E-FILED

VOLUME 2 - APPENDIX A
FINAL APPROVED PLAN

GILL CREEK REMEDIATION PROJECT FINAL REPORT

Prepared for:
E.I. du Pont de Nemours & Company, Inc.
26th Street and Buffalo Avenue
Niagara Falls, New York 14302

and

Olin Corporation
1186 Lower River Road
Charleston, Tennessee 37310
December 1993

Woodward-Clyde Consultants
3571 Niagara Falls Boulevard
North Tonawanda, New York 14120
Project Number 92C2255-6

REV 11/90

DU PONT

CHEMICALS

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MVermersch - WCC*
REAustin - Legal, D7016-1
DEEllis - Engg, L3382
JELeemann - Chem, B16271
PBButler - Chem, BOD918-4
RWPorter/DEShimp*
RJGentilucci/File 52150

*Cover letter only

April 28, 1992

Mr. Yavuz Erk, Environmental Engineer II
NYS Dept. of Environmental Conservation
270 Michigan Avenue
Buffalo, NY 14203-2999

Dear Mr. Erk:

Du Pont and Olin respectfully submit eight copies of "Gill Creek Remediation, Construction Plans and Specifications." Per the Order on Consent, we are presenting this package for NYSDEC review and approval. In order to meet the construction schedule which is planned to begin in mid-June, we request a rapid review.

We have previously submitted the "Final Design Concepts Report" (February 1992) and the addendum to that report (March 1992). The design plans now being submitted reflect the following changes:

- Water treatment: An air stripper unit followed by GAC replaces the existing steam stripper as the primary treatment option. Carbonate scaling has prevented the existing steam stripper from demonstrating the required capacity for Gill Creek remediation water treatment. We are continuing our efforts to find a solution that will allow us to utilize the steam stripper. Contingency treatment options are the existing steam stripper and GAC. Water pretreatment plans include utilizing two modutanks to provide surge capacity for any treatment system outages. Water quality estimates have been refined. (Sections 5 and 6)

- Diversion structures: Diversions 3, 3A (if constructed), and 4 will remain in place until sediment removal is complete. The rockfill cofferdam design includes a breach to mitigate flood impact if necessary. (Sections 2 and 3)

- Management of Upstream Watershed: In the "Final Design Concepts Report" we presented preliminary information about Continuous Daily Event Analysis. The completed analysis is presented in this submittal as well as discussion of flood mitigation and floodplain development permitting requirements. (Section 4)

Attached are summarized responses to NYSDEC comments and references to sections of the design plans providing detailed discussions. Separate submissions detailing the Health and Safety Plan and the post-remediation monitoring plan are being developed.

If you have any questions, please contact Leslie Warner at (716) 278-5452 or Jim Brown at (615) 336-4308.

Du Pont Chemicals

Leslie A. Warner /klf

Leslie A. Warner, Senior Engineer
Engineering and Environmental Affairs

Olin Chemicals

James C. Brown /klf

James C. Brown, Manager
Environmental Technology

LAW/JCB:klf
Enc.
18591

cc: NYSDEC - Division of Hazardous Waste Remediation (Buffalo)
NYSDEC - Division of Environmental Enforcement (Buffalo)*
NYSDEC - Division of Hazardous Waste Remediation (Albany)*
NYSDOH - Bureau of Environmental Exposure Investigation (Albany)*

* Two copies per order on consent

HEALTH AND SAFETY ISSUES

Comments 1, 2, and 3, Air Monitoring:

The specifications for the site-specific project Health and Safety Plan are being developed. These specifications will respond to NYSDEC comments on the air monitoring and response plan to be used for this project.

Comment 3, Contingency Plan:

We are concerned that VOC monitoring on the Robert Moses Parkway bridge will be more indicative of automobile emissions than potential emissions from the remediation activities.

Comment 4, Minimizing Emissions:

As discussed in Sections 7.2.2 and 7.4.2 of the design package, we plan to cover exposed contaminated sediment surfaces in Areas 1 and 3 with suitable materials, such as clay-based granular materials or plastic sheeting, to minimize volatile and contaminated sediment particulate emissions. For example, following creek water removal prior to mechanical excavation and during non-work hours, the creek bed floor in Areas 1 and 3 will be covered as necessary with clay-based granular materials which will suppress potential volatile emissions and odors and not create a dusting problem. Additionally, contaminated sediment piles in these two areas will be covered as necessary with such materials or plastic sheeting during non-work hours.

RCRA ISSUES

Comment 1, Sediment Storage and Drain Water:

Excavated sediments will be handled in piles on the creek bed floor and on the sediment staging area contiguous to the creek, serving as part of Area 1 (same area of contamination per Superfund LDR Guidance).

Accumulation or storage of contaminated sediments will be in containers described in Section 8.1.1.

Water draining from the sediments will be collected at collection points in the creek bed as described in Sections 7.2.2 and 7.5 for Areas 3 and 1, respectively.

Comment 2, Secondary Containment and Leak Detection:

As discussed in the Tanks and Piping subsection at the end of Section 6, tanks, piping, and ancillary equipment in the remediation water treatment system are exempt from Part 373 secondary containment and leak detection requirements pursuant to the 6NYCRR 373-1.1(d)(1)(xii) wastewater treatment unit exemption. This subsection of the design package goes on to describe the protective aspects of the design of these tank systems.

Comment 3, Pretreatment System Pipeline:

As discussed in the Tanks and Piping subsection at the end of Section 6, piping in the remediation water treatment system is exempt from Part 373 secondary containment and leak detection requirements pursuant to the 6NYCRR 373-1.1(d)(1)(xii) wastewater treatment unit exemption.

Comment 4, Decon, Containment, Separation of Liquids:

DECON AREA

As described in Section 8.2, routine decontamination will be performed with brooms, brushes, and other dry removal methods and thereby will not generate wastewater. Wastewater generated from nonroutine steam cleaning or water washing for decontamination during the project and for demobilization at the end of the project will be performed in curbed areas from which the resulting wastewater will be collected and treated.

CONTAINMENT FOR TRUCKS

Tank trucks, trailers, and other trucks holding hazardous waste containers are portable devices in which material is stored and transported and hence meet the Part 370.2(b) definition of container. Such trucks will be managed in accordance with the applicable provisions of Part 373-1.1(d)(1)(iii) and Part 373-3.9, neither of which require containment for containers.

CONTAINMENT FOR PIPELINES

As discussed in the Tanks and Piping subsection at the end of Section 6, piping for the remediation water treatment system in this project is exempt from Part 373 secondary containment and leak detection requirements pursuant to the 6NYCRR 373-1.1(d)(1)(xii) wastewater treatment unit exemption.

SEPARATION OF LIQUID IN TRANSIT

Wastes meeting the criteria for non-liquids via the Paint Filter Liquids Test at the point of generation can undergo some separation of liquid during transit due to vibration, particularly on long rail hauls. Therefore, as described in Sections 7.2.2 and 7.4.2, additives such as lime, fly ash, or kiln dust will be mixed with the sediment waste as necessary prior to shipment in order to prevent the separation of liquid from the sediment waste during transit. Similar additives will also be used for nonhazardous Area 2D sediment wastes as needed.

DAM SAFETY AND FLOOD CONTROL ISSUES

Comment 1, Temporary Encroachments:

Sections 4.5.2, 4.5.3, and 4.5.4 discuss compliance with standards of the National Flood Insurance Program. The increased depth of flooding as a result of the temporary diversion structures and cofferdam in the reach of the creek between the confluence of the Niagara River and Staub Road is predicted to be more than one foot. For this reach of stream, the increased flood height will be mitigated by placing sand bags on the creek banks to contain flood waters. The New York Power Authority (NYPA) has jurisdiction over property south of Staub Road. Du Pont and Olin have applied for a NYPA permit for the remedial activities.

The increased depth of flooding is predicted to be less than one foot in the reach of the stream between Buffalo Avenue and Hyde Park Lake dam. An estimated 950 structures lie within the existing flood plain. The increased depth of flooding resulting from the project diversion structures and cofferdam may affect an estimated additional 160 structures. The owners of potentially affected structures will be notified of the potential for flooding. Additional protection will be provided for these properties as described in comment 2 below.

Comment 2, Emergency Action Plan:

As described in Sections 4.5.3 and 4.5.4, a flood mitigation plan will be prepared prior to construction and will contain procedures to be followed for breaching the cofferdam and for minimizing sediment disturbance in the event of a major storm. Breaching activities will require human intervention; therefore, the estimated potential impacts on structures due to the increased depth of flooding as noted above are based on predicted flood depths without breaching. Breaching will reduce the potential impacts.

Comment 3, Floodplain Development Permit:

A Floodplain Development Permit will be submitted to the city of Niagara Falls in early May. City officials are aware of the project and will be informed as additional information becomes available. See Section 4.5.4.

DAM SAFETY AND FLOOD CONTROL - ADDITIONAL TECHNICAL ISSUES

Comment 1, HEC-2 Model:

The HEC-2 model with-project was started by estimating the depth of flow over the Niagara River cofferdam. The depth of flow was estimated using the weir discharge equation with a discharge coefficient of 2.8.

Comment 2, Flood Attenuation:

The flood peaks for major events will not be attenuated. Storm waters from the upper watershed will be released from the Hyde Park Lake dam at a rate such that the inflow capacity into the Buffalo Avenue Diversion sewer is not exceeded. The release rate will be controlled so that water remains within the existing channel.

Comment 3, Dam Safety:

By applying the DEC "Guidelines for Design of Dams," it is our conclusion that the existing Hyde Park Lake dam does not meet the stability requirements of current DEC dam safety regulations. Alternatives for using the dam and lake are being evaluated and will be discussed with DEC Dam Safety Division in Albany and with city officials. Mitigation measures will be implemented to maintain the safety of the dam.

Comment 4, Streambank Restoration:

The cross-sectional area in the remediation reach will be restored to approximately that of the existing area.

Comment 5, Bridges:

Issues related to bridges crossing Gill Creek are outside the scope of this project but can be addressed separately.

Comment 6, Mitigation:

Refer to Sections 4.5.3 and 4.5.4 and the responses to Comments 1 and 2 (Dam Safety and Flood Control) above.

Comment 7, Minimize Damages:

Other than Du Pont and Olin structures, there are no privately owned structures south of Diversion Structure 1 that could be affected by failure of the upstream diversion structure. The bridges at Buffalo Avenue and the Robert Moses Parkway are public structures. Since the diversion structure upstream of Buffalo Avenue is only three feet in height, no damage to the bridges is anticipated should this structure fail.

Should the cofferdam fail while the creek is dewatered, it is anticipated that no structural damage would result either upstream or downstream. Should the cofferdam fail during a flood event, there should be no downstream damage to structures since there will likely be insignificant, if any, effect on flood heights in the Niagara River. In the unlikely event of a diversion structure failure, affected property will be restored.

WATER DISCHARGES TO THE NIAGARA RIVER

Comment 1, Turbidity Values:

As described in Section 5.1, a new baseline turbidity value for Gill Creek water will be established prior to creek pumpdown by averaging the results of grab samples taken from near the mid-depth at four sampling locations evenly spread along the length of the creek still covered with water. We believe that establishing a baseline turbidity value just prior to remediation and after the creek waters are contained is as protective if not more protective than establishing baseline turbidity values now under uncertain and variable creek flow conditions. As described in Section 5.2, a similar baseline procedure will be used when stormwater overtops diversion structures and flows over areas which have not been remediated. As per DEC Comment 3, no monitoring or baseline levels will be used when removing waters contained in already remediated areas.

Comment 2, Water Discharged to Treatment System:

Except for initial creek drawdown (see Section 5.1) and management of storm water which overtops dams (see Section 5.2), water collected in the creek during the remediation will be treated in the remediation water treatment system described in Section 6.

Comment 3, Diversion Structures:

All diversion structures will remain in the creek throughout remedial activities. Section 3 presents the sequences for construction and removal of diversion structures and the cofferdam. Section 5.2 discusses management of storm water which overtops dams.

Comment 4, Diversion Pipe:

The design specifications and plans include a small pipe connecting diversion Structures 2 and 4. This pipe will be used only after Areas 2D and 3 have been remediated. Other pumps and piping may also be used as required to supplement the capacity of this pipe to transfer uncontaminated overtopped stormwaters to the Niagara River. As discussed in Section 5.2, discharges of stormwaters which overtop diversion structures and which are contained in remediated areas will not be monitored.

GENERAL COMMENTS

Comment 1, Turbidity Readings:

As described in Section 5.1, creek water turbidity will be continuously monitored during the initial creek water drawdown and pump-out to the Niagara River by checking grab samples at the pump discharge for turbidity every 20 minutes.

Comment 2, Testing of Demobilized Materials:

As described in Section 8.3.4, representative samples of demobilized diversion structure and cofferdam materials will be analyzed for PCB, tetrachloroethylene, trichloroethylene, gamma-BHC, and total organic carbon (TOC) if Du Pont/Olin plans to reuse these materials to recontour the creek bed in areas where sediments have been removed or to restore the creek banks. Diversion structure and cofferdam materials will not be used for recontouring and restoration unless analyses of representative samples of the materials for these parameters indicate levels less than 0.1 ppm (100 ppb) PCB and acceptable levels for the other parameters.

Comment 3, Testing Sediment Samples:

Prior sampling and analysis is sufficient to enable sediment waste classification except that additional sampling and analysis is needed to confirm that removed Area 3 sediments are not EP toxic for gamma-BHC (lindane). As described in Section 7.2.2, a composite sample of Area 3 sediments will be collected from each railcar bin or rolloff box prior to mixing in additives such as lime, fly ash, or kiln dust potentially needed to prevent liquid separation due to vibration in transit.

As described in Sections 7.2.2 and 7.4.2, visual observations and field testing with the Paint Filter Liquids Test (PFLT) will be conducted as necessary to ensure that Area 3 and Area 1 sediments have adequately drained prior to mixing with additives such as lime, fly ash, or kiln dust, potentially needed to prevent liquid separation due to vibration in transit.

Due to past TCLP analyses leading to the classification of Area 1 and Area 3, sediment waste as Toxicity Characteristic wastes for tetrachloroethylene and trichloroethylene, TCLP testing of sediment waste does not seem necessary and is not planned.

LAW:klf
18591

REV. 11/90

DU PONT

CHEMICALS

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bcc: SWConstable - Engg, L33E3
RWPorter/DEShimp
RJ~~Gentilucci~~/File 74100
LAWarner

kw: POTW, Gill Creek, stripper
area: Env Services

April 16, 1992

Mr. Albert C. Zaepfel
Industrial Monitoring Coordinator
Department of Wastewater Facilities
1200 Buffalo Avenue
Niagara Falls, NY 14302

Dear Mr. Zaepfel:

DU PONT NIAGARA PLANT - SIU PERMIT NO. 7

The remediation of Gill Creek sediments will generate contaminated water which will require treatment. There will be several sources of remediation water:

- groundwater inflows to the creekbed
- precipitation and run-off
- water that drains from the dredged materials
- seepage through the diversion structures constructed as a part of the remediation project

These waters will be collected from the dewatered creek bed and treated in a new on-site remediation water treatment system as described in Attachment 1. The Du Pont Niagara Plant is requesting permission to send treated remediation waters to the Niagara Falls Publicly Owned Treatment Works (POTW) through Outfall 023. Attachment 2 summarizes the compounds for which a permit modification is needed for the duration of the remediation project.

Your time and assistance in expediting the review process is appreciated. I can be reached at 278-5420 should you have questions.

Sincerely,

Marit P. Crowe

Marit P. Crowe
Engineer, Engineering and
Environmental Affairs

MPC:klf
Attach.
cc: D. Leemhuis - NYSDEC
H. Mazuka - EPA
G. Shanahan - EPA
E. Strazeski - SAIC

DNI 6070995

ATTACHMENT 1

REMEDIATION WATER TREATMENT SYSTEM DESCRIPTION

As presented in the "Gill Creek Final Design Concepts Report[1]" and in the Addendum[2], remediation waters were to be treated by first removing suspended solids in a new pretreatment system and then removing organics from the clarified waters using the existing on-site steam stripper. However, the possibility of encountering remediation water flows in excess of the steam stripper's hydraulic capacity and the need to provide 100 percent utility during the project have necessitated that our remediation treatment system be designed to use alternative organics removal systems in conjunction with or in lieu of the existing steam stripper. The solids removal pretreatment and organics removal alternatives are described separately below.

Following removal of suspended solids and organics, treated remediation waters will be discharged to the plant process sewers which drain through Outfall 023 to the city POTW. A conservative estimate of the likely quality of the remediation water was developed from historic sampling data and prior studies. To determine the worst-case and average quality of effluent waters to be discharged to the POTW, the estimated flow rates and contaminant concentrations were input into a computer model which was developed to simulate the stripping capacity of the existing steam stripper. The effluent quality of the other organics removal treatment alternatives were also estimated through computer modeling and/or treatability studies. Predicted effluent qualities were modified to account for variability and then compared to existing permit limits. Those parameters which we believe need to be modified for the life of the remediation project are detailed in Attachment 2.

Suspended Solids Removal

The suspended solids removal system would be installed in the vicinity of the remediation activities. Following flow equalization, suspended solids will be removed using an inclined plate clarifier, sand filter, and chemical addition. The resulting clarified water would be sent to the steam stripper or other alternative for organics removal. Effluent suspended solids should be below 50 ppm, and generally average 5 ppm or less. Under some treatment conditions, the sand filters may be bypassed, in which case suspended solids concentrations in the discharge to the site process sewers (following organics removal) may slightly exceed 50 ppm.

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[1]Woodward-Clyde Consultants, "Gill Creek Final Design Concepts Report," February 29, 1992.

[2]Woodward-Clyde Consultants, "Addendum to Gill Creek Final Design Concepts Report," March 1992.

Existing Steam Stripper

The design capacity of the existing steam stripper is 270 gpm. It is currently being utilized in the range of 30-45 gpm. The treatment rate through the stripper is currently being limited in part due to flow restrictions caused by carbonate scaling. Du Pont is evaluating alternatives for restoring the full hydraulic capacity to the steam stripper and believes that up to 240 gpm of the stripper's design capacity may be available for treatment of the remediation waters in conjunction with recovered groundwaters. At no time would more than the design capacity flow of 270 gpm be sent to the POTW from the existing steam stripper. However, the combined flows from the existing steam stripper and one or more alternate organic removal treatment system would likely exceed 270 gpm.

Alternative Organics Removal Systems

The primary organic removal system will consist of air stripping followed by Granulated Activated Carbon (GAC) bed treatment. GAC only and the existing steam stripper may also be used in lieu of or in conjunction with the primary system or each other. Our design criteria for the effluent produced by all organic removal alternatives include compliance with the existing POTW permit limits as modified in Attachment 2.

