

RECRA ENVIRONMENTAL LABORATORIES

I.D. 483-1303

ANALYTICAL RESULTS

E. I. DU PONT DE NEMOURS & COMPANY, INC.
GAS CHROMATOGRAPHY/MASS SPECTROMETRY
PRIORITY POLLUTANT ANALYSES

Report Date: 1/9/84

BASE/NEUTRALS

COMPOUND	METHOD DETECTION LIMIT (µg/l)	SAMPLE IDENTIFICATION	
		W-4J	W-8J
acenaphthene	1.9	BMDL	2.6 µg/l
acenaphthylene	3.5	3.8 µg/l	ND
anthracene	1.9	ND	ND
benzidine	44	ND	ND
benzo(a)anthracene	7.8	BMDL	ND
benzo(a)pyrene	2.5	BMDL	ND
benzo(b)fluoranthene	4.8	-	ND
benzo(g,h,i)perylene	4.1	ND	ND
benzo(k)fluoranthene	2.5	ND	ND
bis(2-chloroethoxy)methane	5.3	ND	ND
bis(2-chloroethyl)ether	5.7	ND	ND
bis(2-chloroisopropyl)ether	5.7	ND	ND
bis(2-ethylhexyl)phthalate	2.5	ND	ND
4-bromophenylphenylether	1.9	ND	ND
butylbenzylphthalate	2.5	ND	ND
2-chloronaphthalene	1.9	ND	ND
4-chlorophenylphenylether	4.2	ND	ND
chrysene	2.5	ND	ND
dibenzo(a,h)anthracene	2.5	ND	ND
1,2-dichlorobenzene	1.9	ND	ND
1,3-dichlorobenzene	1.9	ND	ND
1,4-dichlorobenzene	4.4	ND	ND
3,3'-dichlorobenzidine	16.5	ND	ND
diethylphthalate	22	ND	ND
dimethylphthalate	1.6	ND	ND
di-n-butylphthalate	2.5	ND	ND

ANALYTICAL RESULTS

E. I. DU PONT DE NEMOURS & COMPANY, INC.
GAS CHROMATOGRAPHY/MASS SPECTROMETRY
PRIORITY POLLUTANT ANALYSES

Report Date: 1/9/84

BASE/NEUTRALS

COMPOUND	METHOD DETECTION LIMIT (µg/l)	SAMPLE IDENTIFICATION W-4J	W-8J
2,6-dinitrotoluene	1.9	ND	ND
2,4-dinitrotoluene	5.7	ND	ND
di-n-octylphthalate	2.5	ND	ND
1,2-diphenylhydrazine	25	ND	ND
fluoranthene	2.2	4.7 µg/1	2.8 µg/1
fluorene	1.9	2.5 µg/1	3.2 µg/1
hexachlorobenzene	1.9	ND	ND
hexachlorobutadiene	0.9	2.1 µg/1	7.1 µg/1
hexachlorocyclopentadiene	25	ND	ND
hexachloroethane	1.6	BMDL	ND
indeno (1,2,3-cd)pyrene	3.7	ND	ND
isophorone	2.2	ND	ND
naphthalene	1.6	7.8 µg/1	34 µg/1
nitrobenzene	1.9	ND	ND
N-nitrosodimethylamine	25	ND	ND
N-nitrosodi-n-propylamine	25	ND	ND
N-nitrosodiphenylamine	1.9	ND	ND
phenanthrene	5.4	9.4 µg/1	6.0 µg/1
pyrene	1.9	6.1 µg/1	2.4 µg/1
1,2,4-trichlorobenzene	1.9	ND*	ND

ADDITIONAL SAMPLE INFORMATION

Sample Date	12/6/83	12/7/83
Extraction Date	12/10/83	12/10/83
Analysis Date	1/5/84	1/5/84
Internal Standard - Level	20 µg/1	20 µg/1
deuterated phenanthrene - Recovery	100%	95%
Surrogate Standard (SS3) - Level	130 µg/1	130 µg/1
decafluorobiphenyl - Recovery	59%	55%
Surrogate Standard (SS4) - Level	50 µg/1	50 µg/1
2-fluorobiphenyl - Recovery	74%	71%

FOR RECRA ENVIRONMENTAL LABORATORIES Barbara J Kajewski

DATE 1/9/84

RECRA ENVIRONMENTAL LABORATORIES

I.D. #83-1303

ANALYTICAL RESULTS

E. I. DU PONT DE NEMOURS & COMPANY INC.
GAS CHROMATOGRAPHY/MASS SPECTROMETRY
PRIORITY POLLUTANT ANALYSES

Report Date: 1/9/84

VOLATILES

COMPOUND	METHOD DETECTION LIMIT (µg/l)	SAMPLE IDENTIFICATION	
		W-4J	W-8J
crolein	10,000	ND	ND
acrylonitrile	10,000	ND	ND
enzene	110	ND	ND
romodichloromethane	55	ND	380 µg/l
bromoform	120	ND	ND
romomethane	50	ND	ND
carbon tetrachloride	70	ND*	ND
hlorobenzene	150	ND	ND
chloroethane	250	ND	ND
-chloroethylvinyl ether	250	ND	ND
chloroform	40	20,000 µg/l	ND
hloromethane	250	ND	ND
ibromochloromethane	78	ND	ND
1,1-dichloroethane	120	ND	ND
,2-dichloroethane	70	ND	ND
1,1-dichloroethylene	70	ND*	140 µg/l
ans-1,2-dichloroethylene	40	290 µg/l	1,500 µg/l
1,2-dichloropropane	150	ND	ND
,3-dichloropropene	125	ND	ND
ethylbenzene	180	ND	BMDL
ethylene chloride	70	1,300 µg/l	ND
1,1,2,2-tetrachloroethane	170	ND	ND
etrachloroethylene	100	4,600 µg/l	BMDL

(Continued)

ANALYTICAL RESULTS

E. I. DU PONT DE NEMOURS & COMPANY INC.
GAS CHROMATOGRAPHY/MASS SPECTROMETERY
PRIORITY POLLUTANT ANALYSES

Report Date: 1/9/84

VOLATILES

COMPOUND	METHOD DETECTION LIMIT (µg/l)	SAMPLE IDENTIFICATION W-4J	W-8J
toluene	150	ND	330 µg/l
1,1,1-trichloroethane	95	ND	ND
1,1,2-trichloroethane	125	ND	ND
trichloroethylene	48	310 µg/l	700 µg/l
vinyl chloride	250	ND*	ND

ADDITIONAL SAMPLE INFORMATION

Sample Date	12/6/83	12/7/83
Analysis Date	1/8/84	1/8/84
Internal Standard - Level	40 µg/l	40 µg/l
bromochloromethane - Recovery	78%	110%
Internal Standard - Level	40 µg/l	40 µg/l
2-bromo-1-chloropropane - Recovery	91%	100%
Internal Standard - Level	40 µg/l	40 µg/l
1,4-dichlorobutane - Recovery	100%	*

* Recovery of 1,4-dichlorobutane could not be determined due to the presence of interfering peaks that were not of interest.