ATTACHMENT 2

DU PONT NIAGARA PLANT - GILL CREEK REMEDIATION PROJECT
PRELIMINARY ESTIMATE OF POSSIBLE PERMIT MODIFICATION REQUIREMENTS
SIU PERMIT NO. 7

PARAMETER	EXISTING PERMIT LIMITS daily max/annual avg		PRELIMINARY ESTIMATED WORST CASE PERMIT LIMITS daily max/annual avg		INCREASE daily max/annual avg	
Chromium	2.0	0.8	2	1	+0	+0.2
Copper	ordinance-->	0.965	18	13	+18	+12.035
Lead	19.5	7.8	19.5	10	+0	+2.2
Mercury	0.90	0.36	1.5	0.6	+0.6	+0.24
Nickel	ordinance-->	0.400	6	4	+6.0	+3.6
Zinc	9.0	3.6	30	25	+21	+21.4
Trichlorobenzenes	ordinance-->	0.076	8	4	+8	+3.924
gamma-BHC	ordinance-->	0.014	0.25	0.16	+0.25	+0.146
2-chlorophenol	ordinance-->	0.038	0.2	0.1	+0.2	+0.062

Notes:

1. All values are in pounds per day.

0-2~~RJG~~/File ~~71200~~
1x LAW 52150

City of Niagara Falls, New York

KW: Gill Creek
POTW
permit modification
areas: N/A

April 24, 1992

Ms. Marit P. Crowe
E. I. DuPont de Nemours & Co. Inc.
PO Box 787
Niagara Falls NY 14302-0787

Dear Ms. Crowe:

Thank you for your letter dated April 16, 1992. Upon review of the letter the City requires additional information to complete the review to accept this addition to DuPont's existing stream stripper wastestream.

The following information is required:

1. A copy of the computer model report on the expected pollutant removal capability of the steam stripper.
2. Data in concentration and loads of <u>all</u> pollutants expected from remedial waters prior to and after pretreatment with the steam stripper unit.
3. Explanation or clarification of: Attachment No. 1, paragraph No. 2, "Predicted effluent qualities were modified to account for variability and then compared to existing permit limits."
4. Discussion of where solids will be disposed of after removal from remedial waters (prior to steam stripper). What chemicals will be used to assist in solids removal.

Please contact me at 716-286-4978 if you have any questions.

Sincerely,

DEPARTMENT OF WASTEWATER FACILITIES

Albert C Zaepfel

Albert C. Zaepfel
Industrial Monitoring Coordinator

ACZ:mjl
cc: File 7A

az147

DNI 6011399

REV 11/90

bcc - LA Warner
File

DU PONT

CHEMICALS

P.O. Box 787
Buffalo Ave. & 26th Street
Niagara Falls, NY 14302-0787
(716) 278-5100

May 5, 1992

Mr. Albert C. Zaepfel
Industrial Monitoring Coordinator
Department of Wastewater Facilities
1200 Buffalo Avenue
Niagara Falls, NY 14302

Dear Mr. Zaepfel:

DU PONT NIAGARA PLANT
SIU PERMIT NO. 7

Ref.: 1) Letter from M. Crowe to A. Zaepfel dated April 16, 1992
2) Letter from A. Zaepfel to M. Crowe dated April 24, 1992

Du Pont appreciates your timely response to our request (see Ref. No. 1) to send pretreated Gill Creek Remediation waters to the Niagara Falls Publicly Owned Treatment Works (POTW). We are responding to your requests (as per Ref. No. 2) for clarification as to how we derived our estimates of water quality before and after treatment and the derivation of the limits requested for selected parameters.

To specifically address the Department's requests:

1. The requested computer model report is included in Attachment 1: Steam Stripper Simulation Run.

2. Influent (before treatment) and Effluent (after treatment, before discharging to POTW) Pollutant Concentrations and Loadings

Influent Quality

Attachment 2 shows our best estimate of the remediation water quality prior to treatment. This estimate was prepared by our consultant, Woodward-Clyde Consultants (WCC), and considers dilution and attenuation by the various sources (groundwater inflows, stormwaters, etc., as described in Ref. No. 1) expected during remediation. We believe that Attachment 2 is representative of the maximum one day concentrations of the parameters shown.

Effluent Quality

As described previously (Ref. No. 1), remediation waters will be pretreated to remove suspended solids prior to treatment for organic removals. As described in Attachment 3, this pretreatment step will substantially reduce the concentrations of all parameters shown in Attachment 2. Nonetheless, in order to predict the stripper's performance under even conservatively high "maximum" organic loadings, Attachment 2 concentrations were used as estimates for the existing steam stripper's influent water quality. A computer model was used to estimate the stripper's effluent quality. The results of this modeling are shown in Attachment 1. The model is the same as that used to predict the steam stripper's performance for treating the recovered site groundwater which is currently discharged to the POTW through Outfall 023. Therefore we believe that the model accurately predicts effluent quality for the Gill Creek project wastewaters which will be treated in the stripper.

Attachment 4A presents a comparison of the predicted stripper effluent quality against existing site permit limits and recent Outfall 023 and 024 (as applicable) performance. Attachment 4B provides a similar prediction for effluent quality for selected inorganic parameters. This prediction is very conservative since it does not consider the very substantial removals of inorganics reasonably expected for the solids pretreatment step.

3. Clarification of previous text: "Predicted effluent qualities were modified to account for variability and then compared to existing permit limits."

   A review of Attachments 4A and B suggests that some permitted parameters may be exceeded during remediation under the current POTW permit limitations. Our desire to ensure compliance with both our existing SIU permit and the Sewer Use Ordinance led to the request for modification of the permit limitations for selected parameters as per Ref. No. 1. The modified permit limitations requested in Ref. No. 1 (see Attachment 2, Ref. No. 1) are approximately one to two times higher than that predicted in Attachments 4A and B. The fact that "predicted effluent qualities were modified (i.e. multiplied by some factor) to account for variability" (as we stated in Ref. No. 1) reflects the uncertainty of estimating influent flow quantities and qualities during remediation and our desire to be in compliance with both our existing SIU permit and the Sewer Use Ordinance even during the short period of remediation.

4. Solids Removal and Disposal Issues

   Solids removed from remedial water as a result of pretreatment prior to Air Stripping/GAC will be handled in the same fashion as sediments which are excavated from Gill Creek: solids will be disposed at an off-site landfill. Various cationic, anionic, and nonionic high molecular weight organic polymers may be used to assist settling and/or subsequent filtration of settled solids. A treatability study has been recently conducted by our consultant WCC and a filtration test was performed by our in-house consultants. Final test reports are expected shortly. We will provide you with a summary of the results and information on expected dosages and identity of polymer and filtration aid data shortly after these reports become available.

We trust that the enclosed provides sufficient information for you to evaluate our request. Your timely assistance in expediting the review process is appreciated. I can be reached at 278-5420 should you have further questions.

Sincerely,

Marit P. Crowe

Marit P. Crowe, Engineer
Engineering and Environmental Affairs

MPC:klf
Attach.
18716

cc: D. Leemhuis - NYSDEC
H. Mazuka - EPA
E. Strazeski - EPA
G. Shanahan - EPA

ATTACHMENT 1

STEAM STRIPPER SIMULATION RUN

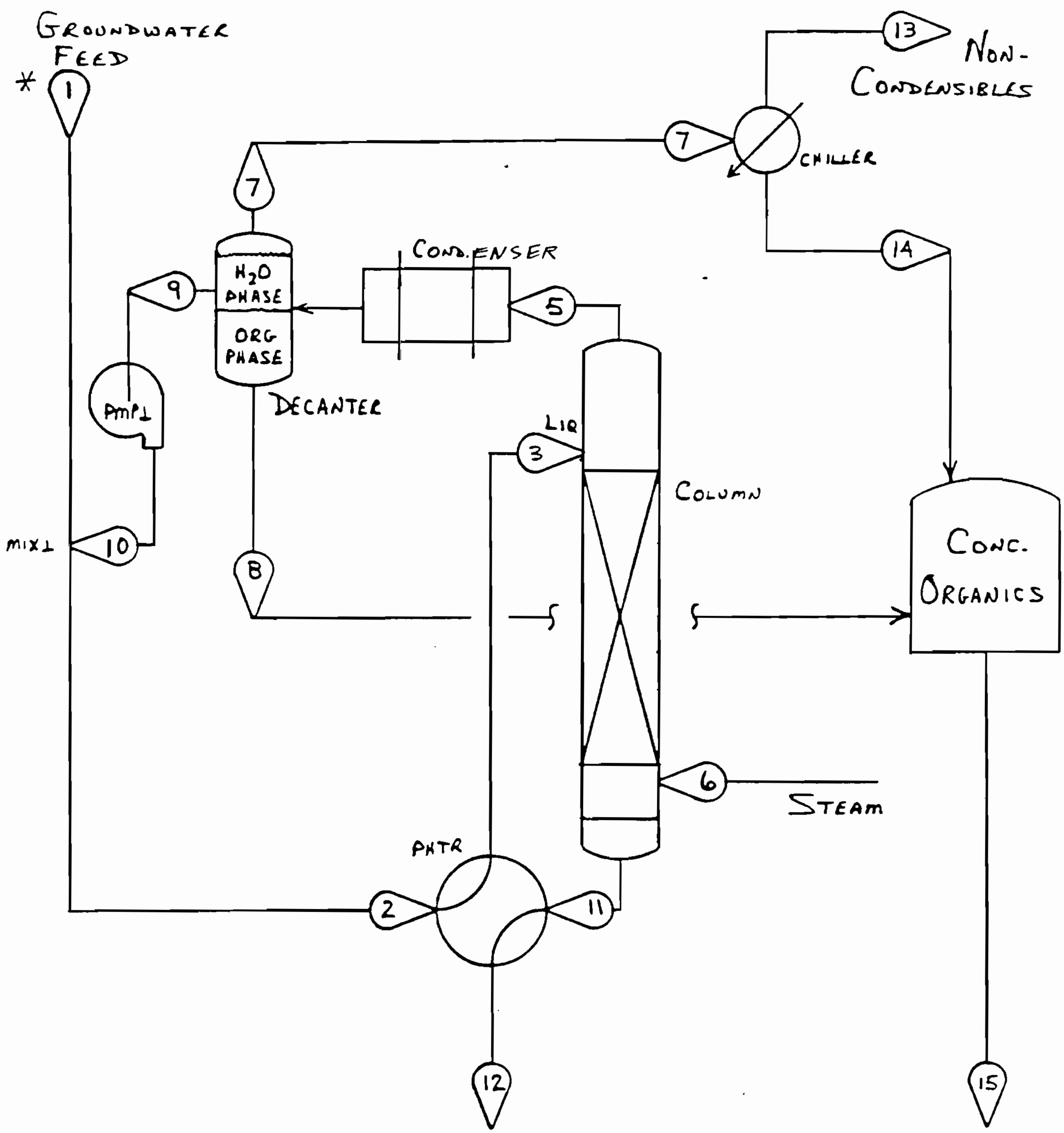
The steam stripper's ability to treat Gill Creek remediation waters was predicted using the same computer modeling program which was used to predict effluent quality from treatment of recovered site groundwaters. The computer model is available to Du Pont through a royalty arrangement with Simulation Sciences, Inc., Fullerton, California. A schematic of the stripper treatment elements is attached. This schematic was taken from the Groundwater Treatment Facility's Engineering Report, which should be on file in both the City's and EPA's records. The attached results of the computer modeling were based on an influent flow of 165 gpm remediation waters of quality as shown in Attachment 3 mixing with 30 gpm of recovered groundwater. The recovered site groundwater qualities and flow reflect that which is currently seen in the site's recovery well system. The stream numbers identified on the attached schematic are the same as those shown in the attached computer printout results. Stream No. 12 on page 47 of the computer printout identifies the weight fractions which were used to generate Column D (i.e. stripper effluent quality) in Attachment 4A of this letter.

G-46 REV 5-77 ENGINEERING (DU PONT) COMPUTATION SHEET SHEET NO

TITLE OF PROJ OR STUDY SIMSCI Program Schmatic PROJ OR STUDY NO

SUBJECT STEAM STRIPPING WORKS

COMPUTER M.E. MECKLEY DATE 19



* Stream numbers on Schematic match those in SIMSCI Run Output (pages B-1 to B-26)

TM

PROCESS VERSION 4.01 L4

TM - PROCESS IS A TRADEMARK OF SIMULATION SCIENCES INC.

VIIIA UNIT - STREAM CORRELATION MATRIX

UNIT NO	ID	====== FEED STREAM IDS ======						===== PRODUCT STREAM IDS =====		
1	FDTK	GWTR	GCRW	9	-	-	-	F01		
2	FPMP	F01	-	-	-	-	-	F01A		
3	PHTR	11	F01A	-	-	-	-	12	3V	3L
4	STRP	3L	6	-	-	-	-	11	5	
5	CDEC	3V	5	-	-	-	-	7	8	9
6	CHIL	7	22	-	-	-	-	13	14	14W

VIIIC CALCULATIONAL SEQUENCE IS DEFINED BY INPUT

VIIID RECYCLE LOOPS DETERMINED BY PROGRAM

LOOP 1 STARTS AT UNIT 1, FDTK AND ENDS AT UNIT 5, CDEC

VIIIE RECYCLE STREAMS

STREAM	FROM UNIT	TO UNIT	LOOP
9	5,CDEC	1,FDTK	1
11	4,STRP	3,PHTR	1

*** ALL INPUT DATA IN ORDER ***

```
                         FLOWSHEET CONNECTIVITY PLOTS
 +-----+
 I NN I    NN - INTERNAL UNIT NUMBER.
 ITYPEI  TYPE - ABBREVIATION FOR THE UNIT TYPE.
 I UIDI   UID - USER SUPPLIED UNIT IDENTIFIER.
 +-----+

 +-+
 IMI          - FEED STREAM MIXER.
 +-+

 +-+
 ISI          - PRODUCT STREAM PHASE SEPARATOR / PRODUCT STREAM SPLITTER.
 +-+

 D---->       - SIGNIFIES A DUPLICATE STREAM (INTERNAL STREAMS WHICH HAVE
                BEEN DEFINED AS A FEED MORE THAN ONCE IN THE FLOWSHEET).

 ----R>       - SIGNIFIES A RECYCLE STREAM.


 THE FOLLOWING UNIT TYPES ARE NOT PLOTTED.
 =========================================
  1. HCURVE       2. PGEN          3. CONTROLLER    4. MVC
  5. SET          6. CALCULATOR    7. OPTIMIZER     8. MATERIAL BALANCER
  9. USER ADDED SUBROUTINES WITHOUT FEEDS OR PRODUCTS
```

```
                                                                   22
                                                                  ----->


                                                                   7
                                                               +-------->
                                                               I
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**** PROBLEM SOLUTION REACHED ****

FEED STREAMS : GWTR GCRW 6 22

PRODUCT STREAMS : 12 8 13 14 14W

OVERALL PLANT MOLAR BALANCE

	COMPONENT	FEED + LB MOLS/HR	REACTION - LB MOLS/HR	PRODUCT = LB MOLS/HR	DEVIATION LB MOLS/HR	PERCENT
1	1122tetcleth	0.004	0.000	0.004	0.000	0.00
2	chloroform	0.004	0.000	0.004	0.000	0.00
3	methylene ch	0.003	0.000	0.003	0.000	0.00
4	trichloroeth	0.018	0.000	0.018	0.000	0.00
5	tetraclethen	0.005	0.000	0.005	0.000	0.00
6	trans12dicle	0.000	0.000	0.000	0.000	0.00
7	vinyl chlori	0.004	0.000	0.004	0.000	0.00
8	benzene	0.006	0.000	0.006	0.000	0.00
9	tetrahydroth	0.001	0.000	0.001	0.000	0.00
10	14diclorbuta	0.000	0.000	0.000	0.000	0.00
11	2-methylfura	0.000	0.000	0.000	0.000	0.00
12	chlorobenzen	0.001	0.000	0.001	0.000	0.00
13	water	5558.216	0.000	5558.216	0.000	0.00
14	N2	2.921	0.000	2.921	0.000	0.00
15	O2	0.010	0.000	0.010	0.000	0.00
16	o12dichlorob	0.000	0.000	0.000	0.000	0.00
17	m13dichlorob	0.000	0.000	0.000	0.000	0.00
18	p14dichlorob	0.000	0.000	0.000	0.000	0.00
19	124trichloro	0.000	0.000	0.000	0.000	0.00
20	hexaclbutadi	0.000	0.000	0.000	0.000	0.00
21	hexachlorobz	0.000	0.000	0.000	0.000	0.00
22	naphthalene	0.000	0.000	0.000	0.000	0.00
23	cis12dicleth	0.011	0.000	0.011	0.000	0.00
24	phenol	0.000	0.000	0.000	0.000	0.00
25	11diclethene	0.000	0.000	0.000	0.000	0.00
26	111tricletha	0.000	0.000	0.000	0.000	0.00
27	carbon tetra	0.000	0.000	0.000	0.000	0.00
28	hexaclethane	0.000	0.000	0.000	0.000	0.00
29	acetone	0.000	0.000	0.000	0.000	0.00
30	toluene	0.000	0.000	0.000	0.000	0.00
31	benzoic acid	0.000	0.000	0.000	0.000	0.00
32	Alpha-BHC	0.000	0.000	0.000	0.000	0.00
33	Beta-BHC	0.000	0.000	0.000	0.000	0.00
34	Delta-BHC	0.000	0.000	0.000	0.000	0.00
35	Gamma-BHC	0.000	0.000	0.000	0.000	0.00
36	PCB-1248+54	0.000	0.000	0.000	0.000	0.00
37	bis2ehxphtha	0.000	0.000	0.000	0.000	0.00
38	123trichloro	0.000	0.000	0.000	0.000	0.00
39	chloromethan	0.000	0.000	0.000	0.000	0.00
40	methanol	0.003	0.000	0.003	0.000	0.00
41	fluoranthene	0.000	0.000	0.000	0.000	0.00
42	phenanthrene	0.000	0.000	0.000	0.000	0.00
43	acenaphthene	0.000	0.000	0.000	0.000	0.00
44	fluorene	0.000	0.000	0.000	0.000	0.00
45	pyrene	0.000	0.000	0.000	0.000	0.00
46	2-chlorophen	0.000	0.000	0.000	0.000	0.00
	TOTAL	5561.211	0.000	5561.211	0.000	0.00

OVERALL PLANT MASS BALANCE

	COMPONENT	FEED + LBS/HR	REACTION - LBS/HR	PRODUCT = LBS/HR	DEVIATION LBS/HR	DEVIATION PERCENT
1	1122tetcleth	0.60	0.00	0.60	0.00	0.00
2	chloroform	0.50	0.00	0.50	0.00	0.00
3	methylene ch	0.26	0.00	0.26	0.00	0.00
4	trichloroeth	2.40	0.00	2.39	0.00	0.00
5	tetraclethen	0.81	0.00	0.81	0.00	0.00
6	trans12dicle	0.00	0.00	0.00	0.00	0.00
7	vinyl chlori	0.27	0.00	0.27	0.00	0.00
8	benzene	0.45	0.00	0.45	0.00	0.00
9	tetrahydroth	0.06	0.00	0.06	0.00	0.00
10	14diclorbuta	0.05	0.00	0.05	0.00	0.00
11	2-methylfura	0.00	0.00	0.00	0.00	0.00
12	chlorobenzen	0.16	0.00	0.16	0.00	0.00
13	water	100131.26	0.00	100131.26	0.00	0.00
14	N2	81.82	0.00	81.82	0.00	0.00
15	O2	0.33	0.00	0.33	0.00	0.00
16	o12dichlorob	0.05	0.00	0.05	0.00	0.00
17	m13dichlorob	0.01	0.00	0.01	0.00	0.00
18	p14dichlorob	0.03	0.00	0.03	0.00	0.00
19	124trichloro	0.07	0.00	0.07	0.00	0.00
20	hexaclbutadi	0.03	0.00	0.03	0.00	0.00
21	hexachlorobz	0.00	0.00	0.00	0.00	0.00
22	naphthalene	0.00	0.00	0.00	0.00	0.00
23	cis12dicleth	1.06	0.00	1.06	0.00	0.00
24	phenol	0.03	0.00	0.03	0.00	0.00
25	11diclethene	0.01	0.00	0.01	0.00	0.00
26	111tricletha	0.03	0.00	0.03	0.00	0.00
27	carbon tetra	0.01	0.00	0.01	0.00	0.00
28	hexaclethane	0.01	0.00	0.01	0.00	0.00
29	acetone	0.00	0.00	0.00	0.00	0.00
30	toluene	0.00	0.00	0.00	0.00	0.00
31	benzoic acid	0.00	0.00	0.00	0.00	0.00
32	Alpha-BHC	0.01	0.00	0.01	0.00	0.00
33	Beta-BHC	0.01	0.00	0.01	0.00	0.00
34	Delta-BHC	0.00	0.00	0.00	0.00	0.00
35	Gamma-BHC	0.00	0.00	0.00	0.00	0.00
36	PCB-1248+54	0.08	0.00	0.08	0.00	0.00
37	bis2ehxphtha	0.00	0.00	0.00	0.00	0.00
38	123trichloro	0.04	0.00	0.04	0.00	0.00
39	chloromethan	0.01	0.00	0.01	0.00	0.00
40	methanol	0.10	0.00	0.10	0.00	0.00
41	fluoranthene	0.00	0.00	0.00	0.00	0.00
42	phenanthrene	0.00	0.00	0.00	0.00	0.00
43	acenaphthene	0.00	0.00	0.00	0.00	0.00
44	fluorene	0.00	0.00	0.00	0.00	0.00
45	pyrene	0.00	0.00	0.00	0.00	0.00
46	2-chlorophen	0.00	0.00	0.00	0.00	0.00
	TOTAL	100220.59	0.00	100220.58	0.00	0.00

SUMMARY OF FLASH DRUMS,MIXER/SPLITTERS AND VALVES

```
UNIT ID              FDTK

     NUMBER            1
     NAME          FEED TANK
     TYPE            MIXER

FEEDS                GWTR

                     GCRW

                     9

PRODUCTS             F01   (L)

TEMP, DEG C         20.4425
PRESSURE, PSIA      14.7000
FRACTION LIQUID     1.00000
```

SUMMARY OF HEAT EXCHANGE UNITS

3 UNIT PHTR, FEED PREHTR , IS A HEAT EXCHANGER

*** OPERATING CONDITIONS

DUTY, MM PCU /HR	7.40096
LMTD, DEG C	5.367
F FACTOR (FT)	1.00000
MTD, DEG C	5.367
U*A, PCU /HR DEG C	1379062.369

*** HOT SIDE CONDITIONS	INLET	OUTLET
FEED(S)	11	
LIQUID PRODUCT		12
VAPOR, LB MOLS/HR	0.0000	0.0000
M LBS/HR	0.0000	0.0000
CP, PCU /LB - DEG C	0.0000	0.0000
LIQUID, LB MOLS/HR	5558.2186	5558.2186
M LBS/HR	100.1314	100.1314
CP, PCU /LB - DEG C	1.0072	0.9983
TOTAL, LB MOLS/HR	5558.2186	5558.2186
CONDENS(VAPORIZ)ATION, LB MOLS/HR		0.0000
TEMPERATURE, DEG C	100.042	26.148
PRESSURE, PSIA	14.723	14.723

*** COLD SIDE CONDITIONS	INLET	OUTLET
FEED(S)	F01A	
VAPOR PRODUCT		3V
LIQUID PRODUCT		3L
VAPOR, LB MOLS/HR	0.0000	0.6956
M LBS/HR	0.0000	0.0163
CP, PCU /LB - DEG C	0.0000	0.3691
LIQUID, LB MOLS/HR	5507.1540	5506.4584
M LBS/HR	99.2228	99.2065
CP, PCU /LB - DEG C	0.9987	1.0056
TOTAL, LB MOLS/HR	5507.1540	5507.1540
CONDENS(VAPORIZ)ATION, LB MOLS/HR		0.6956
TEMPERATURE, DEG C	20.443	95.000
PRESSURE, PSIA	15.010	14.010

SUMMARY OF COMPRESSOR/EXPANDER/PUMP/TURBINE UNITS

2 UNIT FPMP, FEED PUMP , IS A PUMP

FEED STREAMS ARE F01
LIQUID PRODUCT IS STREAM F01A

OPERATING CONDITIONS

WORK, HP	0.04
EFFICIENCY, PERCENT	100.00

	INLET	OUTLET
MOLE FRACTION LIQUID	1.0000	1.0000
TEMPERATURE, DEG C	20.443	20.443
PRESSURE, PSIA	14.7000	15.0100
HEAD, FT		0.7172
HOT VOLUME, FT3/HR	1593.987	1593.987

SUMMARY OF THREE PHASE FLASH CALCULATION

UNIT ID	CDEC	
NUMBER	5	
NAME	CONDNSR+DEC	
FLASH TYPE	ISOTHERMAL	
FEEDS	3V	5
PRODUCTS	7	(V)
	8	(L)
	9	(W)
TEMP, DEG C	15.0000	
PRESSURE, PSIA	14.7000	
FRACTION LIQUID	0.99933	
L1/TOTAL LIQUID	0.00053	
DUTY, MM PCU /HR	-1.07202	

SUMMARY OF THREE PHASE FLASH CALCULATION
(UNIT 5 - CONTINUED)

COMPONENT MOLE FRACTIONS AND STREAM FLOWRATES

COMPONENT	F E E D S	V A P O R	LIQUID L	LIQUID W
1 1122tetclethan	0.000061	0.000290	0.070489	0.000024
2 chloroform	0.000128	0.011315	0.068660	0.000084
3 methylene chlo	0.000153	0.015127	0.040121	0.000122
4 trichloroethen	0.000243	0.020238	0.333904	0.000052
5 tetraclethene	0.000053	0.001389	0.094378	0.000002
6 trans12diclene	0.000001	0.000159	0.000591	0.000001
7 vinyl chloride	0.000088	0.051934	0.018074	0.000043
8 benzene	0.000102	0.008072	0.103895	0.000041
9 tetrahydrothio	0.000039	0.000191	0.014267	0.000031
10 14diclorbutane	0.000006	0.000045	0.007816	0.000001
12 chlorobenzene	0.000017	0.000236	0.028036	0.000002
13 water	0.998178	0.016817	0.005638	0.999369
14 N2	0.000470	0.682314	0.000010	0.000009
15 O2	0.000112	0.158910	0.000005	0.000005
16 o12dichlorobz	0.000003	0.000006	0.006191	0.000000
17 m13dichlorobz	0.000001	0.000003	0.001878	0.000000
18 p14dichlorobz	0.000002	0.000005	0.004310	0.000000
19 124trichlorobz	0.000003	0.000001	0.004757	0.000001
20 hexaclbutadien	0.000001	0.000003	0.002300	0.000000
21 hexachlorobz	0.000000	0.000000	0.000114	0.000000
22 naphthalene	0.000000	0.000000	0.000049	0.000000
23 cis12diclethen	0.000318	0.030245	0.176790	0.000204
24 phenol	0.000000	0.000000	0.000003	0.000000
25 11diclethene	0.000002	0.000805	0.001495	0.000001
26 111triclethane	0.000003	0.000368	0.003569	0.000001
27 carbon tetracl	0.000001	0.000129	0.001355	0.000000
28 hexaclethane	0.000000	0.000001	0.000855	0.000000
29 acetone	0.000000	0.000000	0.000000	0.000000
32 Alpha-BHC	0.000001	0.000000	0.001007	0.000000
33 Beta-BHC	0.000001	0.000000	0.001007	0.000000
34 Delta-BHC	0.000000	0.000000	0.000336	0.000000
35 Gamma-BHC	0.000000	0.000000	0.000108	0.000000
36 PCB-1248+54	0.000003	0.000000	0.005161	0.000000
37 bis2ehxphthal	0.000000	0.000000	0.000001	0.000000
38 123trichlorobz	0.000002	0.000000	0.002325	0.000000
39 chloromethane	0.000002	0.001396	0.000335	0.000001
40 methanol	0.000005	0.000001	0.000017	0.000005
41 fluoranthene	0.000000	0.000000	0.000055	0.000000
42 phenanthrene	0.000000	0.000000	0.000034	0.000000
43 acenaphthene	0.000000	0.000000	0.000014	0.000000
44 fluorene	0.000000	0.000000	0.000008	0.000000
45 pyrene	0.000000	0.000000	0.000031	0.000000
46 2-chlorophenol	0.000000	0.000000	0.000009	0.000000
RATE LB MOLS/HR	95.4799	0.0644	0.0507	95.3648

SUMMARY OF THREE PHASE FLASH CALCULATION
(UNIT 5 - CONTINUED)

COMPONENT WEIGHT FRACTIONS AND STREAM FLOWRATES

COMPONENT	F E E D S	V A P O R	LIQUID L	LIQUID W
1 1122tetclethan	0.000567	0.001311	0.096988	0.000220
2 chloroform	0.000844	0.036340	0.067190	0.000557
3 methylene chlo	0.000716	0.034566	0.027933	0.000572
4 trichloroethen	0.001760	0.071539	0.359630	0.000378
5 tetraclethene	0.000483	0.006195	0.128298	0.000016
6 trans12diclene	0.000006	0.000416	0.000469	0.000004
7 vinyl chloride	0.000303	0.087327	0.009260	0.000150
8 benzene	0.000438	0.016964	0.066528	0.000178
9 tetrahydrothio	0.000189	0.000453	0.010312	0.000152
10 14diclorbutane	0.000039	0.000153	0.008138	0.000009
12 chlorobenzene	0.000107	0.000714	0.025868	0.000013
13 water	0.991669	0.008151	0.000833	0.996594
14 N2	0.000726	0.514239	0.000002	0.000015
15 O2	0.000197	0.136807	0.000001	0.000008
16 o12dichlorobz	0.000027	0.000024	0.007461	0.000001
17 m13dichlorobz	0.000008	0.000011	0.002263	0.000000
18 p14dichlorobz	0.000019	0.000021	0.005194	0.000000
19 124trichlorobz	0.000035	0.000007	0.007076	0.000010
20 hexaclbutadien	0.000018	0.000018	0.004916	0.000000
21 hexachlorobz	0.000001	0.000000	0.000267	0.000000
22 naphthalene	0.000000	0.000000	0.000051	0.000000
23 cis12diclethen	0.001701	0.078886	0.140493	0.001095
24 phenol	0.000000	0.000000	0.000002	0.000000
25 11diclethene	0.000011	0.002098	0.001188	0.000004
26 111triclethane	0.000022	0.001319	0.003903	0.000006
27 carbon tetracl	0.000008	0.000534	0.001709	0.000001
28 hexaclethane	0.000006	0.000005	0.001659	0.000000
29 acetone	0.000000	0.000000	0.000000	0.000000
32 Alpha-BHC	0.000009	0.000000	0.002401	0.000000
33 Beta-BHC	0.000009	0.000000	0.002401	0.000000
34 Delta-BHC	0.000003	0.000000	0.000800	0.000000
35 Gamma-BHC	0.000001	0.000000	0.000258	0.000000
36 PCB-1248+54	0.000045	0.000000	0.012671	0.000000
37 bis2ehxphthal	0.000000	0.000000	0.000002	0.000000
38 123trichlorobz	0.000017	0.000002	0.003458	0.000005
39 chloromethane	0.000006	0.001896	0.000139	0.000003
40 methanol	0.000010	0.000001	0.000004	0.000010
41 fluoranthene	0.000000	0.000000	0.000091	0.000000
42 phenanthrene	0.000000	0.000000	0.000050	0.000000
43 acenaphthene	0.000000	0.000000	0.000018	0.000000
44 fluorene	0.000000	0.000000	0.000011	0.000000
45 pyrene	0.000000	0.000000	0.000051	0.000000
46 2-chlorophenol	0.000000	0.000000	0.000010	0.000000
RATE LBS/HR	1731.3609	2.3952	6.1804	1722.7818

SUMMARY OF THREE PHASE FLASH CALCULATION

UNIT ID	CHIL
NUMBER	6
NAME	OVHD CHILLER
FLASH TYPE	ISOTHERMAL
FEEDS	7 22
PRODUCTS	13 (V)
	14 (L)
	14W (W)
TEMP, DEG C	5.0000
PRESSURE, PSIA	14.7000
FRACTION LIQUID	0.00000
L1/TOTAL LIQUID	0.00000
DUTY, MM PCU /HR	0.00029

SUMMARY OF THREE PHASE FLASH CALCULATION
(UNIT 6 - CONTINUED)

COMPONENT MOLE FRACTIONS AND STREAM FLOWRATES

COMPONENT	F E E D S	V A P O R	SINGLE L +	LIQUID W +
1 1122tetclethan	0.000006	0.000006	0.000000	0.000000
2 chloroform	0.000248	0.000248	0.000000	0.000000
3 methylene chlo	0.000331	0.000331	0.000000	0.000000
4 trichloroethen	0.000443	0.000443	0.000000	0.000000
5 tetraclethene	0.000030	0.000030	0.000000	0.000000
6 trans12diclene	0.000003	0.000003	0.000000	0.000000
7 vinyl chloride	0.001138	0.001138	0.000000	0.000000
8 benzene	0.000177	0.000177	0.000000	0.000000
9 tetrahydrothio	0.000004	0.000004	0.000000	0.000000
10 14diclorbutane	0.000001	0.000001	0.000000	0.000000
12 chlorobenzene	0.000005	0.000005	0.000000	0.000000
13 water	0.000368	0.000368	0.000000	0.000000
14 N2	0.993040	0.993040	0.000000	0.000000
15 O2	0.003482	0.003482	0.000000	0.000000
16 o12dichlorobz	0.000000	0.000000	0.000000	0.000000
17 m13dichlorobz	0.000000	0.000000	0.000000	0.000000
18 p14dichlorobz	0.000000	0.000000	0.000000	0.000000
19 124trichlorobz	0.000000	0.000000	0.000000	0.000000
20 hexaclbutadien	0.000000	0.000000	0.000000	0.000000
21 hexachlorobz	0.000000	0.000000	0.000000	0.000000
22 naphthalene	0.000000	0.000000	0.000000	0.000000
23 cis12diclethen	0.000663	0.000663	0.000000	0.000000
24 phenol	0.000000	0.000000	0.000000	0.000000
25 11diclethene	0.000018	0.000018	0.000000	0.000000
26 111triclethane	0.000008	0.000008	0.000000	0.000000
27 carbon tetracl	0.000003	0.000003	0.000000	0.000000
28 hexaclethane	0.000000	0.000000	0.000000	0.000000
29 acetone	0.000000	0.000000	0.000000	0.000000
32 Alpha-BHC	0.000000	0.000000	0.000000	0.000000
33 Beta-BHC	0.000000	0.000000	0.000000	0.000000
34 Delta-BHC	0.000000	0.000000	0.000000	0.000000
35 Gamma-BHC	0.000000	0.000000	0.000000	0.000000
36 PCB-1248+54	0.000000	0.000000	0.000000	0.000000
37 bis2ehxphthal	0.000000	0.000000	0.000000	0.000000
38 123trichlorobz	0.000000	0.000000	0.000000	0.000000
39 chloromethane	0.000031	0.000031	0.000000	0.000000
40 methanol	0.000000	0.000000	0.000000	0.000000
41 fluoranthene	0.000000	0.000000	0.000000	0.000000
42 phenanthrene	0.000000	0.000000	0.000000	0.000000
43 acenaphthene	0.000000	0.000000	0.000000	0.000000
44 fluorene	0.000000	0.000000	0.000000	0.000000
45 pyrene	0.000000	0.000000	0.000000	0.000000
46 2-chlorophenol	0.000000	0.000000	0.000000	0.000000
RATE LB MOLS/HR	2.9412	2.9412	0.0000	0.0000

NOTE: + - DOES NOT EXIST OR COMBINED WITH MIXED, IF ANY
$ - SINGLE L COULD BE EITHER LIQUID L OR LIQUID W

SUMMARY OF THREE PHASE FLASH CALCULATION
(UNIT 6 - CONTINUED)

COMPONENT WEIGHT FRACTIONS AND STREAM FLOWRATES

COMPONENT	F E E D S	V A P O R	SINGLE L +	LIQUID W +
1 1122tetclethan	0.000038	0.000038	0.000000	0.000000
2 chloroform	0.001049	0.001049	0.000000	0.000000
3 methylene chlo	0.000998	0.000998	0.000000	0.000000
4 trichloroethen	0.002065	0.002065	0.000000	0.000000
5 tetraclethene	0.000179	0.000179	0.000000	0.000000
6 trans12diclene	0.000012	0.000012	0.000000	0.000000
7 vinyl chloride	0.002521	0.002521	0.000000	0.000000
8 benzene	0.000490	0.000490	0.000000	0.000000
9 tetrahydrothio	0.000013	0.000013	0.000000	0.000000
10 14diclorbutane	0.000004	0.000004	0.000000	0.000000
12 chlorobenzene	0.000021	0.000021	0.000000	0.000000
13 water	0.000235	0.000235	0.000000	0.000000
14 N2	0.985979	0.985979	0.000000	0.000000
15 O2	0.003949	0.003949	0.000000	0.000000
16 o12dichlorobz	0.000001	0.000001	0.000000	0.000000
17 m13dichlorobz	0.000000	0.000000	0.000000	0.000000
18 p14dichlorobz	0.000001	0.000001	0.000000	0.000000
19 124trichlorobz	0.000000	0.000000	0.000000	0.000000
20 hexaclbutadien	0.000001	0.000001	0.000000	0.000000
21 hexachlorobz	0.000000	0.000000	0.000000	0.000000
22 naphthalene	0.000000	0.000000	0.000000	0.000000
23 cis12diclethen	0.002277	0.002277	0.000000	0.000000
24 phenol	0.000000	0.000000	0.000000	0.000000
25 11diclethene	0.000061	0.000061	0.000000	0.000000
26 111triclethane	0.000038	0.000038	0.000000	0.000000
27 carbon tetracl	0.000015	0.000015	0.000000	0.000000
28 hexaclethane	0.000000	0.000000	0.000000	0.000000
29 acetone	0.000000	0.000000	0.000000	0.000000
32 Alpha-BHC	0.000000	0.000000	0.000000	0.000000
33 Beta-BHC	0.000000	0.000000	0.000000	0.000000
34 Delta-BHC	0.000000	0.000000	0.000000	0.000000
35 Gamma-BHC	0.000000	0.000000	0.000000	0.000000
36 PCB-1248+54	0.000000	0.000000	0.000000	0.000000
37 bis2ehxphthal	0.000000	0.000000	0.000000	0.000000
38 123trichlorobz	0.000000	0.000000	0.000000	0.000000
39 chloromethane	0.000055	0.000055	0.000000	0.000000
40 methanol	0.000000	0.000000	0.000000	0.000000