FOR RECRA ENVIRONMENTAL LABORATORIES Barbara J Kazenski

DATE 1/9/84

RECRA ENVIRONMENTAL LABORATORIES
I.D. #83-1303

ANALYTICAL RESULTS

E. I. DU PONT DE NEMOURS & COMPANY, INC.
GAS CHROMATOGRAPHY/MASS SPECTROMETRY
SPECIFIC VOLATILE ANALYSES

Report Date: 1/9/84

COMPOUND	METHOD DETECTION LIMIT (µg/l)	SAMPLE IDENTIFICATION W-10	W-5D
benzene	4.4	9.9 µg/1	5.6 µg/1
chlorobenzene	6.0	ND	BMDL
chloroform	1.6	120 µg/1	ND
trans-1,2-dichloroethylene	1.6	170 µg/1	950 µg/1
methylene chloride	2.8	4,500 µg/1	5.5 µg/1
1,1,2,2-tetrachloroethane	6.9	22 µg/1	ND
tetrachloroethylene	4.1	290 µg/1	48 µg/1
trichloroethylene	1.9	1,800 µg/1	220 µg/1
vinyl chloride	10	68 µg/1	200 µg/1

ADDITIONAL SAMPLE INFORMATION

Sample Date	12/5/83	12/8/83
Analysis Date	1/5/84	1/5/84
Internal Standard - Level	40 µg/1	40 µg/1
bromochloromethane - Recovery	97%	110%
Internal Standard - Level	40 µg/1	40 µg/1
2-bromo-1-chloropropane - Recovery	100%	95%
Internal Standard - Level	40 µg/1	40 µg/1
1,4-dichlorobutane - Recovery	110%	95%

FOR RECRA ENVIRONMENTAL LABORATORIES Barbara J Krajewski

DATE 1/9/84

RECRA ENVIRONMENTAL LABORATORIES
I.D. #83-1303

ANALYTICAL RESULTS

E. I. DU PONT DE NEMOURS & COMPANY, INC.
GAS CHROMATOGRAPHY/MASS SPECTROMETRY
SPECIFIC VOLATILE ANALYSES

Report Date: 1/9/84

COMPOUND	METHOD DETECTION LIMIT (µg/1)	SAMPLE IDENTIFICATION	
		W-5CD	W-5F
benzene	110	ND	ND
chlorobenzene	150	ND	ND
chloroform	40	89 µg/1	1,800 µg/1
trans-1,2-dichloroethylene	40	440 µg/1	160 µg/1
methylene chloride	70	ND	ND
1,1,2,2-tetrachloroethane	170	ND	ND
tetrachloroethylene	100	BMDL	BMDL
trichloroethylene	48	52 µg/1	BMDL
vinyl chloride	250	BMDL	ND

ADDITIONAL SAMPLE INFORMATION

Sample Date	12/8/83	12/8/83
Analysis Date	1/5/84	1/5/84
Internal Standard - Level	40 µg/1	40 µg/1
bromochloromethane - Recovery	100%	96%
Internal Standard - Level	40 µg/1	40 µg/1
2-bromo-1-chloropropane - Recovery	110%	100%
Internal Standard - Level	40 µg/1	40 µg/1
1,4-dichlorobutane - Recovery	100%	92%

FOR RECRA ENVIRONMENTAL LABORATORIES Barbara J Kazenski

DATE 1/9/84

RECRA ENVIRONMENTAL LABORATORIES
I.D. #83-1303

ANALYTICAL RESULTS

E. I. DU PONT DE NEMOURS & COMPANY, INC.
GAS CHROMATOGRAPHY/MASS SPECTROMETRY
SPECIFIC VOLATILE ANALYSES

Report Date: 1/9/84

COMPOUND	METHOD DETECTION LIMIT (µg/l)	SAMPLE IDENTIFICATION	
		W-10F	W-14C
benzene	110	BMDL	BMDL
chlorobenzene	150	BMDL	BMDL
chloroform	40	ND	350 µg/l
trans-1,2-dichloroethylene	40	760 µg/l	500 µg/l
methylene chloride	70	ND	160 µg/l
1,1,2,2-tetrachloroethane	170	140 µg/l	ND
tetrachloroethylene	100	BMDL	4,900 µg/l
trichloroethylene	48	100 µg/l	16,000 µg/l
vinyl chloride	250	BMDL	ND

ADDITIONAL SAMPLE INFORMATION

Sample Date	12/9/83	12/9/83
Analysis Date	1/5/84	1/6/84
Internal Standard - Level	40 µg/l	40 µg/l
bromochloromethane - Recovery	98%	93%
Internal Standard - Level	40 µg/l	40 µg/l
2-bromo-1-chloropropane - Recovery	100%	90%
Internal Standard - Level	40 µg/l	40 µg/l
1,4-dichlorobutane - Recovery	92%	110%

FOR RECRA ENVIRONMENTAL LABORATORIES Barbara J Krajewski

DATE 1/9/84

RECRA ENVIRONMENTAL LABORATORIES
I.D. #83-1303

ANALYTICAL RESULTS

E. I. DU PONT DE NEMOURS & COMPANY, INC.
GAS CHROMATOGRAPHY/MASS SPECTROMETRY
SPECIFIC VOLATILE ANALYSES

Report Date: 1/9/84

COMPOUND	METHOD DETECTION LIMIT (µg/l)	SAMPLE IDENTIFICATION W-2C
benzene	110	140 µg/l
chlorobenzene	150	BMDL
chloroform	40	1,200 µg/l
trans-1,2-dichloroethylene	40	2,400 µg/l
methylene chloride	70	49,000 µg/l
1,1,2,2-tetrachloroethane	170	43,000 µg/l
tetrachloroethylene	100	76,000 µg/l
trichloroethylene	48	70,000 µg/l
vinyl chloride	250	BMDL

ADDITIONAL SAMPLE INFORMATION

Sample Date	12/12/83
Analysis Date	1/6/84
Internal Standard - Level	40 µg/l
bromochloromethane - Recovery	91%
Internal Standard - Level	40 µg/l
2-bromo-1-chloropropane - Recovery	91%
Internal Standard - Level	40 µg/l
1,4-dichlorobutane - Recovery	80%