41 fluoranthene	0.000000	0.000000	0.000000	0.000000
42 phenanthrene	0.000000	0.000000	0.000000	0.000000
43 acenaphthene	0.000000	0.000000	0.000000	0.000000
44 fluorene	0.000000	0.000000	0.000000	0.000000
45 pyrene	0.000000	0.000000	0.000000	0.000000
46 2-chlorophenol	0.000000	0.000000	0.000000	0.000000
RATE LBS/HR	82.9829	82.9829	0.0000	0.0000

I SUMMARY FOR COLUMN UNIT 4 - STRP, STM STRIPPR

1 TOTAL NUMBER OF ITERATIONS

FAST METHOD	0
SURE METHOD	26

2 COLUMN SUMMARY

TRAY	TEMP DEG C	PRESSURE PSIA	NET FLOW RATES, LB MOLS/HR LIQUID PHASE(L)	VAPOR PHASE(V)	FEED	PRODUCT	HEAT(COOL)ER DUTIES MM PCU /HR
1	100.0	14.70	5557.6		5506.5L	94.8V	
2	100.0	14.71	5557.9	145.9			
3	100.0	14.71	5558.0	146.3			
4	100.0	14.72	5558.2	146.4			
5	100.0	14.72		146.5	146.5V	5558.2L	

3 FEED AND PRODUCT STREAMS

		FLOW RATES LB MOLS/HR	HEAT RATES MM PCU /HR
* FEED STREAMS:	(FROM UNIT, UID)		
3L IS LIQUID TO TRAY 1	(UNIT 3, PHTR)	5506.458	9.4223
6 IS VAPOR TO TRAY 5		146.545	1.6870
* PRODUCT STREAMS:			
11 IS LIQUID FROM TRAY 5		5558.219	10.0188
5 IS VAPOR FROM TRAY 1		94.784	1.0906

OVERALL MASS BALANCE, (FEEDS - PRODUCTS) 0.00000E+00
OVERALL HEAT BALANCE, (HIN - HOUT) 0.62528E-12

IIA PACKED COLUMN DATA

SECTION 1 PACKED HEIGHT = 16.00 FEET

TRAY	X	Y	PRESSURE DROP IN H2O/FT	PRESSURE DROP PSIA	PRESSURE PSIA	DIAM FT	HETP FT	DESIGN FT/SEC	FLOOD FT/SEC	APPR
1	0.948	0.003	0.050	0.006	14.70	3.50	3.20	0.051	0.144	0.35
2	0.946	0.003	0.050	0.006	14.71	3.50	3.20	0.051	0.144	0.35
3	0.945	0.003	0.050	0.006	14.71	3.50	3.20	0.051	0.144	0.35
4	0.945	0.003	0.050	0.006	14.72	3.50	3.20	0.051	0.144	0.35
5	0.944	0.003	0.050	0.006	14.72	3.50	3.20	0.051	0.144	0.35

*** WARNING - AT LEAST ONE TRAY IN THIS SECTION EXCEEDS FOLLOWING LIMITS:
* PRESSURE DROP IS BELOW 0.05 IN H2O/FT

STREAM COMPONENT FLOW RATES - LB MOLS/HR

STREAM ID	GCRW	GWTR	F01	3L
NAME	GC REM WTR	GROUNDWATER	COMPOSITE FD	COL FEED LIQ
PHASE	LIQUID	LIQUID	LIQUID	LIQUID
1 1122tetclethan	0.0035	0.0001	0.0059	0.0056
2 chloroform	0.0006	0.0036	0.0122	0.0091
3 methylene chlo	0.0026	0.0004	0.0146	0.0111
4 trichloroethen	0.0142	0.0040	0.0232	0.0126
5 tetraclethene	0.0036	0.0013	0.0050	0.0019
6 trans12diclene	0.0000	0.0000	0.0001	0.0001
7 vinyl chloride	0.0037	0.0005	0.0084	0.0041
8 benzene	0.0058	0.0000	0.0097	0.0079
9 tetrahydrothio	0.0005	0.0003	0.0037	0.0035
10 14diclorbutane	0.0003	0.0001	0.0005	0.0005
11 2-methylfuran	0.0000	0.0000	0.0000	0.0000
12 chlorobenzene	0.0014	0.0000	0.0016	0.0015
13 water	4579.1518	832.5198	5506.9763	5506.3674
14 N2	0.0372	0.0068	0.0449	0.0027
15 O2	0.0087	0.0016	0.0107	0.0010
16 o12dichlorobz	0.0003	0.0000	0.0003	0.0003
17 m13dichlorobz	0.0001	0.0000	0.0001	0.0001
18 p14dichlorobz	0.0002	0.0000	0.0002	0.0002
19 124trichlorobz	0.0004	0.0000	0.0005	0.0005
20 hexaclbutadien	0.0001	0.0000	0.0001	0.0000
21 hexachlorobz	0.0000	0.0000	0.0000	0.0000
22 naphthalene	0.0000	0.0000	0.0000	0.0000
23 cis12diclethen	0.0047	0.0062	0.0304	0.0236
24 phenol	0.0003	0.0000	0.0003	0.0003
25 11diclethene	0.0001	0.0000	0.0002	0.0001
26 111triclethane	0.0002	0.0000	0.0003	0.0001
27 carbon tetracl	0.0001	0.0000	0.0001	0.0000
28 hexaclethane	0.0000	0.0000	0.0000	0.0000
29 acetone	0.0000	0.0000	0.0000	0.0000
30 toluene	0.0000	0.0000	0.0000	0.0000
31 benzoic acid	0.0000	0.0000	0.0000	0.0000
32 Alpha-BHC	0.0001	0.0000	0.0001	0.0000
33 Beta-BHC	0.0001	0.0000	0.0001	0.0000
34 Delta-BHC	0.0000	0.0000	0.0000	0.0000
35 Gamma-BHC	0.0000	0.0000	0.0000	0.0000
36 PCB-1248+54	0.0003	0.0000	0.0003	0.0003
37 bis2ehxphthal	0.0000	0.0000	0.0000	0.0000
38 123trichlorobz	0.0002	0.0000	0.0003	0.0003
39 chloromethane	0.0000	0.0001	0.0002	0.0001
40 methanol	0.0031	0.0000	0.0037	0.0037
41 fluoranthene	0.0000	0.0000	0.0000	0.0000
42 phenanthrene	0.0000	0.0000	0.0000	0.0000
43 acenaphthene	0.0000	0.0000	0.0000	0.0000
44 fluorene	0.0000	0.0000	0.0000	0.0000
45 pyrene	0.0000	0.0000	0.0000	0.0000
46 2-chlorophenol	0.0000	0.0000	0.0000	0.0000

STREAM COMPONENT FLOW RATES - LB MOLS/HR

STREAM ID	GCRW	GWTR	F01	3L
TOTALS, LB MOLS/HR	4579.2442	832.5449	5507.1540	5506.4584
TEMPERATURE, DEG C	20.0000	23.5000	20.4425	95.0000
PRESSURE, PSIA	14.7000	14.7000	14.7000	14.0100
H, MM PCU /HR	1.6504	0.3525	2.0286	9.4223
MOLECULAR WEIGHT	18.0161	18.0170	18.0171	18.0164
MOL FRAC LIQUID	1.0000	1.0000	1.0000	1.0000
RECYCLE CONVERGENCE	0.0000	0.0000	0.0000	0.0000

STREAM COMPONENT FLOW RATES - LB MOLS/HR

STREAM ID	3V	6	11	12
NAME	FLSHD FD VAP	LIVE STEAM	COL BOTTOMS	STRPPD WATER
PHASE	VAPOR	VAPOR	LIQUID	LIQUID
1 1122tetclethan	0.0003	0.0000	0.0000	0.0000
2 chloroform	0.0032	0.0000	0.0000	0.0000
3 methylene chlo	0.0035	0.0000	0.0000	0.0000
4 trichloroethen	0.0106	0.0000	0.0000	0.0000
5 tetraclethene	0.0031	0.0000	0.0000	0.0000
6 trans12diclene	0.0000	0.0000	0.0000	0.0000
7 vinyl chloride	0.0043	0.0000	0.0000	0.0000
8 benzene	0.0019	0.0000	0.0000	0.0000
9 tetrahydrothio	0.0002	0.0000	0.0000	0.0000
10 14diclorbutane	0.0001	0.0000	0.0000	0.0000
11 2-methylfuran	0.0000	0.0000	0.0000	0.0000
12 chlorobenzene	0.0002	0.0000	0.0000	0.0000
13 water	0.6089	146.5446	5558.2149	5558.2149
14 N2	0.0422	0.0000	0.0000	0.0000
15 O2	0.0096	0.0000	0.0000	0.0000
16 o12dichlorobz	0.0001	0.0000	0.0000	0.0000
17 m13dichlorobz	0.0000	0.0000	0.0000	0.0000
18 p14dichlorobz	0.0000	0.0000	0.0000	0.0000
19 124trichlorobz	0.0000	0.0000	0.0002	0.0002
20 hexaclbutadien	0.0001	0.0000	0.0000	0.0000
21 hexachlorobz	0.0000	0.0000	0.0000	0.0000
22 naphthalene	0.0000	0.0000	0.0000	0.0000
23 cis12diclethen	0.0067	0.0000	0.0000	0.0000
24 phenol	0.0000	0.0000	0.0003	0.0003
25 11diclethene	0.0001	0.0000	0.0000	0.0000
26 111triclethane	0.0002	0.0000	0.0000	0.0000
27 carbon tetracl	0.0001	0.0000	0.0000	0.0000
28 hexaclethane	0.0000	0.0000	0.0000	0.0000
29 acetone	0.0000	0.0000	0.0000	0.0000
30 toluene	0.0000	0.0000	0.0000	0.0000
31 benzoic acid	0.0000	0.0000	0.0000	0.0000
32 Alpha-BHC	0.0000	0.0000	0.0000	0.0000
33 Beta-BHC	0.0000	0.0000	0.0000	0.0000
34 Delta-BHC	0.0000	0.0000	0.0000	0.0000
35 Gamma-BHC	0.0000	0.0000	0.0000	0.0000
36 PCB-1248+54	0.0000	0.0000	0.0000	0.0000
37 bis2ehxphthal	0.0000	0.0000	0.0000	0.0000
38 123trichlorobz	0.0000	0.0000	0.0001	0.0001
39 chloromethane	0.0001	0.0000	0.0000	0.0000
40 methanol	0.0000	0.0000	0.0031	0.0031
41 fluoranthene	0.0000	0.0000	0.0000	0.0000
42 phenanthrene	0.0000	0.0000	0.0000	0.0000
43 acenaphthene	0.0000	0.0000	0.0000	0.0000
44 fluorene	0.0000	0.0000	0.0000	0.0000
45 pyrene	0.0000	0.0000	0.0000	0.0000
46 2-chlorophenol	0.0000	0.0000	0.0000	0.0000

STREAM COMPONENT FLOW RATES - LB MOLS/HR

STREAM ID	3V	6	11	12
TOTALS, LB MOLS/HR	0.6956	146.5446	5558.2186	5558.2186
TEMPERATURE, DEG C	95.0000	100.5649	100.0418	26.1478
PRESSURE, PSIA	14.0100	15.0000	14.7231	14.7231
H, MM PCU /HR	0.0073	1.6870	10.0188	2.6178
MOLECULAR WEIGHT	23.4724	18.0150	18.0150	18.0150
MOL FRAC LIQUID	0.0000	0.0000	1.0000	1.0000
RECYCLE CONVERGENCE	0.0000	0.0000	0.0000	0.0000

STREAM COMPONENT FLOW RATES - LB MOLS/HR

STREAM ID	5	9	8	7
NAME	STPR OVHD	WATER PHASE	ORG PHASE	CONDNSR VAP
PHASE	VAPOR	LIQUID	LIQUID	VAPOR
1 1122tetclethan	0.0056	0.0023	0.0036	0.0000
2 chloroform	0.0091	0.0080	0.0035	0.0007
3 methylene chlo	0.0111	0.0116	0.0020	0.0010
4 trichloroethen	0.0126	0.0050	0.0169	0.0013
5 tetraclethene	0.0019	0.0002	0.0048	0.0001
6 trans12diclene	0.0001	0.0001	0.0000	0.0000
7 vinyl chloride	0.0041	0.0041	0.0009	0.0033
8 benzene	0.0079	0.0039	0.0053	0.0005
9 tetrahydrothio	0.0035	0.0030	0.0007	0.0000
10 14diclorbutane	0.0005	0.0001	0.0004	0.0000
11 2-methylfuran	0.0000	0.0000	0.0000	0.0000
12 chlorobenzene	0.0015	0.0002	0.0014	0.0000
13 water	94.6971	95.3046	0.0003	0.0011
14 N2	0.0027	0.0009	0.0000	0.0440
15 O2	0.0010	0.0004	0.0000	0.0102
16 o12dichlorobz	0.0003	0.0000	0.0003	0.0000
17 m13dichlorobz	0.0001	0.0000	0.0001	0.0000
18 p14dichlorobz	0.0002	0.0000	0.0002	0.0000
19 124trichlorobz	0.0003	0.0001	0.0002	0.0000
20 hexaclbutadien	0.0000	0.0000	0.0001	0.0000
21 hexachlorobz	0.0000	0.0000	0.0000	0.0000
22 naphthalene	0.0000	0.0000	0.0000	0.0000
23 cis12diclethen	0.0236	0.0195	0.0090	0.0019
24 phenol	0.0000	0.0000	0.0000	0.0000
25 11diclethene	0.0001	0.0001	0.0001	0.0001
26 111triclethane	0.0001	0.0001	0.0002	0.0000
27 carbon tetracl	0.0000	0.0000	0.0001	0.0000
28 hexaclethane	0.0000	0.0000	0.0000	0.0000
29 acetone	0.0000	0.0000	0.0000	0.0000
30 toluene	0.0000	0.0000	0.0000	0.0000
31 benzoic acid	0.0000	0.0000	0.0000	0.0000
32 Alpha-BHC	0.0000	0.0000	0.0001	0.0000
33 Beta-BHC	0.0000	0.0000	0.0001	0.0000
34 Delta-BHC	0.0000	0.0000	0.0000	0.0000
35 Gamma-BHC	0.0000	0.0000	0.0000	0.0000
36 PCB-1248+54	0.0003	0.0000	0.0003	0.0000
37 bis2ehxphthal	0.0000	0.0000	0.0000	0.0000
38 123trichlorobz	0.0002	0.0000	0.0001	0.0000
39 chloromethane	0.0001	0.0001	0.0000	0.0001
40 methanol	0.0005	0.0005	0.0000	0.0000
41 fluoranthene	0.0000	0.0000	0.0000	0.0000
42 phenanthrene	0.0000	0.0000	0.0000	0.0000
43 acenaphthene	0.0000	0.0000	0.0000	0.0000
44 fluorene	0.0000	0.0000	0.0000	0.0000
45 pyrene	0.0000	0.0000	0.0000	0.0000
46 2-chlorophenol	0.0000	0.0000	0.0000	0.0000

STREAM COMPONENT FLOW RATES - LB MOLS/HR

STREAM ID	5	9	8	7
TOTALS, LB MOLS/HR	94.7843	95.3648	0.0507	0.0644
TEMPERATURE, DEG C	99.9721	15.0000	15.0000	15.0000
PRESSURE, PSIA	14.7000	14.7000	14.7000	14.7000
H, MM PCU /HR	1.0906	0.0258	0.0000	0.0000
MOLECULAR WEIGHT	18.0941	18.0652	121.9900	37.1688
MOL FRAC LIQUID	0.0000	1.0000	1.0000	0.0000
RECYCLE CONVERGENCE	0.0000	0.0000	0.0000	0.0000

STREAM COMPONENT FLOW RATES - LB MOLS/HR

STREAM ID	22	13
NAME	N2 TO SECNRY	NON-CONDENS
PHASE	VAPOR	VAPOR
1 1122tetclethan	0.0000	0.0000
2 chloroform	0.0000	0.0007
3 methylene chlo	0.0000	0.0010
4 trichloroethen	0.0000	0.0013
5 tetraclethene	0.0000	0.0001
6 trans12diclene	0.0000	0.0000
7 vinyl chloride	0.0000	0.0033
8 benzene	0.0000	0.0005
9 tetrahydrothio	0.0000	0.0000
10 14diclorbutane	0.0000	0.0000
11 2-methylfuran	0.0000	0.0000
12 chlorobenzene	0.0000	0.0000
13 water	0.0000	0.0011
14 N2	2.8768	2.9208
15 O2	0.0000	0.0102
16 o12dichlorobz	0.0000	0.0000
17 m13dichlorobz	0.0000	0.0000
18 p14dichlorobz	0.0000	0.0000
19 124trichlorobz	0.0000	0.0000
20 hexaclbutadien	0.0000	0.0000
21 hexachlorobz	0.0000	0.0000
22 naphthalene	0.0000	0.0000
23 cis12diclethen	0.0000	0.0019
24 phenol	0.0000	0.0000
25 11diclethene	0.0000	0.0001
26 111triclethane	0.0000	0.0000
27 carbon tetracl	0.0000	0.0000
28 hexaclethane	0.0000	0.0000
29 acetone	0.0000	0.0000
30 toluene	0.0000	0.0000
31 benzoic acid	0.0000	0.0000
32 Alpha-BHC	0.0000	0.0000
33 Beta-BHC	0.0000	0.0000
34 Delta-BHC	0.0000	0.0000
35 Gamma-BHC	0.0000	0.0000
36 PCB-1248+54	0.0000	0.0000
37 bis2ehxphthal	0.0000	0.0000
38 123trichlorobz	0.0000	0.0000
39 chloromethane	0.0000	0.0001
40 methanol	0.0000	0.0000
41 fluoranthene	0.0000	0.0000
42 phenanthrene	0.0000	0.0000
43 acenaphthene	0.0000	0.0000
44 fluorene	0.0000	0.0000
45 pyrene	0.0000	0.0000
46 2-chlorophenol	0.0000	0.0000

STREAM COMPONENT FLOW RATES - LB MOLS/HR

STREAM ID	22	13
TOTALS, LB MOLS/HR	2.8768	2.9412
TEMPERATURE, DEG C	-10.0000	5.0000
PRESSURE, PSIA	15.0000	14.7000
H, MM PCU /HR	-0.0042	-0.0039
MOLECULAR WEIGHT	28.0130	28.2136
MOL FRAC LIQUID	0.0000	0.0000
RECYCLE CONVERGENCE	0.0000	0.0000

STREAM COMPONENT FLOW RATES - LBS/HR

STREAM ID	GCRW	GWTR	F01	3L
NAME	GC REM WTR	GROUNDWATER	COMPOSITE FD	COL FEED LIQ
PHASE	LIQUID	LIQUID	LIQUID	LIQUID
1 1122tetclethan	0.5841	0.0189	0.9820	0.9362
2 chloroform	0.0709	0.4316	1.4616	1.0811
3 methylene chlo	0.2186	0.0369	1.2402	0.9398
4 trichloroethen	1.8660	0.5294	3.0472	1.6553
5 tetraclethene	0.5940	0.2143	0.8361	0.3183
6 transl2diclene	0.0000	0.0039	0.0102	0.0073
7 vinyl chloride	0.2335	0.0330	0.5246	0.2532
8 benzene	0.4521	0.0000	0.7588	0.6140
9 tetrahydrothio	0.0404	0.0244	0.3264	0.3121