FOR RECRA ENVIRONMENTAL LABORATORIES Barbara J Krajewski

DATE 1/9/84

RECRA ENVIRONMENTAL LABORATORIES

I.D. #83-1303

ANALYTICAL RESULTS

E. I. DU PONT DE NEMOURS & COMPANY, INC.
GAS CHROMATOGRAPHY/MASS SPECTROMETRY
SPECIFIC VOLATILE ANALYSES

Report Date: 1/9/84

COMPOUND	METHOD DETECTION LIMIT (µg/l)	SAMPLE IDENTIFICATION W-11	W-12	W-13
benzene	4.4	ND	ND	ND
chlorobenzene	6.0	ND	ND	ND
chloroform	1.6	ND	48 µg/l	14 µg/l
trans-1,2-dichloroethylene	1.6	140 µg/l	57 µg/l	240 µg/l
methylene chloride	2.8	ND	ND	ND
1,1,2,2-tetrachloroethane	6.9	7.9 µg/l	34 µg/l	11 µg/l
tetrachloroethylene	4.1	7.7 µg/l	14 µg/l	12 µg/l
trichloroethylene	1.9	120 µg/l	86 µg/l	400 µg/l
vinyl chloride	10	ND	ND	12 µg/l

ADDITIONAL SAMPLE INFORMATION

Sample Date	12/12/83	12/12/83	12/12/83
Analysis Date	1/6/84	1/6/84	1/6/84
Internal Standard - Level	40 µg/l	40 µg/l	40 µg/l
bromochloromethane - Recovery	100%	110%	120%
Internal Standard - Level	40 µg/l	40 µg/l	40 µg/l
2-bromo-1-chloropropane - Recovery	100%	100%	120%
Internal Standard - Level	40 µg/l	40 µg/l	40 µg/l
1,4-dichlorobutane - Recovery	110%	100%	110%

FOR RECRA ENVIRONMENTAL LABORATORIES Barbara J Krajewski

DATE 1/9/84

ANALYTICAL RESULTS

E. I. DU PONT DE NEMOURS & COMPANY, INC.
GAS CHROMATOGRAPHY/MASS SPECTROMETRY
SPECIFIC VOLATILE ANALYSES

Report Date: 1/9/84

COMPOUND	METHOD DETECTION LIMIT (µg/l)	SAMPLE IDENTIFICATION W-1
benzene	110	ND
chlorobenzene	150	ND
chloroform	40	240,000 µg/l
trans-1,2-dichloroethylene	40	990 µg/l
methylene chloride	70	17,000 µg/l
1,1,2,2-tetrachloroethane	170	380 µg/l
tetrachloroethylene	100	6,200 µg/l
trichloroethylene	48	12,000 µg/l
vinyl chloride	250	BMDL

ADDITIONAL SAMPLE INFORMATION

Sample Date	12/13/83
Analysis Date	1/6/84
Internal Standard - Level	40 µg/l
bromochloromethane - Recovery	97%
Internal Standard - Level	40 µg/l
2-bromo-1-chloropropane - Recovery	100%
Internal Standard - Level	40 µg/l
1,4-dichlorobutane - Recovery	110%

FOR RECRA ENVIRONMENTAL LABORATORIES Barbara J Krajewski

DATE 1/9/84

RECRA ENVIRONMENTAL LABORATORIES
I.D. #83-1303

ANALYTICAL RESULTS

E. I. DU PONT DE NEMOURS & COMPANY, INC.
GAS CHROMATOGRAPHY/MASS SPECTROMETRY
SPECIFIC VOLATILE ANALYSES

Report Date: 1/9/84

COMPOUND	METHOD DETECTION LIMIT (µg/l)	SAMPLE IDENTIFICATION	
		W-6	W-7
benzene	4.4	ND	ND
chlorobenzene	6.0	ND	ND
chloroform	1.6	ND	ND
trans-1,2-dichloroethylene	1.6	ND	56 µg/l
methylene chloride	2.8	ND	ND
1,1,2,2-tetrachloroethane	6.9	BMDL	BMDL
tetrachloroethylene	4.1	13 µg/l	BMDL
trichloroethylene	1.9	10 µg/l	72 µg/l
vinyl chloride	10	ND	18 µg/l

ADDITIONAL SAMPLE INFORMATION

Sample Date	12/13/83	12/13/83
Analysis Date	1/7/84	1/7/84
Internal Standard - Level	40 µg/l	40 µg/l
bromochloromethane - Recovery	95%	96%
Internal Standard - Level	40 µg/l	40 µg/l
2-bromo-1-chloropropane - Recovery	110%	98%
Internal Standard - Level	40 µg/l	40 µg/l
1,4-dichlorobutane - Recovery	110%	94%

FOR RECRA ENVIRONMENTAL LABORATORIES Barbara J Krajewski

DATE 1/9/84

RECRA ENVIRONMENTAL LABORATORIES
I.D. #83-1303

ANALYTICAL RESULTS

E. I. DU PONT DE NEMOURS & COMPANY, INC.
GAS CHROMATOGRAPHY/MASS SPECTROMETRY
SPECIFIC VOLATILE ANALYSES

Report Date: 1/9/84

COMPOUND	METHOD DETECTION LIMIT (µg/l)	SAMPLE IDENTIFICATION W-8	W-9
benzene	4.4	ND	BMDL
chlorobenzene	6.0	BMDL	ND
chloroform	1.6	ND	ND
trans-1,2-dichloroethylene	1.6	ND	79 µg/l
methylene chloride	2.8	ND	ND
1,1,2,2-tetrachloroethane	6.9	ND	7.7 µg/l
tetrachloroethylene	4.1	ND	5.1 µg/l
trichloroethylene	1.9	8.4 µg/l	40 µg/l
vinyl chloride	10	ND	BMDL

ADDITIONAL SAMPLE INFORMATION		
Sample Date	12/13/83	12/13/83
Analysis Date	1/7/84	1/7/84
Internal Standard - Level	40 µg/l	40 µg/l
bromochloromethane - Recovery	110%	92%
Internal Standard - Level	40 µg/l	40 µg/l
2-bromo-1-chloropropane - Recovery	120%	92%
Internal Standard - Level	40 µg/l	40 µg/l
1,4-dichlorobutane - Recovery	*	96%

*Recovery of 1,4-dichlorobutane could not be determined due to the presence of interfering compounds that were not of interest.