10 14diclorbutane	0.0412	0.0094	0.0669	0.0593
11 2-methylfuran	0.0000	0.0000	0.0000	0.0000
12 chlorobenzene	0.1617	0.0000	0.1846	0.1670
13 water	82493.4173	14997.8440	99208.1745	99197.2052
14 N2	1.0427	0.1891	1.2569	0.0754
15 O2	0.2772	0.0505	0.3415	0.0332
16 ol2dichlorobz	0.0462	0.0000	0.0471	0.0387
17 ml3dichlorobz	0.0140	0.0000	0.0143	0.0112
18 pl4dichlorobz	0.0322	0.0000	0.0325	0.0256
19 124trichlorobz	0.0734	0.0000	0.0902	0.0899
20 hexaclbutadien	0.0297	0.0007	0.0305	0.0052
21 hexachlorobz	0.0016	0.0000	0.0016	0.0005
22 naphthalene	0.0003	0.0000	0.0003	0.0003
23 cisl2diclethen	0.4537	0.6041	2.9451	2.2913
24 phenol	0.0313	0.0000	0.0319	0.0319
25 lldiclethene	0.0124	0.0000	0.0191	0.0056
26 llltriclethane	0.0247	0.0025	0.0376	0.0130
27 carbon tetracl	0.0115	0.0003	0.0140	0.0047
28 hexaclethane	0.0091	0.0012	0.0103	0.0004
29 acetone	0.0001	0.0000	0.0004	0.0004
30 toluene	0.0000	0.0000	0.0000	0.0000
31 benzoic acid	0.0000	0.0000	0.0000	0.0000
32 Alpha-BHC	0.0148	0.0000	0.0149	0.0130
33 Beta-BHC	0.0148	0.0000	0.0149	0.0091
34 Delta-BHC	0.0049	0.0000	0.0050	0.0047
35 Gamma-BHC	0.0025	0.0000	0.0025	0.0025
36 PCB-1248+54	0.0784	0.0000	0.0784	0.0762
37 bis2ehxphthal	0.0004	0.0000	0.0004	0.0004
38 123trichlorobz	0.0412	0.0000	0.0494	0.0493
39 chloromethane	0.0000	0.0054	0.0103	0.0037
40 methanol	0.1006	0.0000	0.1174	0.1173
41 fluoranthene	0.0006	0.0000	0.0006	0.0006
42 phenanthrene	0.0003	0.0000	0.0003	0.0003
43 acenaphthene	0.0001	0.0000	0.0001	0.0001
44 fluorene	0.0001	0.0000	0.0001	0.0001
45 pyrene	0.0003	0.0000	0.0003	0.0003
46 2-chlorophen.	0.0007	0.0000	0.0010	0.0010

STREAM COMPONENT FLOW RATES - LBS/HR

STREAM ID	GCRW	GWTR	F01	3L
TOTALS, LBS/HR	82500.0000	15000.0000	99222.7818	99206.4545
TEMPERATURE, DEG C	20.0000	23.5000	20.4425	95.0000
PRESSURE, PSIA	14.7000	14.7000	14.7000	14.0100
H, MM PCU /HR	1.6504	0.3525	2.0286	9.4223
MOLECULAR WEIGHT	18.0161	18.0170	18.0171	18.0164
MOL FRAC LIQUID	1.0000	1.0000	1.0000	1.0000
RECYCLE CONVERGENCE	0.0000	0.0000	0.0000	0.0000

STREAM COMPONENT FLOW RATES - LBS/HR

STREAM ID	3V	6	11	12
NAME	FLSHD FD VAP	LIVE STEAM	COL BOTTOMS	STRPPD WATER
PHASE	VAPOR	VAPOR	LIQUID	LIQUID
1 1122tetclethan	0.0458	0.0000	0.0000	0.0000
2 chloroform	0.3804	0.0000	0.0000	0.0000
3 methylene chlo	0.3005	0.0000	0.0000	0.0000
4 trichloroethen	1.3919	0.0000	0.0000	0.0000
5 tetraclethene	0.5177	0.0000	0.0000	0.0000
6 trans12diclene	0.0029	0.0000	0.0000	0.0000
7 vinyl chloride	0.2714	0.0000	0.0000	0.0000
8 benzene	0.1448	0.0000	0.0000	0.0000
9 tetrahydrothio	0.0143	0.0000	0.0000	0.0000
10 14diclorbutane	0.0076	0.0000	0.0000	0.0000
11 2-methylfuran	0.0000	0.0000	0.0000	0.0000
12 chlorobenzene	0.0176	0.0000	0.0000	0.0000
13 water	10.9693	2640.0000	100131.2374	100131.2374
14 N2	1.1815	0.0000	0.0000	0.0000
15 O2	0.3084	0.0000	0.0000	0.0000
16 o12dichlorobz	0.0084	0.0000	0.0000	0.0000
17 m13dichlorobz	0.0031	0.0000	0.0000	0.0000
18 p14dichlorobz	0.0068	0.0000	0.0000	0.0000
19 124trichlorobz	0.0003	0.0000	0.0296	0.0296
20 hexaclbutadien	0.0253	0.0000	0.0000	0.0000
21 hexachlorobz	0.0012	0.0000	0.0000	0.0000
22 naphthalene	0.0000	0.0000	0.0000	0.0000
23 cis12diclethen	0.6538	0.0000	0.0000	0.0000
24 phenol	0.0000	0.0000	0.0313	0.0313
25 11diclethene	0.0135	0.0000	0.0000	0.0000
26 111triclethane	0.0247	0.0000	0.0000	0.0000
27 carbon tetracl	0.0093	0.0000	0.0000	0.0000
28 hexaclethane	0.0099	0.0000	0.0000	0.0000
29 acetone	0.0000	0.0000	0.0001	0.0001
30 toluene	0.0000	0.0000	0.0000	0.0000
31 benzoic acid	0.0000	0.0000	0.0000	0.0000
32 Alpha-BHC	0.0018	0.0000	0.0000	0.0000
33 Beta-BHC	0.0058	0.0000	0.0000	0.0000
34 Delta-BHC	0.0002	0.0000	0.0000	0.0000
35 Gamma-BHC	0.0000	0.0000	0.0009	0.0009
36 PCB-1248+54	0.0022	0.0000	0.0000	0.0000
37 bis2ehxphthal	0.0000	0.0000	0.0004	0.0004
38 123trichlorobz	0.0002	0.0000	0.0199	0.0199
39 chloromethane	0.0066	0.0000	0.0000	0.0000
40 methanol	0.0001	0.0000	0.1006	0.1006
41 fluoranthene	0.0000	0.0000	0.0000	0.0000
42 phenanthrene	0.0000	0.0000	0.0000	0.0000
43 acenaphthene	0.0000	0.0000	0.0000	0.0000
44 fluorene	0.0000	0.0000	0.0000	0.0000
45 pyrene	0.0000	0.0000	0.0000	0.0000
46 2-chlorophenol	0.0000	0.0000	0.0006	0.0006

STREAM COMPONENT FLOW RATES - LBS/HR

STREAM ID	3V	6	11	12
TOTALS, LBS/HR	16.3273	2640.0000	100131.4209	100131.4209
TEMPERATURE, DEG C	95.0000	100.5649	100.0418	26.1478
PRESSURE, PSIA	14.0100	15.0000	14.7231	14.7231
H, MM PCU /HR	0.0073	1.6870	10.0188	2.6178
MOLECULAR WEIGHT	23.4724	18.0150	18.0150	18.0150
MOL FRAC LIQUID	0.0000	0.0000	1.0000	1.0000
RECYCLE CONVERGENCE	0.0000	0.0000	0.0000	0.0000

STREAM COMPONENT FLOW RATES - LBS/HR

STREAM ID	5	9	8	7
NAME	STPR OVHD	WATER PHASE	ORG PHASE	CONDNSR VAP
PHASE	VAPOR	LIQUID	LIQUID	VAPOR
1 1122tetclethan	0.9362	0.3790	0.5994	0.0031
2 chloroform	1.0811	0.9590	0.4153	0.0870
3 methylene chlo	0.9398	0.9847	0.1726	0.0828
4 trichloroethen	1.6553	0.6517	2.2227	0.1714
5 tetraclethene	0.3183	0.0278	0.7929	0.0148
6 trans12diclene	0.0073	0.0063	0.0029	0.0010
7 vinyl chloride	0.2532	0.2582	0.0572	0.2092
8 benzene	0.6140	0.3067	0.4112	0.0406
9 tetrahydrothio	0.3121	0.2616	0.0637	0.0011
10 14diclorbutane	0.0593	0.0162	0.0503	0.0004
11 2-methylfuran	0.0000	0.0000	0.0000	0.0000
12 chlorobenzene	0.1670	0.0229	0.1599	0.0017
13 water	1705.9678	1716.9132	0.0051	0.0195
14 N2	0.0754	0.0251	0.0000	1.2317
15 O2	0.0332	0.0138	0.0000	0.3277
16 o12dichlorobz	0.0387	0.0009	0.0461	0.0001
17 m13dichlorobz	0.0112	0.0003	0.0140	0.0000
18 p14dichlorobz	0.0256	0.0003	0.0321	0.0001
19 124trichlorobz	0.0602	0.0168	0.0437	0.0000
20 hexaclbutadien	0.0052	0.0000	0.0304	0.0000
21 hexachlorobz	0.0005	0.0000	0.0016	0.0000
22 naphthalene	0.0003	0.0000	0.0003	0.0000
23 cis12diclethen	2.2913	1.8872	0.8683	0.1890
24 phenol	0.0006	0.0005	0.0000	0.0000
25 11diclethene	0.0056	0.0068	0.0073	0.0050
26 111triclethane	0.0130	0.0103	0.0241	0.0032
27 carbon tetracl	0.0047	0.0021	0.0106	0.0013
28 hexaclethane	0.0004	0.0000	0.0103	0.0000
29 acetone	0.0003	0.0003	0.0000	0.0000
30 toluene	0.0000	0.0000	0.0000	0.0000
31 benzoic acid	0.0000	0.0000	0.0000	0.0000
32 Alpha-BHC	0.0130	0.0000	0.0148	0.0000
33 Beta-BHC	0.0091	0.0000	0.0148	0.0000
34 Delta-BHC	0.0047	0.0000	0.0049	0.0000
35 Gamma-BHC	0.0016	0.0000	0.0016	0.0000
36 PCB-1248+54	0.0762	0.0000	0.0783	0.0000
37 bis2ehxphthal	0.0000	0.0000	0.0000	0.0000
38 123trichlorobz	0.0294	0.0082	0.0214	0.0000
39 chloromethane	0.0037	0.0049	0.0009	0.0045
40 methanol	0.0167	0.0167	0.0000	0.0000
41 fluoranthene	0.0006	0.0000	0.0006	0.0000
42 phenanthrene	0.0003	0.0000	0.0003	0.0000
43 acenaphthene	0.0001	0.0000	0.0001	0.0000
44 fluorene	0.0001	0.0000	0.0001	0.0000
45 pyrene	0.0003	0.0000	0.0003	0.0000
46 2-chlorophenol	0.0004	0.0003	0.0001	0.0000

STREAM COMPONENT FLOW RATES - LBS/HR

STREAM ID	5	9	8	7
TOTALS, LBS/HR	1715.0336	1722.7818	6.1804	2.3952
TEMPERATURE, DEG C	99.9721	15.0000	15.0000	15.0000
PRESSURE, PSIA	14.7000	14.7000	14.7000	14.7000
H, MM PCU /HR	1.0906	0.0258	0.0000	0.0000
MOLECULAR WEIGHT	18.0941	18.0652	121.9900	37.1688
MOL FRAC LIQUID	0.0000	1.0000	1.0000	0.0000
RECYCLE CONVERGENCE	0.0000	0.0000	0.0000	0.0000

STREAM COMPONENT FLOW RATES - LBS/HR

STREAM ID	22	13
NAME	N2 TO SECNRY	NON-CONDENS
PHASE	VAPOR	VAPOR
1 1122tetclethan	0.0000	0.0031
2 chloroform	0.0000	0.0870
3 methylene chlo	0.0000	0.0828
4 trichloroethen	0.0000	0.1714
5 tetraclethene	0.0000	0.0148
6 transl2diclene	0.0000	0.0010
7 vinyl chloride	0.0000	0.2092
8 benzene	0.0000	0.0406
9 tetrahydrothio	0.0000	0.0011
10 14diclorbutane	0.0000	0.0004
11 2-methylfuran	0.0000	0.0000
12 chlorobenzene	0.0000	0.0017
13 water	0.0000	0.0195
14 N2	80.5877	81.8194
15 O2	0.0000	0.3277
16 o12dichlorobz	0.0000	0.0001
17 m13dichlorobz	0.0000	0.0000
18 p14dichlorobz	0.0000	0.0001
19 124trichlorobz	0.0000	0.0000
20 hexaclbutadien	0.0000	0.0000
21 hexachlorobz	0.0000	0.0000
22 naphthalene	0.0000	0.0000
23 cis12diclethen	0.0000	0.1890
24 phenol	0.0000	0.0000
25 11diclethene	0.0000	0.0050
26 111triclethane	0.0000	0.0032
27 carbon tetracl	0.0000	0.0013
28 hexaclethane	0.0000	0.0000
29 acetone	0.0000	0.0000
30 toluene	0.0000	0.0000
31 benzoic acid	0.0000	0.0000
32 Alpha-BHC	0.0000	0.0000
33 Beta-BHC	0.0000	0.0000
34 Delta-BHC	0.0000	0.0000
35 Gamma-BHC	0.0000	0.0000
36 PCB-1248+54	0.0000	0.0000
37 bis2ehxphthal	0.0000	0.0000
38 123trichlorobz	0.0000	0.0000
39 chloromethane	0.0000	0.0045
40 methanol	0.0000	0.0000
41 fluoranthene	0.0000	0.0000
42 phenanthrene	0.0000	0.0000
43 acenaphthene	0.0000	0.0000
44 fluorene	0.0000	0.0000
45 pyrene	0.0000	0.0000
46 2-chlorophen...	0.0000	0.0000

STREAM COMPONENT FLOW RATES - LBS/HR

STREAM ID	22	13
TOTALS, LBS/HR	80.5877	82.9829
TEMPERATURE, DEG C	-10.0000	5.0000
PRESSURE, PSIA	15.0000	14.7000
H, MM PCU /HR	-0.0042	-0.0039
MOLECULAR WEIGHT	28.0130	28.2136
MOL FRAC LIQUID	0.0000	0.0000
RECYCLE CONVERGENCE	0.0000	0.0000

STREAM MOLAL COMPOSITIONS - FRACTIONS

STREAM ID	GCRW	GWTR	F01	3L
NAME	GC REM WTR	GROUNDWATER	COMPOSITE FD	COL FEED LIQ
PHASE	LIQUID	LIQUID	LIQUID	LIQUID
1 1122tetclethan	7.5988E-07	1.3523E-07	1.0623E-06	1.0129E-06
2 chloroform	1.2978E-07	4.3430E-06	2.2231E-06	1.6447E-06
3 methylene chlo	5.6208E-07	5.2178E-07	2.6515E-06	2.0094E-06
4 trichloroethen	3.1015E-06	4.8400E-06	4.2113E-06	2.2880E-06
5 tetraclethene	7.8215E-07	1.5523E-06	9.1547E-07	3.4860E-07
6 trans12diclene	0.0000E+00	4.8315E-08	1.9114E-08	1.3620E-08
7 vinyl chloride	8.1573E-07	6.3413E-07	1.5242E-06	7.3567E-07
8 benzene	1.2638E-06	0.0000E+00	1.7638E-06	1.4274E-06
9 tetrahydrothio	1.0012E-07	3.3304E-07	6.7228E-07	6.4283E-07
10 14diclorbutane	7.0917E-08	8.9355E-08	9.5626E-08	8.4836E-08
11 2-methylfuran	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
12 chlorobenzene	3.1370E-07	0.0000E+00	2.9774E-07	2.6946E-07
13 water	9.9998E-01	9.9997E-01	9.9997E-01	9.9998E-01
14 N2	8.1287E-06	8.1093E-06	8.1474E-06	4.8913E-07
15 O2	1.8916E-06	1.8972E-06	1.9381E-06	1.8832E-07
16 o12dichlorobz	6.8626E-08	0.0000E+00	5.8215E-08	4.7839E-08
17 m13dichlorobz	2.0833E-08	0.0000E+00	1.7672E-08	1.3884E-08
18 p14dichlorobz	4.7793E-08	0.0000E+00	4.0097E-08	3.1670E-08
19 124trichlorobz	8.8362E-08	0.0000E+00	9.0269E-08	8.9945E-08
20 hexaclbutadien	2.4871E-08	3.4542E-09	2.1221E-08	3.5976E-09
21 hexachlorobz	1.2651E-09	0.0000E+00	1.0519E-09	3.0544E-10
22 naphthalene	5.4111E-10	0.0000E+00	4.5297E-10	4.4214E-10
23 cis12diclethen	1.0221E-06	7.4851E-06	5.5163E-06	4.2922E-06
24 phenol	7.2738E-08	0.0000E+00	6.1541E-08	6.1542E-08
25 11diclethene	2.7874E-08	0.0000E+00	3.5853E-08	1.0476E-08
26 111triclethane	4.0512E-08	2.2956E-08	5.1232E-08	1.7661E-08
27 carbon tetracl	1.6396E-08	2.3423E-09	1.6496E-08	5.5619E-09
28 hexaclethane	8.3698E-09	6.0871E-09	7.8811E-09	2.9309E-10
29 acetone	3.8461E-10	0.0000E+00	1.1246E-09	1.1202E-09
30 toluene	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
31 benzoic acid	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
32 Alpha-BHC	1.1150E-08	0.0000E+00	9.2751E-09	8.1238E-09
33 Beta-BHC	1.1150E-08	0.0000E+00	9.2729E-09	5.6688E-09
34 Delta-BHC	3.7166E-09	0.0000E+00	3.0929E-09	2.9422E-09
35 Gamma-BHC	1.8583E-09	0.0000E+00	1.5476E-09	1.5422E-09
36 PCB-1248+54	5.7142E-08	0.0000E+00	4.7524E-08	4.6211E-08
37 bis2ehxphthal	2.3386E-10	0.0000E+00	1.9445E-10	1.9445E-10
38 123trichlorobz	4.9642E-08	0.0000E+00	4.9486E-08	4.9330E-08
39 chloromethane	0.0000E+00	1.2845E-07	3.6982E-08	1.3169E-08
40 methanol	6.8592E-07	0.0000E+00	6.6518E-07	6.6467E-07
41 fluoranthene	6.0568E-10	0.0000E+00	5.0373E-10	4.9647E-10
42 phenanthrene	3.8004E-10	0.0000E+00	3.1613E-10	3.0751E-10
43 acenaphthene	1.5888E-10	0.0000E+00	1.3224E-10	1.2493E-10
44 fluorene	8.8870E-11	0.0000E+00	7.3943E-11	7.0438E-11
45 pyrene	3.3846E-10	0.0000E+00	2.8148E-10	2.7137E-10
46 2-chlorophenol	1.2023E-09	0.0000E+00	1.4362E-09	1.4334E-09

STREAM MOLAL COMPOSITIONS - FRACTIONS

STREAM ID	GCRW	GWTR	F01	3L
TOTALS, LB MOLS/HR	4579.2442	832.5449	5507.1540	5506.4584
TEMPERATURE, DEG C	20.0000	23.5000	20.4425	95.0000
PRESSURE, PSIA	14.7000	14.7000	14.7000	14.0100
H, MM PCU /HR	1.6504	0.3525	2.0286	9.4223
MOLECULAR WEIGHT	18.0161	18.0170	18.0171	18.0164
MOL FRAC LIQUID	1.0000	1.0000	1.0000	1.0000
RECYCLE CONVERGENCE	0.0000	0.0000	0.0000	0.0000

STREAM MOLAL COMPOSITIONS - FRACTIONS

STREAM ID	3V	6	11	12
NAME	FLSHD FD VAP	LIVE STEAM	COL BOTTOMS	STRPPD WATER
PHASE	VAPOR	VAPOR	LIQUID	LIQUID
1 1122tetclethan	3.9231E-04	0.0000E+00	8.8273E-12	8.8273E-12
2 chloroform	4.5812E-03	0.0000E+00	7.5143E-16	7.5143E-16
3 methylene chlo	5.0856E-03	0.0000E+00	1.5517E-15	1.5518E-15
4 trichloroethen	1.5229E-02	0.0000E+00	1.4498E-17	1.4498E-17
5 tetraclethene	4.4884E-03	0.0000E+00	8.4878E-20	8.4878E-20
6 trans12diclene	4.3516E-05	0.0000E+00	3.7374E-18	3.7373E-18
7 vinyl chloride	6.2434E-03	0.0000E+00	1.7371E-18	1.7371E-18
8 benzene	2.6649E-03	0.0000E+00	6.0794E-15	6.0794E-15
9 tetrahydrothio	2.3376E-04	0.0000E+00	5.6957E-12	5.6956E-12
10 14diclorbutane	8.5509E-05	0.0000E+00	5.6837E-15	5.6837E-15
11 2-methylfuran	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
12 chlorobenzene	2.2417E-04	0.0000E+00	7.0009E-14	7.0009E-14
13 water	8.7536E-01	1.0000E+00	1.0000E+00	1.0000E+00
14 N2	6.0632E-02	0.0000E+00	2.6462E-24	2.6462E-24
15 O2	1.3854E-02	0.0000E+00	1.3161E-23	1.3161E-23
16 o12dichlorobz	8.2198E-05	0.0000E+00	2.6793E-16	2.6793E-16
17 m13dichlorobz	3.0006E-05	0.0000E+00	2.5447E-17	2.5447E-17
18 p14dichlorobz	6.6752E-05	0.0000E+00	7.7617E-17	7.7617E-17
19 124trichlorobz	2.6539E-06	0.0000E+00	2.9392E-08	2.9392E-08
20 hexaclbutadien	1.3953E-04	0.0000E+00	3.8328E-24	3.8328E-24
21 hexachlorobz	5.9104E-06	0.0000E+00	9.4002E-24	9.4001E-24
22 naphthalene	8.6236E-08	0.0000E+00	1.5123E-13	1.5123E-13
23 cis12diclethen	9.6954E-03	0.0000E+00	6.5607E-15	6.5607E-15
24 phenol	5.3657E-08	0.0000E+00	5.9899E-08	5.9899E-08
25 11diclethene	2.0093E-04	0.0000E+00	3.3079E-22	3.3079E-22
26 111triclethane	2.6580E-04	0.0000E+00	1.6702E-21	1.6702E-21
27 carbon tetracl	8.6572E-05	0.0000E+00	5.0164E-22	5.0164E-22
28 hexaclethane	6.0076E-05	0.0000E+00	1.0652E-28	1.0652E-28
29 acetone	3.5607E-08	0.0000E+00	3.1313E-10	3.1313E-10
30 toluene	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
31 benzoic acid	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
32 Alpha-BHC	9.1231E-06	0.0000E+00	5.5700E-16	5.5700E-16
33 Beta-BHC	2.8540E-05	0.0000E+00	2.5122E-19	2.5122E-19
34 Delta-BHC	1.1961E-06	0.0000E+00	2.7294E-14	2.7294E-14
35 Gamma-BHC	4.3927E-08	0.0000E+00	5.4322E-10	5.4322E-10
36 PCB-1248+54	1.0448E-05	0.0000E+00	5.2380E-12	5.2380E-12
37 bis2ehxphthal	2.4202E-10	0.0000E+00	1.8732E-10	1.8732E-10
38 123trichlorobz	1.2803E-06	0.0000E+00	1.9686E-08	1.9686E-08
39 chloromethane	1.8854E-04	0.0000E+00	2.0204E-21	2.0204E-21
40 methanol	4.6483E-06	0.0000E+00	5.6494E-07	5.6494E-07
41 fluoranthene	5.7980E-08	0.0000E+00	1.0874E-12	1.0874E-12
42 phenanthrene	6.8563E-08	0.0000E+00	3.8298E-14	3.8298E-14
43 acenaphthene	5.7966E-08	0.0000E+00	4.3340E-16	4.3340E-16
44 fluorene	2.7823E-08	0.0000E+00	5.3303E-16	5.3303E-16
45 pyrene	8.0384E-08	0.0000E+00	9.2102E-15	9.2102E-15
46 2-chlorophenol	2.3303E-08	0.0000E+00	9.0395E-10	9.0395E-10

STREAM MOLAL COMPOSITIONS - FRACTIONS

STREAM ID	3V	6	11	12
TOTALS, LB MOLS/HR	0.6956	146.5446	5558.2186	5558.2186
TEMPERATURE, DEG C	95.0000	100.5649	100.0418	26.1478
PRESSURE, PSIA	14.0100	15.0000	14.7231	14.7231
H, MM PCU /HR	0.0073	1.6870	10.0188	2.6178
MOLECULAR WEIGHT	23.4724	18.0150	18.0150	18.0150
MOL FRAC LIQUID	0.0000	0.0000	1.0000	1.0000
RECYCLE CONVERGENCE	0.0000	0.0000	0.0000	0.0000

STREAM MOLAL COMPOSITIONS - FRACTIONS

STREAM ID	5	9	8	7
NAME	STPR OVHD	WATER PHASE	ORG PHASE	CONDNSR VAP
PHASE	VAPOR	LIQUID	LIQUID	VAPOR
1 1122tetclethan	5.8843E-05	2.3678E-05	7.0489E-02	2.9042E-04
2 chloroform	9.5548E-05	8.4236E-05	6.8660E-02	1.1315E-02
3 methylene chlo	1.1674E-04	1.2157E-04	4.0121E-02	1.5127E-02
4 trichloroethen	1.3292E-04	5.2013E-05	3.3390E-01	2.0238E-02
5 tetraclethene	2.0252E-05	1.7571E-06	9.4378E-02	1.3886E-03
6 trans12diclene	7.9123E-07	6.8203E-07	5.9067E-04	1.5950E-04
7 vinyl chloride	4.2739E-05	4.3312E-05	1.8074E-02	5.1934E-02
8 benzene	8.2923E-05	4.1171E-05	1.0389E-01	8.0718E-03
9 tetrahydrothio	3.7345E-05	3.1109E-05	1.4267E-02	1.9082E-04
10 14diclorbutane	4.9285E-06	1.3369E-06	7.8161E-03	4.4881E-05
11 2-methylfuran	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
12 chlorobenzene	1.5654E-05	2.1309E-06	2.8036E-02	2.3579E-04
13 water	9.9908E-01	9.9937E-01	5.6384E-03	1.6817E-02
14 N2	2.8416E-05	9.3796E-06	1.0246E-05	6.8231E-01
15 O2	1.0941E-05	4.5275E-06	4.9455E-06	1.5891E-01
16 o12dichlorobz	2.7792E-06	6.6490E-08	6.1912E-03	6.0139E-06
17 m13dichlorobz	8.0658E-07	2.0172E-08	1.8783E-03	2.7427E-06
18 p14dichlorobz	1.8398E-06	2.0593E-08	4.3103E-03	5.3007E-06
19 124trichlorobz	3.5018E-06	9.6990E-07	4.7574E-03	1.3664E-06
20 hexaclbutadien	2.0900E-07	1.0820E-09	2.2999E-03	2.6217E-06
21 hexachlorobz	1.7745E-08	5.6567E-14	1.1427E-04	1.5506E-11
22 naphthalene	2.5677E-08	1.7507E-10	4.8849E-05	9.2812E-09
23 cis12diclethen	2.4936E-04	2.0414E-04	1.7679E-01	3.0245E-02
24 phenol	6.2731E-08	6.1144E-08	3.0016E-06	5.3835E-10
25 11diclethene	6.0859E-07	7.3199E-07	1.4950E-03	8.0455E-04
26 111tricletha ne	1.0260E-06	8.1284E-07	3.5691E-03	3.6754E-04
27 carbon tetracl	3.2312E-07	1.4486E-07	1.3554E-03	1.2904E-04
28 hexaclethane	1.7027E-08	7.3893E-11	8.5502E-04	7.6740E-07
29 acetone	4.6718E-08	4.6476E-08	3.3226E-07	6.0908E-08
30 toluene	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
31 benzoic acid	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
32 Alpha-BHC	4.7195E-07	2.3212E-10	1.0071E-03	4.1816E-08
33 Beta-BHC	3.2933E-07	1.0425E-10	1.0071E-03	4.7945E-08
34 Delta-BHC	1.7092E-07	1.4553E-10	3.3570E-04	8.1495E-09
35 Gamma-BHC	5.7740E-08	1.3809E-10	1.0830E-04	1.7317E-10
36 PCB-1248+54	2.6843E-06	5.8127E-10	5.1610E-03	1.3118E-09
37 bis2ehxphthal	3.1167E-10	9.6107E-14	5.8586E-07	5.8590E-17
38 123trichlorobz	1.7114E-06	4.7402E-07	2.3251E-03	4.7989E-07
39 chloromethane	7.6503E-07	1.0142E-06	3.3471E-04	1.3961E-03
40 methanol	5.4857E-06	5.4763E-06	1.6888E-05	1.4541E-06
41 fluoranthene	2.8779E-08	6.2330E-12	5.4590E-05	2.5668E-12
42 phenanthrene	1.7863E-08	7.4080E-12	3.4324E-05	3.7568E-11
43 acenaphthene	7.2580E-09	7.6920E-12	1.4351E-05	1.0879E-10
44 fluorene	4.0920E-09	2.6903E-12	8.0274E-06	2.5860E-11
45 pyrene	1.5764E-08	3.0718E-12	3.0571E-05	9.7892E-12
46 2-chlorophenol	3.0265E-08	2.5203E-08	9.4757E-06	1.5501E-08

STREAM MOLAL COMPOSITIONS - FRACTIONS

STREAM ID	5	9	8	7
TOTALS, LB MOLS/HR	94.7843	95.3648	0.0507	0.0644
TEMPERATURE, DEG C	99.9721	15.0000	15.0000	15.0000
PRESSURE, PSIA	14.7000	14.7000	14.7000	14.7000
H, MM PCU /HR	1.0906	0.0258	0.0000	0.0000
MOLECULAR WEIGHT	18.0941	18.0652	121.9900	37.1688
MOL FRAC LIQUID	0.0000	1.0000	1.0000	0.0000
RECYCLE CONVERGENCE	0.0000	0.0000	0.0000	0.0000

STREAM MOLAL COMPOSITIONS - FRACTIONS

STREAM ID	22	13
NAME	N2 TO SECNRY	NON-CONDENS
PHASE	VAPOR	VAPOR
1 1122tetclethan	0.0000E+00	6.3630E-06
2 chloroform	0.0000E+00	2.4790E-04
3 methylene chlo	0.0000E+00	3.3143E-04
4 trichloroethen	0.0000E+00	4.4341E-04
5 tetraclethene	0.0000E+00	3.0424E-05
6 trans12diclene	0.0000E+00	3.4945E-06
7 vinyl chloride	0.0000E+00	1.1379E-03
8 benzene	0.0000E+00	1.7685E-04
9 tetrahydrothio	0.0000E+00	4.1808E-06
10 14diclorbutane	0.0000E+00	9.8334E-07
11 2-methylfuran	0.0000E+00	0.0000E+00
12 chlorobenzene	0.0000E+00	5.1662E-06
13 water	0.0000E+00	3.6847E-04
14 N2	1.0000E+00	9.9304E-01
15 O2	0.0000E+00	3.4817E-03
16 o12dichlorobz	0.0000E+00	1.3177E-07
17 m13dichlorobz	0.0000E+00	6.0093E-08
18 p14dichlorobz	0.0000E+00	1.1614E-07
19 124trichlorobz	0.0000E+00	2.9938E-08
20 hexaclbutadien	0.0000E+00	5.7441E-08
21 hexachlorobz	0.0000E+00	3.3974E-13
22 naphthalene	0.0000E+00	2.0335E-10
23 cis12diclethen	0.0000E+00	6.6267E-04
24 phenol	0.0000E+00	1.1795E-11
25 11diclethene	0.0000E+00	1.7628E-05
26 111triclethane	0.0000E+00	8.0527E-06
27 carbon tetracl	0.0000E+00	2.8273E-06
28 hexaclethane	0.0000E+00	1.6814E-08
29 acetone	0.0000E+00	1.3345E-09
30 toluene	0.0000E+00	0.0000E+00
31 benzoic acid	0.0000E+00	0.0000E+00
32 Alpha-BHC	0.0000E+00	9.1619E-10
33 Beta-BHC	0.0000E+00	1.0505E-09
34 Delta-BHC	0.0000E+00	1.7855E-10
35 Gamma-BHC	0.0000E+00	3.7940E-12
36 PCB-1248+54	0.0000E+00	2.8742E-11
37 bis2ehxphthal	0.0000E+00	1.2837E-18
38 123trichlorobz	0.0000E+00	1.0514E-08
39 chloromethane	0.0000E+00	3.0588E-05
40 methanol	0.0000E+00	3.1858E-08
41 fluoranthene	0.0000E+00	5.6239E-14
42 phenanthrene	0.0000E+00	8.2311E-13
43 acenaphthene	0.0000E+00	2.3835E-12
44 fluorene	0.0000E+00	5.6658E-13
45 pyrene	0.0000E+00	2.1448E-13
46 2-chlorophenol	0.0000E+00	3.3963E-10

STREAM MOLAL COMPOSITIONS - FRACTIONS

STREAM ID	22	13
TOTALS, LB MOLS/HR	2.8768	2.9412
TEMPERATURE, DEG C	-10.0000	5.0000
PRESSURE, PSIA	15.0000	14.7000
H, MM PCU /HR	-0.0042	-0.0039
MOLECULAR WEIGHT	28.0130	28.2136
MOL FRAC LIQUID	0.0000	0.0000
RECYCLE CONVERGENCE	0.0000	0.0000

STREAM WEIGHT COMPOSITIONS - FRACTIONS

STREAM ID	GCRW	GWTR	F01	3L
NAME	GC REM WTR	GROUNDWATER	COMPOSITE FD	COL FEED LIQ
PHASE	LIQUID	LIQUID	LIQUID	LIQUID
1 1122tetclethan	7.0795E-06	1.2598E-06	9.8967E-06	9.4366E-06
2 chloroform	8.5994E-07	2.8776E-05	1.4730E-05	1.0898E-05
3 methylene chlo	2.6498E-06	2.4597E-06	1.2499E-05	9.4728E-06
4 trichloroethen	2.2619E-05	3.5295E-05	3.0710E-05	1.6685E-05
5 tetraclethene	7.1995E-06	1.4288E-05	8.4262E-06	3.2087E-06
6 transl2diclene	0.0000E+00	2.5997E-07	1.0285E-07	7.3286E-08
7 vinyl chloride	2.8298E-06	2.1997E-06	5.2872E-06	2.5521E-06
8 benzene	5.4796E-06	0.0000E+00	7.6471E-06	6.1888E-06
9 tetrahydrothio	4.8997E-07	1.6298E-06	3.2899E-06	3.1460E-06
10 14diclorbutane	4.9997E-07	6.2992E-07	6.7413E-07	5.9809E-07
11 2-methylfuran	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
12 chlorobenzene	1.9599E-06	0.0000E+00	1.8601E-06	1.6835E-06
13 water	9.9992E-01	9.9986E-01	9.9985E-01	9.9991E-01
14 N2	1.2639E-05	1.2608E-05	1.2668E-05	7.6053E-07
15 O2	3.3598E-06	3.3696E-06	3.4422E-06	3.3448E-07
16 o12dichlorobz	5.5996E-07	0.0000E+00	4.7498E-07	3.9034E-07
17 m13dichlorobz	1.6999E-07	0.0000E+00	1.4419E-07	1.1329E-07
18 p14dichlorobz	3.8997E-07	0.0000E+00	3.2716E-07	2.5841E-07
19 124trichlorobz	8.8994E-07	0.0000E+00	9.0910E-07	9.0587E-07
20 hexaclbutadien	3.5998E-07	4.9994E-08	3.0714E-07	5.2070E-08
21 hexachlorobz	1.9999E-08	0.0000E+00	1.6628E-08	4.8284E-09
22 naphthalene	3.8497E-09	0.0000E+00	3.2225E-09	3.1455E-09
23 cis12diclethen	5.4996E-06	4.0275E-05	2.9681E-05	2.3096E-05
24 phenol	3.7998E-07	0.0000E+00	3.2147E-07	3.2148E-07
25 11diclethene	1.4999E-07	0.0000E+00	1.9291E-07	5.6369E-08
26 111triclethane	2.9998E-07	1.6998E-07	3.7934E-07	1.3078E-07
27 carbon tetracl	1.3999E-07	1.9997E-08	1.4084E-07	4.7488E-08
28 hexaclethane	1.0999E-07	7.9990E-08	1.0356E-07	3.8516E-09
29 acetone	1.2399E-09	0.0000E+00	3.6253E-09	3.6114E-09
30 toluene	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
31 benzoic acid	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
32 Alpha-BHC	1.7999E-07	0.0000E+00	1.4972E-07	1.3114E-07
33 Beta-BHC	1.7999E-07	0.0000E+00	1.4968E-07	9.1509E-08
34 Delta-BHC	5.9996E-08	0.0000E+00	4.9925E-08	4.7494E-08
35 Gamma-BHC	2.9998E-08	0.0000E+00	2.4981E-08	2.4895E-08
36 PCB-1248+54	9.4994E-07	0.0000E+00	7.9000E-07	7.6820E-07
37 bis2ehxphthal	5.0697E-09	0.0000E+00	4.2153E-09	4.2153E-09
38 123trichlorobz	4.9997E-07	0.0000E+00	4.9837E-07	4.9682E-07
39 chloromethane	0.0000E+00	3.5995E-07	1.0363E-07	3.6903E-08
40 methanol	1.2199E-06	0.0000E+00	1.1830E-06	1.1821E-06