FOR RECRA ENVIRONMENTAL LABORATORIES Barbara J Kazenski

DATE 1/9/84

RECRA ENVIRONMENTAL LABORATORIES
I.D. #83-1303

ANALYTICAL RESULTS

E. I. DU PONT DE NEMOURS & COMPANY, INC.
GAS CHROMATOGRAPHY/MASS SPECTROMETRY
SPECIFIC VOLATILE ANALYSES

Report Date: 1/9/84

COMPOUND	METHOD DETECTION LIMIT (µg/l)	SAMPLE IDENTIFICATION W-10D
benzene	220	570 µg/l
chlorobenzene	300	BMDL
chloroform	80	140 µg/l
trans-1,2-dichloroethylene	80	3,000 µg/l
methylene chloride	140	ND
1,1,2,2-tetrachloroethane	340	15,000 µg/l
tetrachloroethylene	200	6,200 µg/l
trichloroethylene	95	15,000 µg/l
vinyl chloride	500	ND

ADDITIONAL SAMPLE INFORMATION

Sample Date	12/13/83
Analysis Date	1/7/84
Internal Standard - Level	40 µg/l
bromochloromethane - Recovery	100%
Internal Standard - Level	40 µg/l
2-bromo-1-chloropropane - Recovery	120%
Internal Standard - Level	40 µg/l
1,4-dichlorobutane - Recovery	110%

FOR RECRA ENVIRONMENTAL LABORATORIES Barbara J Kuzemski

DATE 1/9/84

RECRA ENVIRONMENTAL LABORATORIES
I.D. #83-1303

ANALYTICAL RESULTS

E. I. DU PONT DE NEMOURS & COMPANY, INC.
GAS CHROMATOGRAPHY/MASS SPECTROMETRY
SPECIFIC VOLATILE ANALYSES

Report Date: 1/9/84

COMPOUND	METHOD DETECTION LIMIT (µg/l)	SAMPLE IDENTIFICATION	
		W-2	W-5
benzene	4.4	BMDL	BMDL
chlorobenzene	6.0	ND*	ND
chloroform	1.6	18 µg/l	BMDL
trans-1,2-dichloroethylene	1.6	18 µg/l	180 µg/l
methylene chloride	2.8	ND	ND
1,1,2,2-tetrachloroethane	6.9	ND	BMDL
tetrachloroethylene	4.1	60 µg/l	6.6 µg/l
trichloroethylene	1.9	97 µg/l	160 µg/l
vinyl chloride	10	ND	BMDL

ADDITIONAL SAMPLE INFORMATION		
Sample Date	12/14/83	12/14/83
Analysis Date	1/7/84	1/7/84
Internal Standard - Level	40 µg/l	40 µg/l
bromochloromethane - Recovery	86%	100%
Internal Standard - Level	40 µg/l	40 µg/l
2-bromo-1-chloropropane - Recovery	81%	95%
Internal Standard - Level	40 µg/l	40 µg/l
1,4-dichlorobutane - Recovery	91%	96%

FOR RECRA ENVIRONMENTAL LABORATORIES Barbara J Kagendi

DATE 1/9/84

RECRA ENVIRONMENTAL LABORATORIES
I.D. #83-1303

ANALYTICAL RESULTS

E.I. DU PONT DE NEMOURS & COMPANY, INC.
GAS CHROMATOGRAPHY
PRIORITY POLLUTANT ANALYSES

Report Date: 1/9/84

PESTICIDES/PCB'S

COMPOUND	UNITS OF MEASURE	SAMPLE IDENTIFICATION (DATE)	
		W-4J (12/6/83)	W-8J (12/7/83)
Aldrin	µg/l	<0.1	<0.1
α-BHC	µg/l	<0.1	<0.1
β-BHC	µg/l	<0.1	<0.1
δ-BHC	µg/l	<0.1	<0.1
γ-BHC	µg/l	<0.1	<0.1
Chlordane	µg/l	<1	<1
4,4'-DDD	µg/l	<0.1	<0.1
4,4'-DDE	µg/l	<0.1	<0.1
4,4'-DDT	µg/l	<0.1	<0.1
Dieldrin	µg/l	<0.1	<0.1
α-Endosulfan	µg/l	<0.1	<0.1
β-Endosulfan	µg/l	<0.1	<0.1
Endosulfan sulfate	µg/l	<0.1	<0.1
Endrin	µg/l	<0.1	<0.1
Endrin aldehyde	µg/l	<0.1	<0.1
Heptachlor	µg/l	<0.1	<0.1
Heptachlor epoxide	µg/l	<0.1	<0.1
PCB-1016	µg/l	<1	<1
PCB-1221	µg/l	<2	<2
PCB-1232	µg/l	<2	<2
PCB-1242	µg/l	<1	<1
PCB-1248	µg/l	<1	<1
PCB-1254	µg/l	<1	<1
PCB-1260	µg/l	<1	<1
Toxaphene	µg/l	<1	<1

FOR RECRA ENVIRONMENTAL LABORATORIES Deborah J. Prairie

DATE 1/9/84

RECRA ENVIRONMENTAL LABORATORIES

I.D. #83-1303

ANALYTICAL RESULTS

E. I. DU PONT DE NEMOURS & COMPANY, INC.
GAS CHROMATOGRAPHY

Report Date: 1/9/84

PARAMETER	UNITS OF MEASURE	SAMPLE IDENTIFICATION (DATE)
		W-10 (12/5/83)
α-BHC	µg/l	0.05
β-BHC	µg/l	<0.01
δ-BHC	µg/l	0.03
γ-BHC	µg/l	0.03
PCB-1016	µg/l	<0.1
PCB-1221	µg/l	<0.2
PCB-1232	µg/l	<0.2
PCB-1242	µg/l	<0.1
PCB-1248	µg/l	<0.1
PCB-1254	µg/l	<0.1
PCB-1260	µg/l	<0.1

FOR RECRA ENVIRONMENTAL LABORATORIES Deborah J. Praus

DATE 1/9/84

RECRA ENVIRONMENTAL LABORATORIES
I.D. #83-1303.

ANALYTICAL RESULTS

E. I. DU PONT DE NEMOURS & COMPANY, INC.
GAS CHROMATOGRAPHY

Report Date: 1/9/84

PARAMETER	UNITS OF MEASURE	SAMPLE IDENTIFICATION (DATE)		
		W-5CD (12/8/83)	W-5D (12/8/83)	W-5F (12/8/83)
α-BHC	µg/l	0.06	0.21	1.1
β-BHC	µg/l	<0.01	0.48	0.08
δ-BHC	µg/l	<0.01	0.01	0.02
γ-BHC	µg/l	0.14	0.20	0.19
PCB-1016	µg/l	<0.1	<0.1	<0.1
PCB-1221	µg/l	<0.2	<0.2	<0.2
PCB-1232	µg/l	<0.2	<0.2	<0.2
PCB-1242	µg/l	<0.1	<0.1	<0.1
PCB-1248	µg/l	<0.1	<0.1	<0.1
PCB-1254	µg/l	<0.1	<0.1	<0.1
PCB-1260	µg/l	<0.1	<0.1	<0.1

FOR RECRA ENVIRONMENTAL LABORATORIES Deborah J. Pracna

DATE 1/9/84

RECRA ENVIRONMENTAL LABORATORIES

I.D. #83-1303

ANALYTICAL RESULTS

E. I. DU PONT DE NEMOURS & COMPANY, INC.
GAS CHROMATOGRAPHY

Report Date: 1/9/84

PARAMETER	UNITS OF MEASURE	SAMPLE IDENTIFICATION (DATE)	
		W-10F (12/9/83)	W-14C (12/9/83)
α-BHC	µg/l	0.41	0.29
β-BHC	µg/l	0.17	0.03
δ-BHC	µg/l	0.03	0.04
γ-BHC	µg/l	0.39	0.02
PCB-1016	µg/l	<0.1	<0.1
PCB-1221	µg/l	<0.2	<0.2
PCB-1232	µg/l	<0.2	<0.2
PCB-1242	µg/l	<0.1	<0.1
PCB-1248	µg/l	<0.1	<0.1
PCB-1254	µg/l	<0.1	<0.1
PCB-1260	µg/l	<0.1	<0.1

FOR RECRA ENVIRONMENTAL LABORATORIES Deborah J. Prarie

DATE 1/9/84

RECRA ENVIRONMENTAL LABORATORIES

I.D. #83-1303

ANALYTICAL RESULTS

E. I. DU PONT DE NEMOURS & COMPANY, INC.
GAS CHROMATOGRAPHY

Report Date: 1/9/84

PARAMETER	UNITS OF MEASURE	SAMPLE IDENTIFICATION (DATE)			
		W-2C (12/12/83)	W-11 (12/12/83)	W-12 (12/12/83)	W-13 (12/12/83)
α-BHC	µg/1	22	<0.01	<0.01	<0.01
β-BHC	µg/1	<0.01	<0.01	<0.01	<0.01
δ-BHC	µg/1	0.13	<0.01	<0.01	<0.01
γ-BHC	µg/1	0.40	<0.01	<0.01	<0.01
PCB-1016	µg/1	<0.1	<0.1	<0.1	<0.1
PCB-1221	µg/1	<0.2	<0.2	<0.2	<0.2
PCB-1232	µg/1	<0.2	<0.2	<0.2	<0.2
PCB-1242	µg/1	<0.1	<0.1	<0.1	<0.1
PCB-1248	µg/1	<0.1	<0.1	<0.1	<0.1
PCB-1254	µg/1	<0.1	<0.1	<0.1	<0.1
PCB-1260	µg/1	<0.1	<0.1	<0.1	<0.1

FOR RECRA ENVIRONMENTAL LABORATORIES Deborah J. Praus

DATE 1/9/84

RECRA ENVIRONMENTAL LABORATORIES

I.D #83-1303

ANALYTICAL RESULTS

E. I. DU PONT DE NEMOURS & COMPANY, INC.
GAS CHROMATOGRAPHY

Report Date: 1/9/84

PARAMETER	UNITS OF MEASURE	SAMPLE IDENTIFICATION (DATE)		
		W-1 (12/13/83)	W-6 (12/13/83)	W-7 (12/13/83)
α-BHC	µg/l	0.06	6.1	<0.01
β-BHC	µg/l	0.27	<0.01	<0.01
δ-BHC	µg/l	<0.01	<0.01	<0.01
γ-BHC	µg/l	0.02	1.9	<0.01
PCB-1016	µg/l	<0.1	<0.1	<0.1
PCB-1221	µg/l	<0.2	<0.2	<0.2
PCB-1232	µg/l	<0.2	<0.2	<0.2
PCB-1242	µg/l	<0.1	<0.1	<0.1
PCB-1248	µg/l	<0.1	<0.1	<0.1
PCB-1254	µg/l	<0.1	<0.1	<0.1
PCB-1260	µg/l	<0.1	<0.1	<0.1

FOR RECRA ENVIRONMENTAL LABORATORIES Deborah J. Travis

DATE 1/9/84

RECRA ENVIRONMENTAL LABORATORIES

I.D. #83-1303

ANALYTICAL RESULTS

E. I. DU PONT DE NEMOURS & COMPANY, INC.
GAS CHROMATOGRAPHY

Report Date: 1/9/84

PARAMETER	UNITS OF MEASURE	SAMPLE IDENTIFICATION (DATE)		
		W-8 (12/13/83)	W-9 (12/13/83)	W-10D (12/13/83)
α-BHC	µg/l	0.03	0.06	4.0
β-BHC	µg/l	0.10	<0.01	<0.01
δ-BHC	µg/l	<0.01	0.02	0.90
γ-BHC	µg/l	<0.01	<0.01	4.6
PCB-1016	µg/l	<0.1	<0.1	<0.1
PCB-1221	µg/l	<0.2	<0.2	<0.2
PCB-1232	µg/l	<0.2	<0.2	<0.2
PCB-1242	µg/l	<0.1	<0.1	<0.1
PCB-1248	µg/l	<0.1	<0.1	<0.1
PCB-1254	µg/l	<0.1	<0.1	<0.1
PCB-1260	µg/l	<0.1	<0.1	<0.1

FOR RECRA ENVIRONMENTAL LABORATORIES Deborah J. Travis

DATE 1/9/84

RECRA ENVIRONMENTAL LABORATORIES

I.D. #83-1303

ANALYTICAL RESULTS

E. I. DU PONT DE NEMOURS & COMPANY, INC.
GAS CHROMATOGRAPHY

Report Date: 1/9/84

PARAMETER	UNITS OF MEASURE	SAMPLE IDENTIFICATION (DATE)	
		W-2 (12/14/83)	W-5 (12/14/83)
α-BHC	µg/l	0.38	0.02
β-BHC	µg/l	0.05	0.03
δ-BHC	µg/l	<0.01	<0.01
γ-BHC	µg/l	0.17	<0.01
PCB-1016	µg/l	<0.1	<0.1
PCB-1221	µg/l	<0.2	<0.2
PCB-1232	µg/l	<0.2	<0.2
PCB-1242	µg/l	<0.1	<0.1
PCB-1248	µg/l	<0.1	<0.1
PCB-1254	µg/l	<0.1	<0.1
PCB-1260	µg/l	<0.1	<0.1

FOR RECRA ENVIRONMENTAL LABORATORIES Deborah J. Praus

DATE 1/9/84

RECRA ENVIRONMENTAL LABORATORIES

I.D. #83-1303

ANALYTICAL RESULTS

E. I. DU PONT DE NEMOURS & COMPANY, INC.

Report Date: 1/9/84

METALS

COMPOUND	UNITS OF MEASURE	SAMPLE IDENTIFICATION (DATE) W-4J (12/6/83)	W-8J (12/7/83)
Total antimony	mg/l	<0.02	<0.02
Total arsenic	mg/l	0.028	0.018
Total beryllium	mg/l	<0.005	<0.005
Total cadmium	mg/l	0.040	0.024
Total chromium	mg/l	0.148	0.030
Total copper	mg/l	0.098	0.079
Total lead	mg/l	0.044	0.060
Total mercury	mg/l	<0.001	<0.001
Total nickel	mg/l	0.330	<0.005
Total selenium	mg/l	<0.005	<0.005
Total silver	mg/l	0.017	0.012
Total thallium	mg/l	<0.01	<0.01
Total zinc	mg/l	0.750	0.177