41 fluoranthene	6.7996E-09	0.0000E+00	5.6548E-09	5.5735E-09
42 phenanthrene	3.7598E-09	0.0000E+00	3.1274E-09	3.0422E-09
43 acenaphthene	1.3599E-09	0.0000E+00	1.1319E-09	1.0694E-09
44 fluorene	8.1995E-10	0.0000E+00	6.8218E-10	6.4987E-10
45 pyrene	3.7998E-09	0.0000E+00	3.1599E-09	3.0465E-09
46 2-chlorophenol	8.5794E-09	0.0000E+00	1.0248E-08	1.0228E-08

STREAM WEIGHT COMPOSITIONS - FRACTIONS

STREAM ID	GCRW	GWTR	F01	3L
TOTALS, LBS/HR	82500.0000	15000.0000	99222.7818	99206.4545
TEMPERATURE, DEG C	20.0000	23.5000	20.4425	95.0000
PRESSURE, PSIA	14.7000	14.7000	14.7000	14.0100
H, MM PCU /HR	1.6504	0.3525	2.0286	9.4223
MOLECULAR WEIGHT	18.0161	18.0170	18.0171	18.0164
MOL FRAC LIQUID	1.0000	1.0000	1.0000	1.0000
RECYCLE CONVERGENCE	0.0000	0.0000	0.0000	0.0000

STREAM WEIGHT COMPOSITIONS - FRACTIONS

STREAM ID	3V	6	11	12
NAME	FLSHD FD VAP	LIVE STEAM	COL BOTTOMS	STRPPD WATER
PHASE	VAPOR	VAPOR	LIQUID	LIQUID
1 1122tetclethan	2.8054E-03	0.0000E+00	8.2246E-11	8.2246E-11
2 chloroform	2.3300E-02	0.0000E+00	4.9794E-15	4.9794E-15
3 methylene chlo	1.8402E-02	0.0000E+00	7.3155E-15	7.3158E-15
4 trichloroethen	8.5248E-02	0.0000E+00	1.0573E-16	1.0573E-16
5 tetraclethene	3.1711E-02	0.0000E+00	7.8133E-19	7.8133E-19
6 trans12diclene	1.7973E-04	0.0000E+00	2.0112E-17	2.0112E-17
7 vinyl chloride	1.6624E-02	0.0000E+00	6.0264E-18	6.0264E-18
8 benzene	8.8687E-03	0.0000E+00	2.6361E-14	2.6361E-14
9 tetrahydrothio	8.7808E-04	0.0000E+00	2.7876E-11	2.7875E-11
10 14diclorbutane	4.6271E-04	0.0000E+00	4.0073E-14	4.0073E-14
11 2-methylfuran	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
12 chlorobenzene	1.0750E-03	0.0000E+00	4.3742E-13	4.3742E-13
13 water	6.7184E-01	1.0000E+00	1.0000E+00	1.0000E+00
14 N2	7.2361E-02	0.0000E+00	4.1147E-24	4.1147E-24
15 O2	1.8886E-02	0.0000E+00	2.3378E-23	2.3378E-23
16 o12dichlorobz	5.1479E-04	0.0000E+00	2.1863E-15	2.1863E-15
17 m13dichlorobz	1.8792E-04	0.0000E+00	2.0765E-16	2.0765E-16
18 p14dichlorobz	4.1806E-04	0.0000E+00	6.3336E-16	6.3336E-16
19 124trichlorobz	2.0516E-05	0.0000E+00	2.9604E-07	2.9604E-07
20 hexaclbutadien	1.5501E-03	0.0000E+00	5.5478E-23	5.5478E-23
21 hexachlorobz	7.1713E-05	0.0000E+00	1.4861E-22	1.4861E-22
22 naphthalene	4.7091E-07	0.0000E+00	1.0760E-12	1.0760E-12
23 cis12diclethen	4.0043E-02	0.0000E+00	3.5305E-14	3.5305E-14
24 phenol	2.1514E-07	0.0000E+00	3.1293E-07	3.1293E-07
25 11diclethene	8.2985E-04	0.0000E+00	1.7801E-21	1.7801E-21
26 111triclethane	1.5107E-03	0.0000E+00	1.2368E-20	1.2368E-20
27 carbon tetracl	5.6734E-04	0.0000E+00	4.2833E-21	4.2833E-21
28 hexaclethane	6.0597E-04	0.0000E+00	1.3999E-27	1.3999E-27
29 acetone	8.8108E-08	0.0000E+00	1.0095E-09	1.0095E-09
30 toluene	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
31 benzoic acid	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
32 Alpha-BHC	1.1304E-04	0.0000E+00	8.9921E-15	8.9921E-15
33 Beta-BHC	3.5362E-04	0.0000E+00	4.0556E-18	4.0556E-18
34 Delta-BHC	1.4821E-05	0.0000E+00	4.4063E-13	4.4063E-13
35 Gamma-BHC	5.4427E-07	0.0000E+00	8.7697E-09	8.7697E-09
36 PCB-1248+54	1.3331E-04	0.0000E+00	8.7082E-11	8.7082E-11
37 bis2ehxphthal	4.0270E-09	0.0000E+00	4.0611E-09	4.0611E-09
38 123trichlorobz	9.8970E-06	0.0000E+00	1.9828E-07	1.9828E-07
39 chloromethane	4.0555E-04	0.0000E+00	5.6623E-21	5.6623E-21
40 methanol	6.3453E-06	0.0000E+00	1.0048E-06	1.0048E-06
41 fluoranthene	4.9959E-07	0.0000E+00	1.2208E-11	1.2208E-11
42 phenanthrene	5.2062E-07	0.0000E+00	3.7890E-13	3.7890E-13
43 acenaphthene	3.8083E-07	0.0000E+00	3.7099E-15	3.7099E-15
44 fluorene	1.9703E-07	0.0000E+00	4.9182E-15	4.9182E-15
45 pyrene	6.9266E-07	0.0000E+00	1.0341E-13	1.0341E-13
46 2-chlorophenol	1.2763E-07	0.0000E+00	6.4507E-09	6.4507E-09

STREAM WEIGHT COMPOSITIONS - FRACTIONS

STREAM ID	3V	6	11	12
TOTALS, LBS/HR	16.3273	2640.0000	100131.4209	100131.4209
TEMPERATURE, DEG C	95.0000	100.5649	100.0418	26.1478
PRESSURE, PSIA	14.0100	15.0000	14.7231	14.7231
H, MM PCU /HR	0.0073	1.6870	10.0188	2.6178
MOLECULAR WEIGHT	23.4724	18.0150	18.0150	18.0150
MOL FRAC LIQUID	0.0000	0.0000	1.0000	1.0000
RECYCLE CONVERGENCE	0.0000	0.0000	0.0000	0.0000

STREAM WEIGHT COMPOSITIONS - FRACTIONS

STREAM ID	5	9	8	7
NAME	STPR OVHD	WATER PHASE	ORG PHASE	CONDNSR VAP
PHASE	VAPOR	LIQUID	LIQUID	VAPOR
1 1122tetclethan	5.4586E-04	2.2000E-04	9.6988E-02	1.3115E-03
2 chloroform	6.3039E-04	5.5665E-04	6.7190E-02	3.6340E-02
3 methylene chlo	5.4796E-04	5.7156E-04	2.7933E-02	3.4566E-02
4 trichloroethen	9.6517E-04	3.7829E-04	3.5963E-01	7.1539E-02
5 tetraclethene	1.8561E-04	1.6130E-05	1.2830E-01	6.1953E-03
6 trans12diclene	4.2392E-06	3.6600E-06	4.6940E-04	4.1600E-04
7 vinyl chloride	1.4762E-04	1.4985E-04	9.2600E-03	8.7327E-02
8 benzene	3.5799E-04	1.7803E-04	6.6528E-02	1.6964E-02
9 tetrahydrothio	1.8198E-04	1.5183E-04	1.0312E-02	4.5265E-04
10 14diclorbutane	3.4597E-05	9.3994E-06	8.1380E-03	1.5337E-04
11 2-methylfuran	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
12 chlorobenzene	9.7380E-05	1.3277E-05	2.5868E-02	7.1406E-04
13 water	9.9471E-01	9.9659E-01	8.3266E-04	8.1511E-03
14 N2	4.3993E-05	1.4545E-05	2.3528E-06	5.1424E-01
15 O2	1.9348E-05	8.0195E-06	1.2972E-06	1.3681E-01
16 o12dichlorobz	2.2579E-05	5.4106E-07	7.4607E-03	2.3785E-05
17 m13dichlorobz	6.5530E-06	1.6415E-07	2.2635E-03	1.0848E-05
18 p14dichlorobz	1.4948E-05	1.6757E-07	5.1942E-03	2.0965E-05
19 124trichlorobz	3.5116E-05	9.7418E-06	7.0762E-03	6.6706E-06
20 hexaclbutadien	3.0120E-06	1.5618E-08	4.9162E-03	1.8393E-05
21 hexachlorobz	2.7930E-07	8.9179E-13	2.6678E-04	1.1881E-10
22 naphthalene	1.8189E-07	1.2422E-09	5.1326E-05	3.2006E-08
23 cis12diclethen	1.3360E-03	1.0955E-03	1.4049E-01	7.8886E-02
24 phenol	3.2628E-07	3.1854E-07	2.3157E-06	1.3631E-09
25 11diclethene	3.2607E-06	3.9281E-06	1.1881E-03	2.0984E-03
26 111triclethane	7.5648E-06	6.0025E-06	3.9031E-03	1.3191E-03
27 carbon tetracl	2.7469E-06	1.2335E-06	1.7091E-03	5.3405E-04
28 hexaclethane	2.2280E-07	9.6843E-10	1.6594E-03	4.8882E-06
29 acetone	1.4996E-07	1.4942E-07	1.5819E-07	9.5176E-08
30 toluene	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
31 benzoic acid	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
32 Alpha-BHC	7.5858E-06	3.7369E-09	2.4009E-03	3.2719E-07
33 Beta-BHC	5.2933E-06	1.6783E-09	2.4009E-03	3.7515E-07
34 Delta-BHC	2.7473E-06	2.3429E-09	8.0032E-04	6.3766E-08
35 Gamma-BHC	9.2806E-07	2.2230E-09	2.5818E-04	1.3549E-09
36 PCB-1248+54	4.4431E-05	9.6368E-09	1.2671E-02	1.0570E-08
37 bis2ehxphthal	6.7275E-09	2.0778E-12	1.8757E-06	6.1565E-16
38 123trichlorobz	1.7162E-05	4.7611E-06	3.4584E-03	2.3427E-06
39 chloromethane	2.1347E-06	2.8345E-06	1.3853E-04	1.8963E-03
40 methanol	9.7144E-06	9.7132E-06	4.4359E-06	1.2535E-06
41 fluoranthene	3.2169E-07	6.9784E-11	9.0509E-05	1.3968E-11
42 phenanthrene	1.7595E-07	7.3089E-11	5.0149E-05	1.8015E-10
43 acenaphthene	6.1857E-08	6.5661E-11	1.8141E-05	4.5135E-10
44 fluorene	3.7592E-08	2.4754E-11	1.0938E-05	1.1565E-10
45 pyrene	1.7622E-07	3.4392E-11	5.0687E-05	5.3270E-11
46 2-chlorophenol	2.1503E-07	1.7935E-07	9.9859E-06	5.3616E-08

STREAM WEIGHT COMPOSITIONS - FRACTIONS

STREAM ID	5	9	8	7
TOTALS, LBS/HR	1715.0336	1722.7818	6.1804	2.3952
TEMPERATURE, DEG C	99.9721	15.0000	15.0000	15.0000
PRESSURE, PSIA	14.7000	14.7000	14.7000	14.7000
H, MM PCU /HR	1.0906	0.0258	0.0000	0.0000
MOLECULAR WEIGHT	18.0941	18.0652	121.9900	37.1688
MOL FRAC LIQUID	0.0000	1.0000	1.0000	0.0000
RECYCLE CONVERGENCE	0.0000	0.0000	0.0000	0.0000

STREAM WEIGHT COMPOSITIONS - FRACTIONS

STREAM ID	22	13
NAME	N2 TO SECNRY	NON-CONDENS
PHASE	VAPOR	VAPOR
1 1122tetclethan	0.0000E+00	3.7855E-05
2 chloroform	0.0000E+00	1.0489E-03
3 methylene chlo	0.0000E+00	9.9772E-04
4 trichloroethen	0.0000E+00	2.0649E-03
5 tetraclethene	0.0000E+00	1.7882E-04
6 trans12diclene	0.0000E+00	1.2007E-05
7 vinyl chloride	0.0000E+00	2.5206E-03
8 benzene	0.0000E+00	4.8965E-04
9 tetrahydrothio	0.0000E+00	1.3065E-05
10 14diclorbutane	0.0000E+00	4.4269E-06
11 2-methylfuran	0.0000E+00	0.0000E+00
12 chlorobenzene	0.0000E+00	2.0611E-05
13 water	0.0000E+00	2.3528E-04
14 N2	1.0000E+00	9.8598E-01
15 O2	0.0000E+00	3.9488E-03
16 o12dichlorobz	0.0000E+00	6.8655E-07
17 m13dichlorobz	0.0000E+00	3.1311E-07
18 p14dichlorobz	0.0000E+00	6.0513E-07
19 124trichlorobz	0.0000E+00	1.9254E-07
20 hexaclbutadien	0.0000E+00	5.3089E-07
21 hexachlorobz	0.0000E+00	3.4295E-12
22 naphthalene	0.0000E+00	9.2382E-10
23 cis12diclethen	0.0000E+00	2.2770E-03
24 phenol	0.0000E+00	3.9346E-11
25 11diclethene	0.0000E+00	6.0570E-05
26 111triclethane	0.0000E+00	3.8076E-05
27 carbon tetracl	0.0000E+00	1.5415E-05
28 hexaclethane	0.0000E+00	1.4109E-07
29 acetone	0.0000E+00	2.7472E-09
30 toluene	0.0000E+00	0.0000E+00
31 benzoic acid	0.0000E+00	0.0000E+00
32 Alpha-BHC	0.0000E+00	9.4442E-09
33 Beta-BHC	0.0000E+00	1.0828E-08
34 Delta-BHC	0.0000E+00	1.8406E-09
35 Gamma-BHC	0.0000E+00	3.9110E-11
36 PCB-1248+54	0.0000E+00	3.0511E-10
37 bis2ehxphthal	0.0000E+00	1.7770E-17
38 123trichlorobz	0.0000E+00	6.7620E-08
39 chloromethane	0.0000E+00	5.4736E-05
40 methanol	0.0000E+00	3.6181E-08
41 fluoranthene	0.0000E+00	4.0316E-13
42 phenanthrene	0.0000E+00	5.1999E-12
43 acenaphthene	0.0000E+00	1.3028E-11
44 fluorene	0.0000E+00	3.3381E-12
45 pyrene	0.0000E+00	1.5376E-12
46 2-chlorophenol	0.0000E+00	1.5476E-09

STREAM WEIGHT COMPOSITIONS - FRACTIONS

STREAM ID	22	13
TOTALS, LBS/HR	80.5877	82.9829
TEMPERATURE, DEG C	-10.0000	5.0000
PRESSURE, PSIA	15.0000	14.7000
H, MM PCU /HR	-0.0042	-0.0039
MOLECULAR WEIGHT	28.0130	28.2136
MOL FRAC LIQUID	0.0000	0.0000
RECYCLE CONVERGENCE	0.0000	0.0000

STREAM SUMMARY

STREAM ID	GCRW	GWTR	F01	3L
NAME	GC REM WTR	GROUNDWATER	COMPOSITE FD	COL FEED LIQ
PHASE	LIQUID	LIQUID	LIQUID	LIQUID
FROM UNIT/TRAY	0/ 0	0/ 0	1/ 0	3/ 0
TO UNIT/TRAY	1/ 0	1/ 0	2/ 0	4/ 1
LB MOLS/HR	4579.244	832.545	5507.154	5506.458
TEMPERATURE, DEG C	20.000	23.500	20.443	95.000
PRESSURE, PSIA	14.700	14.700	14.700	14.010
H, MM PCU /HR	1.650	0.352	2.029	9.422
M PCU /LB MOLE	0.360	0.423	0.368	1.711
PCU /LB	20.004	23.498	20.445	94.977
MOL FRAC LIQUID	1.00000	1.00000	1.00000	1.00000
M LBS/HR	82.500	15.000	99.223	99.206
MOLECULAR WEIGHT	18.016	18.017	18.017	18.016
STD LIQ FT3/HR	1324.821	240.871	1593.337	1593.087
DEG API	10.062	10.059	10.059	10.060
SP GR	0.9996	0.9996	0.9996	0.9996
LBS/FT3	62.2726	62.2739	62.2736	62.2731
WATSON K	8.761	8.761	8.761	8.761
REDUCED TEMP (TR)	0.453	0.458	0.454	0.569
REDUCED PRES (PR)	0.005	0.005	0.005	0.004
ACENTRIC FACTOR	0.345	0.345	0.345	0.345
VAPOR				
M LBS/HR	0.000	0.000	0.000	0.000
MOLECULAR WEIGHT	0.000	0.000	0.000	0.000
STD LIQ FT3/HR	0.000	0.000	0.000	0.000
STD M FT3/HR	0.000	0.000	0.000	0.000
ACTUAL M FT3/HR	0.000	0.000	0.000	0.000
LBS/M FT3	0.000	0.000	0.000	0.000
Z	0.00000	0.00000	0.00000	0.00000
COND,BTU/HR.FT.F	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
VISC,CP	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
CP,PCU /LB MOL C	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
LIQUID				
M LBS/HR	82.500	15.000	99.223	99.206
MOLECULAR WEIGHT	18.016	18.017	18.017	18.016
STD LIQ FT3/HR	1324.821	240.871	1593.337	1593.087
ACTUAL GPM	165.2183	30.0705	198.7304	206.0140
FT3/HR	1325.192	241.191	1593.987	1652.408
LBS/FT3	62.255	62.191	62.248	60.038
Z	0.00075	0.00074	0.00075	0.00059
COND,BTU/HR.FT.F	3.4818E-01	3.5067E-01	3.4828E-01	3.9012E-01
VISC,CP	1.0013E+00	9.2135E-01	9.9060E-01	2.9443E-01
CP,PCU /LB MOL C	1.7995E+01	1.7989E+01	1.7995E+01	1.8113E+01
SURF,DYNES/CM	7.2350E+01	7.1895E+01	7.2292E+01	6.0245E+01

-- STD LIQUID CONDITIONS -- ---------- STD VAPOR CONDITIONS ----------
60.0 F, 14.696 PSIA 60.0 F, 14.696 PSIA, 379.490 FT3/LB MOLE
NOTE: TR AND PR ARE PSEUDOCRITICALS CALCULATED VIA KAYS RULE

STREAM SUMMARY

STREAM ID	3V	6	11	12
NAME	FLSHD FD VAP	LIVE STEAM	COL BOTTOMS	STRPPD WATER