FOR RECRA ENVIRONMENTAL LABORATORIES R. V. Zinn

DATE 1/9/84

RECRA ENVIRONMENTAL LABORATORIES
I.D. #83-1303

ANALYTICAL RESULTS

E. I. DU PONT DE NEMOURS & COMPANY, INC.

Report Date: 1/9/84

PARAMETER	UNITS OF MEASURE	SAMPLE IDENTIFICATION (DATE)		
		W-10 (12/5/83)	W-4J (12/6/83)	W-8J (12/7/83)
Total Non-Filterable Residue (103°C)	mg/1	28	600	390
Total Organic Carbon	mg/1	110	21	62
Total Recoverable Phenolics	mg/1	3.6	<0.01	0.18
Total Cyanide	mg/1	0.086	0.026	0.17
Soluble Barium	mg/1	3.530	1.2	1.3
Soluble Copper	mg/1	0.098	-	-

FOR RECRA ENVIRONMENTAL LABORATORIES Q. V. Zinn

DATE 1/9/84

RECRA ENVIRONMENTAL LABORATORIES

I.D. #83-1303

ANALYTICAL RESULTS

E. I. DU PONT DE NEMOURS & COMPANY, INC.

Report Date: 1/9/84

PARAMETER	UNITS OF MEASURE	SAMPLE IDENTIFICATION (DATE)			
		W-5CD (12/8/83)	W-5D (12/8/83)	W-5F (12/8/83)	W-14C (12/9/83)
Total Non-Filterable Residue (103°C)	mg/1	31	<2	19	350
Total Organic Carbon	mg/1	12	11	10	9.7
Total Recoverable Phenolics	mg/1	<0.01	0.025	<0.01	0.011
Total Cyanide	mg/1	0.19	0.30	<0.01	0.010
Soluble Barium	mg/1	0.22	0.37	0.15	0.41
Soluble Copper	mg/1	<0.008	0.014	<0.008	0.009

FOR RECRA ENVIRONMENTAL LABORATORIES R. V. Zinn

DATE 1/9/84

RECRA ENVIRONMENTAL LABORATORIES

I.D. #83-1303

ANALYTICAL RESULTS

E. I. DU PONT DE NEMOURS & COMPANY, INC.

Report Date: 1/9/84

PARAMETER	UNITS OF MEASURE	SAMPLE IDENTIFICATION (DATE)			
		W-10F (12/9/83)	W-2C (12/12/83)	W-11 (12/12/83)	W-12 (12/12/83)
Total Non-Filterable Residue (103°C)	mg/1	170	20	93	44
Total Organic Carbon	mg/1	8.7	3.0	1.0	<1
Total Recoverable Phenolics	mg/1	0.030	0.010	<0.01	<0.01
Total Cyanide	mg/1	<0.01	0.86	3.8	<0.01
Soluble Barium	mg/1	0.35	0.23	450	0.30
Soluble Copper	mg/1	0.012	<0.008	0.014	0.015

FOR RECRA ENVIRONMENTAL LABORATORIES R. V. Finn

DATE 1/9/84

RECRA ENVIRONMENTAL LABORATORIES

I.D. #83-1303

ANALYTICAL RESULTS

E. I. DU PONT DE NEMOURS & COMPANY, INC.

Report Date: 1/9/84

PARAMETER	UNITS OF MEASURE	SAMPLE IDENTIFICATION (DATE)			
		W-13 (12/12/83)	W-1 (12/13/83)	W-6 (12/13/83)	W-7 (12/13/83)
Total Non-Filterable Residue (103°C)	mg/1	110	16	29	66
Total Organic Carbon	mg/1	4.0	19	7.0	15
Total Recoverable Phenolics	mg/1	<0.01	15	15	0.021
Total Cyanide	mg/1	<0.01	19	<0.01	0.012
Soluble Barium	mg/1	0.27	0.31	0.31	0.23
Soluble Copper	mg/1	0.022	8.2	0.019	0.014

FOR RECRA ENVIRONMENTAL LABORATORIES R. V. Fuss

DATE 1/9/84

RECRA ENVIRONMENTAL LABORATORIES

I.D. #83-1303

ANALYTICAL RESULTS

E. I. DU PONT DE NEMOURS & COMPANY, INC.

Report Date: 1/9/84

PARAMETER	UNITS OF MEASURE	SAMPLE IDENTIFICATION (DATE)		
		W-8 (12/13/83)	W-9 (12/13/83)	W-10D (12/13/83)
Total Non-Filterable Residue (103°C)	mg/1	99	51	7.2
Total Organic Carbon	mg/1	6.0	6.5	5.3
Total Recoverable Phenolics	mg/1	<0.01	<0.01	0.019
Total Cyanide	mg/1	<0.01	1.8	0.016
Soluble Barium	mg/1	0.26	0.45	<0.05
Soluble Copper	mg/1	0.015	0.015	0.016

FOR RECRA ENVIRONMENTAL LABORATORIES R. V. Fuson

DATE 1/9/84

RECRA ENVIRONMENTAL LABORATORIES

I.D. #83-1303

ANALYTICAL RESULTS

E. I. DU PONT DE NEMOURS & COMPANY, INC.

Report Date: 1/9/84

PARAMETER	UNITS OF MEASURE	SAMPLE IDENTIFICATION (DATE)	
		W-2 (12/14/83)	W-5 (12/14/83)
Total Non-Filterable Residue (103°C)	mg/1	42	64
Total Organic Carbon	mg/1	24	5.5
Total Recoverable Phenolics	mg/1	0.018	<0.01
Total Cyanide	mg/1	0.029	0.18
Soluble Barium	mg/1	0.55	0.13
Soluble Copper	mg/1	0.067	<0.008

FOR RECRA ENVIRONMENTAL LABORATORIES R. V. Finn

DATE 1/9/84

RECRA ENVIRONMENTAL LABORATORIES

I.D. #83-1303

ANALYTICAL RESULTS

E. I. DU PONT DE NEMOURS & COMPANY, INC.
GAS CHROMATOGRAPHY/MASS SPECTROMETRY
SPECIFIC VOLATILE ANALYSES
QUALITY CONTROL

Report Date: 1/9/84

REPLICATE VOLATILE ANALYSIS OF
SAMPLE W-10F

COMPOUND IDENTIFICATION	UNITS OF MEASURE	VALUE 1	VALUE 2	MEAN	STANDARD DEVIATION	PERCENT COEFFICIENT OF VARIATION
benzene	µg/1	BMDL	BMDL	BMDL	-	-
chlorobenzene	µg/1	BMDL	BMDL	BMDL	-	-
trans-1,2-dichlorobenzene	µg/1	820	690	760	92	12
1,1,2,2-tetrachloroethane	µg/1	150	130	140	14	10
tetrachloroethylene	µg/1	BMDL	BMDL	BMDL	-	-
trichloroethylene	µg/1	100	110	100	7.1	7.1
vinyl chloride	µg/1	BMDL	BMDL	BMDL	-	-

FOR RECRA ENVIRONMENTAL LABORATORIES Barbara J Kasperski

DATE 1/9/84

ANALYTICAL RESULTS

E. I. DU PONT DE NEMOURS & COMPANY, INC.
GAS CHROMATOGRAPHY/MASS SPECTROEMETRY
SPECIFIC VOLATILE ANALYSES
QUALITY CONTROL

Report Date: 1/9/84

REPLICATE VOLATILE ANANLYSIS OF
SAMPLE W-8

COMPOUND IDENTIFICATION	UNITS OF MEASURE	VALUE 1	VALUE 2	MEAN	STANDARD DEVIATION	PERCENT COEFFICIENT OF VARIATION
chlorobenzene	µg/1	BMDL	BMDL	BMDL	-	-
trichloroethylene	µg/1	8.5	8.2	8.4	0.21	2.5

FOR RECRA ENVIRONMENTAL LABORATORIES Barbara J Kiajewski

DATE 1/9/84

RECRA ENVIRONMENTAL LABORATORIES

I.D. #83-1303

ANALYTICAL RESULTS

E. I. DU PONT DE NEMOURS & COMPANY, INC.
GAS CHROMATOGRAPHY/MASS SPECTROMETRY
PRIORITY POLLUTANT ANALYSES
QUALITY CONTROL

Report Date: 1/9/84

REPLICATE EXTRACTABLE ANALYSIS OF
SAMPLE W-8J

COMPOUND IDENTIFICATION	UNITS OF MEASURE	VALUE 1	VALUE 2	MEAN	STANDARD DEVIATION	PERCENT COEFFICIENT OF VARIATION
acenaphthene	µg/1	2.7	2.5	2.6	0.14	5.4
fluoranthene	µg/1	2.9	2.6	2.8	0.21	7.5
fluorene	µg/1	3.2	3.2	3.2	-	-
hexachlorobutadiene	µg/1	8.0	6.2	7.1	1.3	18
naphthalene	µg/1	38	30	34	5.6	16
phenanthrene	µg/1	6.3	5.7	6.0	0.42	7.0
pyrene	µg/1	2.9	1.8	2.4	0.78	32

FOR RECRA ENVIRONMENTAL LABORATORIES Barbara J Kazanski

DATE 1/9/84

RECRA ENVIRONMENTAL LABORATORIES

I.D. #83-1303

ANALYTICAL RESULTS

E. I. DU PONT DE NEMOURS & COMPANY, INC.
GAS CHROMATOGRAPHY/MASS SPECTROMETRY
PRIORITY POLLUTANT ANALYSES
QUALITY CONTROL

Report Date: 1/9/84

EXTRACTABLE RECOVERY ANALYSIS OF
METHOD BLANK

COMPOUND IDENTIFICATION	ng OF SPIKE	ng RECOVERED	% RECOVERY
2-chlorophenol	100	66	66
1,3-dichlorobenzene	100	62	62
2,4-dichlorophenol	100	79	79
di-n-octylphthalate	100	88	88
fluoranthene	100	85	85
fluorene	100	69	69
naphthalene	100	82	82
nitrobenzene	100	64	64
2,4,6-trichlorophenol	100	95	95

ADDITIONAL SAMPLE INFORMATION

Extraction Date	12/10/83
Analysis Date	1/7/84
Internal Standard (IS) - Level	20 µg/l
deuterated phenanthrene - Recovery	110%
Surrogate Standard (SS1) - Level	160 µg/l
2-fluorophenol - Recovery	63%
Surrogate Standard (SS2) - Level	110 µg/l
pentafluorophenol - Recovery	61%
Surrogate Standard (SS3) - Level	130 µg/l
decafluorobiphenyl - Recovery	55%
Surrogate Standard (SS4) - Level	50 µg/l
2-fluorobiphenyl - Recovery	82%

FOR RECRA ENVIRONMENTAL LABORATORIES Barbara J Krajewski

DATE 1/9/84

RECRA ENVIRONMENTAL LABORATORIES
I.D. #83-1303

ANALYTICAL RESULTS

E. I. DU PONT DE NEMOURS & COMPANY, INC.
GAS CHROMATOGRAPHY
QUALITY CONTROL

Report Date: 1/9/84

REPLICATE PESTICIDE/PCB ANALYSIS OF
SAMPLE W-10F

COMPOUND IDENTIFICATION	UNITS OF MEASURE	VALUE 1	VALUE 2	MEAN	STANDARD DEVIATION	PERCENT COEFFICIENT OF VARIATION
α-BHC	µg/l	0.37	0.45	0.41	0.057	14
β-BHC	µg/l	0.22	0.12	0.17	0.071	42
δ-BHC	µg/l	0.03	0.03	0.03	0	0
γ-BHC	µg/l	0.35	0.43	0.39	0.057	15

PESTICIDE RECOVERY ANALYSIS OF
METHOD BLANK

COMPOUND IDENTIFICATION	ng OF SPIKE	ng RECOVERED	% RECOVERY
γ-BHC	0.22	0.17	77

FOR RECRA ENVIRONMENTAL LABORATORIES Deborah J. Harris

DATE 1/9/84

RECRA ENVIRONMENTAL LABORATORIES
I.D. #83-1303

ANALYTICAL RESULTS

E. I. DU PONT DE NEMOURS & COMPANY, INC.
GAS CHROMATOGRAPHY

Report Date: 1/9/84

REPLICATE ANALYSIS OF
SAMPLE W-5

COMPOUND IDENTIFICATION	UNITS OF MEASURE	VALUE 1	VALUE 2	MEAN	STANDARD DEVIATION	PERCENT COEFFICIENT OF VARIATION
α-BHC	µg/l	0.02	0.02	0.02	0	0
β-BHC	µg/l	0.03	0.03	0.03	0	0

FOR RECRA ENVIRONMENTAL LABORATORIES Deborah J Travis

DATE 1/9/84

RECRA ENVIRONMENTAL LABORATORIES

I.D. #83-1303

ANALYTICAL RESULTS

E. I. DU PONT DE NEMOURS & COMPANY, INC.
GAS CHROMATOGRAPHY
PRIORITY POLLUTANT ANALYSES

Report Date: 1/9/84

PESTICIDE RECOVERY ANALYSIS OF
METHOD BLANK

COMPOUND IDENTIFICATION	ng OF SPIKE	ng RECOVERED	% RECOVERY
Aldrin	0.22	0.21	95
γ-BHC	0.22	0.17	77
4,4' DDE	0.26	0.24	92
Endrin	0.26	0.24	92
Heptachlor	0.22	0.26	120

FOR RECRA ENVIRONMENTAL LABORATORIES Deborah J Travis

DATE 1/9/84

RECRA ENVIRONMENTAL LABORATORIES

I.D. #83-1303

ANALYTICAL RESULTS

E. I. DU PONT DE NEMOURS & COMPANY, INC.
GAS CHROMATOGRAPHY
QUALITY CONTROL

Report Date: 1/9/84

RECOVERY ANALYSIS OF
METHOD BLANK

COMPOUND IDENTIFICATION	ng OF SPIKE	ng RECOVERED	% RECOVERY
γ-BHC	0.22	0.18	82

RECOVERY ANALYSIS OF
METHOD BLANK

COMPOUND IDENTIFICATION	ng OF SPIKE	ng RECOVERED	% RECOVERY
Aroclor 1242	1.0	0.89	89

FOR RECRA ENVIRONMENTAL LABORATORIES Deborah J. Travis

DATE 1/9/84

RECRA ENVIRONMENTAL LABORATORIES
I.D. #83-1303

ANALYTICAL RESULTS

E. I. DU PONT DE NEMOURS & COMPANY, INC.
QUALITY CONTROL

Report Date: 1/9/84

REPLICATE ANALYSES

PARAMETER	SAMPLE I.D.	UNITS OF MEASURE	VALUE 1	VALUE 2	MEAN	STANDARD DEVIATION	PERCENT COEFFICIENT OF VARIATION
Total Non-Filterable Residue (103°C)	W-9	mg/1	54.6	47.8	51.2	4.8	9.3
	W-2	mg/1	40.0	44.0	42	2.8	6.7
Total Organic Carbon	W-10D	mg/1	6.5	4.0	5.25	1.76	34
	W-2	mg/1	25	20	22.5	3.5	15.7
Total Recoverable Phenolics	W-8J	mg/1	0.168	0.165	0.1665	0.002	1.3
	W-5D	mg/1	0.025	0.024	0.0245	0.0007	2.9
	W-10F	mg/1	0.0308	0.0297	0.0303	0.0007	2.6
	W-13	mg/1	<0.01	<0.01	<0.01	-	-
Total Cyanide	W-11	mg/1	3.72	3.86	3.79	0.099	2.6
	W-5	mg/1	0.183	0.188	0.1855	0.0035	1.9
Soluble Barium	W-8J	mg/1	1.28	1.34	1.31	0.042	3.2
	W-14C	mg/1	0.41	0.41	0.41	-	-
Soluble Copper	W-2	mg/1	0.070	0.064	0.067	0.0042	6.3
	W-5	mg/1	<0.008	<0.008	<0.008	-	-

FOR RECRA ENVIRONMENTAL LABORATORIES D. V. Zinn

DATE 1/9/84

RECRA ENVIRONMENTAL LABORATORIES
I.D. #83-1303

ANALYTICAL RESULTS

E. I. DU PONT DE NEMOURS & COMPANY, INC.
QUALITY CONTROL

Report Date: 1/9/84

RECOVERY ANALYSES

PARAMETER	SAMPLE IDENTIFICATION	µg OF SPIKE	µg RECOVERED	% RECOVERY
Total Organic Carbon	W-10D	50	55	110
Total Recoverable Phenolics	W-8J	10	8.7	87
Total Cyanide	W-7	50	52	104
Soluble Barium	W-14C	1,000	1,080	108
Soluble Copper	W-5F	500	500	100
	W-14C	500	500	100
	W-6	500	505	101

FOR RECRA ENVIRONMENTAL LABORATORIES R. V. Finn

DATE 1/9/84

RECRA ENVIRONMENTAL LABORATORIES
I.D. #83-1303

ANALYTICAL RESULTS

E. I. DU PONT DE NEMOURS & COMPANY, INC.
GAS CHROMATOGRAPHY/MASS SPECTROMETRY
EXTRACTABLE BROAD SPECTRUM ANALYSES

Report Date: 1/9/84

SAMPLE I.D.: W-4J

SCAN #	COMPUTER LIBRARY CHOICE	CAS #
693	2,3,4-trimethyldecane	62238157
775	2,3-dimethylundecane	17312775
857	2,6,10-trimethylhexadecane	55000527
929	pentadecane	629629
987	2,3,6-trimethyldecane	62238124

FOR RECRA ENVIRONMENTAL LABORATORIES Barbara J Kazenski

DATE 1/9/84

ANALYTICAL RESULTS

E. I. DU PONT DE NEMOURS & COMPANY, INC.
GAS CHROMATOGRAPHY/MASS SPECTROMETRY
EXTRACTABLE BROAD SPECTRUM ANALYSES

Report Date: 1/9/84

SAMPLE I.D.: W-8J

SCAN #	COMPUTER LIBRARY CHOICE	CAS #
37	tetrahydrothiophene	110010
161	3-chloro-2-methyl-1-propene	563473
211	2H-1-benzopyran-2-one	91645
299	benzeneacetaldehyde	122781
608	1,1'-oxybis[4-chlorobutane]	6334969

FOR RECRA ENVIRONMENTAL LABORATORIES Barbara J Kujawski

DATE 1/9/84

RECRA ENVIRONMENTAL LABORATORIES
I.D. #83-1303

ANALYTICAL RESULTS

E. I. DU PONT DE NEMOURS & COMPANY, INC.
GAS CHROMATOGRAPHY/MASS SPECTROMETRY
VOLATILE BROAD SPECTRUM ANALYSES

Report Date: 1/9/84

SAMPLE I.D.: W-4J

SCAN #	COMPUTER LIBRARY CHOICE	CAS #
389	1-aminopyridinium chloride	28460-19-7
647	2,2-dimethylpropanoylchloride	3282-30-2
664	2,2-dimethylpropane	463-82-1

FOR RECRA ENVIRONMENTAL LABORATORIES Barbara J Kujundic

DATE 1/9/84

ANALYTICAL RESULTS

E. I. DU PONT DE NEMOURS & COMPANY, INC.
GAS CHROMATOGRAPHY/MASS SPECTROMETRY
VOLATILE BROAD SPECTRUM ANALYSES

Report Date: 1/9/84

SAMPLE I.D.: W-8J

SCAN #	COMPUTER LIBRARY CHOICE	CAS #
338	2-methylfuran	534-22-5
365	tetrahydrothiophene	110-01-0
461	(E,E)-2,4-hexadienal	4488-48-6
522	1,3-dichlorobutane	1190-22-3
589	5-methyl-1-oxide pyrimidine	17758-50-8

FOR RECRA ENVIRONMENTAL LABORATORIES Barbara J. Kiazewski

DATE 1/9/84

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