PHASE	VAPOR	VAPOR	LIQUID	LIQUID
FROM UNIT/TRAY	3/ 0	0/ 0	4/ 5	3/ 0
TO UNIT/TRAY	5/ 0	4/ 5	3/ 0	0/ 0
LB MOLS/HR	0.696	146.545	5558.219	5558.219
TEMPERATURE, DEG C	95.000	100.565	100.042	26.148
PRESSURE, PSIA	14.010	15.000	14.723	14.723
H, MM PCU /HR	0.007	1.687	10.019	2.618
M PCU /LB MOLE	10.469	11.512	1.803	0.471
PCU /LB	445.995	639.028	100.056	26.144
MOL FRAC LIQUID	0.00000	0.00000	1.00000	1.00000
M LBS/HR	0.016	2.640	100.131	100.131
MOLECULAR WEIGHT	23.472	18.015	18.015	18.015
STD LIQ FT3/HR	0.250	42.395	1607.975	1607.975
DEG API	3.417	10.063	10.063	10.063
SP GR	1.0488	0.9996	0.9996	0.9996
LBS/FT3	65.3395	62.2718	62.2718	62.2718
WATSON K	7.933	8.762	8.762	8.762
REDUCED TEMP (TR)	0.610	0.577	0.577	0.463
REDUCED PRES (PR)	0.005	0.005	0.005	0.005
ACENTRIC FACTOR	0.315	0.345	0.345	0.345
VAPOR				
M LBS/HR	0.016	2.640	0.000	0.000
MOLECULAR WEIGHT	23.472	18.015	0.000	0.000
STD LIQ FT3/HR	0.250	42.395	0.000	0.000
STD M FT3/HR	0.264	55.612	0.000	0.000
ACTUAL M FT3/HR	0.350	69.921	0.000	0.000
LBS/M FT3	46.605	37.757	0.000	0.000
Z	0.99226	0.99147	0.00000	0.00000
COND,BTU/HR.FT.F	1.3762E-02	1.4340E-02	0.0000E+00	0.0000E+00
VISC,CP	1.2790E-02	1.2137E-02	0.0000E+00	0.0000E+00
CP,PCU /LB MOL C	8.6647E+00	8.2037E+00	0.0000E+00	0.0000E+00
LIQUID				
M LBS/HR	0.000	0.000	100.131	100.131
MOLECULAR WEIGHT	0.000	0.000	18.015	18.015
STD LIQ FT3/HR	0.000	0.000	1607.975	1607.975
ACTUAL GPM	0.0000	0.0000	208.6706	200.8966
FT3/HR	0.000	0.000	1673.716	1611.362
LBS/FT3	0.000	0.000	59.826	62.141
Z	0.00000	0.00000	0.00062	0.00074
COND,BTU/HR.FT.F	0.0000E+00	0.0000E+00	3.9226E-01	3.5367E-01
VISC,CP	0.0000E+00	0.0000E+00	2.7895E-01	8.6728E-01
CP,PCU /LB MOL C	0.0000E+00	0.0000E+00	1.8141E+01	1.7985E+01
SURF,DYNES/CM	0.0000E+00	0.0000E+00	5.9279E+01	7.1545E+01

-- STD LIQUID CONDITIONS -- ---------- STD VAPOR CONDITIONS ----------
60.0 F, 14.696 PSIA 60.0 F, 14.696 PSIA, 379.490 FT3/LB MOLE
NOTE: TR AND PR ARE PSEUDOCRITICALS CALCULATED VIA KAYS RULE

STREAM SUMMARY

STREAM ID	5	9	8	7
NAME	STPR OVHD	WATER PHASE	ORG PHASE	CONDNSR VAP
PHASE	VAPOR	LIQUID	LIQUID	VAPOR
FROM UNIT/TRAY	4/ 1	5/ 0	5/ 0	5/ 0
TO UNIT/TRAY	5/ 0	1/ 0	0/ 0	6/ 0
LB MOLS/HR	94.784	95.365	0.051	0.064
TEMPERATURE, DEG C	99.972	15.000	15.000	15.000
PRESSURE, PSIA	14.700	14.700	14.700	14.700
H, MM PCU /HR	1.091	0.026	0.000	0.000
M PCU /LB MOLE	11.506	0.270	0.462	0.177
PCU /LB	635.889	14.973	3.786	4.759
MOL FRAC LIQUID	0.00000	1.00000	1.00000	0.00000
M LBS/HR	1.715	1.723	0.006	0.002
MOLECULAR WEIGHT	18.094	18.065	121.990	37.169
STD LIQ FT3/HR	27.507	27.645	0.072	0.040
DEG API	9.889	9.956	-28.806	17.228
SP GR	1.0008	1.0003	1.3779	0.9514
LBS/FT3	62.3486	62.3189	85.8416	59.2719
WATSON K	8.750	8.754	6.326	6.384
REDUCED TEMP (TR)	0.577	0.445	0.502	1.496
REDUCED PRES (PR)	0.005	0.005	0.020	0.024
ACENTRIC FACTOR	0.345	0.345	0.229	0.065
VAPOR				
M LBS/HR	1.715	0.000	0.000	0.002
MOLECULAR WEIGHT	18.094	0.000	0.000	37.169
STD LIQ FT3/HR	27.507	0.000	0.000	0.040
STD M FT3/HR	35.970	0.000	0.000	0.024
ACTUAL M FT3/HR	46.080	0.000	0.000	0.024
LBS/M FT3	37.218	0.000	0.000	98.359
Z	0.99159	0.00000	0.00000	0.99805
COND,BTU/HR.FT.F	1.4303E-02	0.0000E+00	0.0000E+00	1.2570E-02
VISC,CP	1.2113E-02	0.0000E+00	0.0000E+00	1.5832E-02
CP,PCU /LB MOL C	8.2120E+00	0.0000E+00	0.0000E+00	8.0999E+00
LIQUID				
M LBS/HR	0.000	1.723	0.006	0.000
MOLECULAR WEIGHT	0.000	18.065	121.990	0.000
STD LIQ FT3/HR	0.000	27.645	0.072	0.000
ACTUAL GPM	0.0000	3.4425	0.0194	0.0000
FT3/HR	0.000	27.612	0.156	0.000
LBS/FT3	0.000	62.393	39.646	0.000
Z	0.00000	0.00076	0.00813	0.00000
COND,BTU/HR.FT.F	0.0000E+00	3.3301E-01	6.8238E-02	0.0000E+00
VISC,CP	0.0000E+00	1.1349E+00	7.4810E-01	0.0000E+00
CP,PCU /LB MOL C	0.0000E+00	1.8012E+01	3.0986E+01	0.0000E+00
SURF,DYNES/CM	0.0000E+00	7.2950E+01	3.0584E+01	0.0000E+00

-- STD LIQUID CONDITIONS -- ---------- STD VAPOR CONDITIONS ----------
60.0 F, 14.696 PSIA 60.0 F, 14.696 PSIA, 379.490 FT3/LB MOLE
NOTE: TR AND PR ARE PSEUDOCRITICALS CALCULATED VIA KAYS RULE

STREAM SUMMARY

STREAM ID	22	13
NAME	N2 TO SECNRY	NON-CONDENS
PHASE	VAPOR	VAPOR
FROM UNIT/TRAY	0/ 0	6/ 0
TO UNIT/TRAY	6/ 0	0/ 0
LB MOLS/HR	2.877	2.941
TEMPERATURE, DEG C	-10.000	5.000
PRESSURE, PSIA	15.000	14.700
H, MM PCU /HR	-0.004	-0.004
M PCU /LB MOLE	-1.477	-1.341
PCU /LB	-52.724	-47.527
MOL FRAC LIQUID	0.00000	0.00000
M LBS/HR	0.081	0.083
MOLECULAR WEIGHT	28.013	28.214
STD LIQ FT3/HR	1.601	1.641
DEG API	43.600	42.839
SP GR	0.8081	0.8116
LBS/FT3	50.3450	50.5648
WATSON K	6.414	6.413
REDUCED TEMP (TR)	2.084	2.178
REDUCED PRES (PR)	0.030	0.030
ACENTRIC FACTOR	0.045	0.045
VAPOR		
M LBS/HR	0.081	0.083
MOLECULAR WEIGHT	28.013	28.214
STD LIQ FT3/HR	1.601	1.641
STD M FT3/HR	1.092	1.116
ACTUAL M FT3/HR	0.974	1.075
LBS/M FT3	82.704	77.215
Z	0.99956	0.99973
COND,BTU/HR.FT.F	1.3367E-02	1.3951E-02
VISC,CP	1.5997E-02	1.6706E-02
CP,PCU /LB MOL C	6.9193E+00	6.9440E+00
LIQUID		
M LBS/HR	0.000	0.000
MOLECULAR WEIGHT	0.000	0.000
STD LIQ FT3/HR	0.000	0.000
ACTUAL GPM	0.0000	0.0000
FT3/HR	0.000	0.000
LBS/FT3	0.000	0.000
Z	0.00000	0.00000
COND,BTU/HR.FT.F	0.0000E+00	0.0000E+00
VISC,CP	0.0000E+00	0.0000E+00
CP,PCU /LB MOL C	0.0000E+00	0.0000E+00
SURF,DYNES/CM	0.0000E+00	0.0000E+00

-- STD LIQUID CONDITIONS -- ---------- STD VAPOR CONDITIONS ----------
60.0 F, 14.696 PSIA 60.0 F, 14.696 PSIA, 379.490 FT3/LB MOLE
NOTE: TR AND PR ARE PSEUDOCRITICALS CALCULATED VIA KAYS RULE

SIMSCI ROYALTY FOR THIS PROBLEM IS 256.04 PROCESS CHARGE UNITS

ATTACHMENT 2

(from the Engineering Report for Gill Creek Remediation Plans and Specifications, April, 1992)

TABLE 5-3
DESIGN BASIS FOR ESTIMATED
REMEDIATION WATER QUALITY

Woodward-Clyde Consultants

Constituent Parameters	Units	Average Value
Chloride	mg/l	1,674
Phenol, Total	mg/l	0.38
Tot. Org. Halogens	mg/l	327
Cyanide, Total	mg/l	0.31
Vinyl Chloride	ug/l	2,832
1,1-Dichloroethene	ug/l	148
Methylene Chloride	ug/l	2,649
Chloroform	ug/l	862
1,1,1-Trichloroethane	ug/l	296
Carbon tetrachloride	ug/l	136
Trichloroethene	ug/l	22,624
Tetrachloroethene	ug/l	7,205
1,4-Dichlorobutane	ug/l	500
1,1,2,2-Tetrachloroethane	ug/l	7,076
Chlorobenzene	ug/l	1,959
Hexachloroethane	ug/l	111
1,4-Dichlorobenzene (p)	ug/l	387
1,2-Dichlorobenzene (o)	ug/l	558
Hexachlorobutadiene	ug/l	357
Tetrahydrothiophene	ug/l	492
Benzene	ug/l	5,477
Total Volatiles	ug/l	55,371
Alpha-BHC	ug/l	182
Gamma-BHC	ug/l	32.7
Beta-BHC	ug/l	181
Delta-BHC	ug/l	58.6
PCB 1254	ug/l	41.3
PCB 1248	ug/l	909
Bis(2-ethylhexyl)phthalate	ug/l	5.07
Naphthalene	ug/l	3.85
Acetone	ug/l	1.24
1,2-Dichloroethene (total)	ug/l	5,501
Acenaphthene	ug/l	1.36
Fluorene	ug/l	0.82
Hexachlorobenzene	ug/l	16.5
Phenanthrene	ug/l	3.76

Constituent Parameters	Units	Average Value
Fluoranthene	ug/l	6.8
Pyrene	ug/l	3.7
Anthracene	ug/l	0.46
Phenol	ug/l	10.7
2-Chlorophenol	ug/l	8.58
1,3-Dichlorobenzene	ug/l	173
1,2,4-Trichlorobenzene	ug/l	894
1,2,3-Trichlorobenzene	ug/l	499
Methanol	ug/l	1,218
Aluminum	mg/l	73.2
Arsenic	mg/l	0.10
Barium	mg/l	0.75
Beryllium, Total	mg/l	0.00
Cadmium, Total	mg/l	0.01
Calcium, Total	mg/l	235
Chromium, Total	mg/l	0.09
Cobalt, Total	mg/l	0.31
Copper, Total	mg/l	2.10
Iron, Total	mg/l	114
Lead, Total	mg/l	1.61
Magnesium, Total	mg/l	67.5
Manganese, Total	mg/l	4.21
Mercury	ug/l	22.7
Nickel, Total	mg/l	0.53
Potassium, Total	mg/l	9.58
Silver, Total	mg/l	0.01
Sodium, Total	mg/l	109
Vanadium, Total	mg/l	0.06
Zinc, Total	mg/l	4.59
Alkalinity, Total	mg/l	132
Hardness, Total	mg/l	502
pH		7.29
Total Suspended Solids	mg/l	258
Turbidity	NTU	119

ATTACHMENT 3

PREDICTED PARTITIONING BETWEEN SUSPENDED SOLIDS AND AQUEOUS PHASES

In our initial investigations, water quality analyses did not differentiate between soluble and insoluble fractions of the tested parameters. Since suspended solids pretreatment is needed to make the remediation waters compatible for treatment in the organic removal treatment units, subsequent analyses were performed as "filtered" (which reflect soluble concentrations only) and "unfiltered" or "total" (which reflect the total of soluble and insoluble fractions) analyses to attempt to differentiate between the fractions and to predict pretreatment removals.

In recent treatability tests, synthetic remediation waters were prepared by mixing together samples of Gill Creek water with samples of groundwaters obtained from the recovery wells located along Gill Creek as follows:

TS-1: one part groundwater to three parts creek water
TS-2: one part groundwater to one part creek water
TS-3: two parts groundwater to one part creek water

The fractions were chosen to reflect our best estimates at the time of how different water sources will contribute to the makeup of the remediation waters. The synthetic treatability waters are believed to conservatively overestimate the poor quality of the remediation waters since dilution from relatively good quality stormwaters and other factors which would tend to improve water quality were not considered in their preparation.

These synthetic waters were mixed with contaminated sediments taken from Gill Creek to provide a range of suspended solids concentrations. The resultant mixtures were then analyzed on a total (i.e. unfiltered) and filtered (through a 0.45 micron filter) basis to determine how inorganic and organic parameters may partition between the water and the suspended solids. A draft (the results have not been validated yet) of the results is attached as Table 1. A review shows that both organic and inorganic parameters compose and/or adsorb to the insoluble fractions of the synthetic waters. Substantial removals of all parameters, and especially the inorganic metallic parameters, can therefore be reasonably expected in the suspended solids pretreatment step.

TABLE 1 (DRAFT)

Estimated Quality of Remediation Water of Samples 1, 2, and 3
Unfiltered vs. Filtered

PARAMETER	UNITS	UNFILTERED SAMPLES*			FILTERED SAMPLES*		
		TS-1	TS-2	TS-3	TS-1	TS-2	TS-3
pH	SU	7.5	7.2	7.4			
Sulfate	mg/L	226	385	333			
Nitrate	mg/L	0.47	0.16	0.1			
Phosphate (ortho)	mg/L	0.12	< 0.1	< 0.1			
Silica, total, soluble	mg/L	5.3	5.2	5.7			
Chloride, soluble	mg/L	818	1430	1840			
Fluoride	mg/L	0.68	0.87	1.33			
Oxygen, dissolved	mg/L	6.86	3.21	5.25			
Conductivity	uhmos/cm	3160	5330	6640			
Organic carbon, total	mg/L	11.2	24	23.3			
Total suspended solids	mg/L	481	1540	1960			
Total dissolved solids	mg/L	1880	3200	4060			
Turbidity	NTU	570	2800	2900			
Alkalinity, total	mg/L	19	385	236			
Hardness	mg/L	840	2040	1920			
Barium	mg/L	0.13	17	0.37	0.055	0.06	0.09
Cadmium	mg/L	< 0.008	< 0.008	< 0.008	< 0.008	< 0.008	< 0.008
Calcium	mg/L	170	670	500	110	170	190
Chromium	mg/L	0.02	0.29	0.05	< 0.009	< 0.009	< 0.009
Copper	mg/L	0.02	1	0.09	< 0.01	< 0.01	< 0.01
Iron	mg/L	42	160	150	0.078	0.41	0.22
Lead	mg/L	0.05	0.88	0.11	< 0.043	0.05	< 0.043
Magnesium	mg/L	49	150	180	19	21	21
Manganese	mg/L	0.47	2.2	1.8	0.15	0.33	0.31
Nickel	mg/L	< 0.012	0.2	0.04	< 0.012	< 0.012	< 0.012
Potassium	mg/L	8	33	20	6	10	11
Sodium	mg/L	460	850	1100	480	860	1000
Zinc	mg/L	0.14	5.2	0.45	0.013	0.013	0.012
Benzene	ug/L	24	85	64	19	50	54
Chlorobenzene	ug/L	2.8	51	7	2.2	18	6.4
1,2-Dichloroethylene	ug/L	2,500	15,000J	6,300	1,900	7,000	6,600
Tetrachloroethene	ug/L	130	17,000J	530	97	5,000	440
1,1,2,2-Tetrachloroethane	ug/L	1,700	3,000	5,100	1,300	4,100	3,100
Trichloroethylene	ug/L	2,400	14,000J	6,100	1,400	6,400	5,100
Vinyl chloride	ug/L	290J	2,100	1,100	150	750	1,000
1,2-Dichlorobenzene	ug/L	ND	13	ND	ND	5.7	ND
1,3-Dichlorobenzene	ug/L	ND	5.6	ND	ND	2.1	ND
1,4-Dichlorobenzene	ug/L	ND	22	ND	ND	8.4	ND
1,2,4-Trichlorobenzene	ug/L	ND	26	ND	ND	12	ND
Naphthalene	ug/L	ND	3.5	ND	ND	1.7	ND
Hexachlorobutadiene	ug/L	ND	310J	2.4	ND	80	ND
Hexachlorobenzene	ug/L	ND	33	ND	ND	ND	ND
Aroclor-1248	ug/L	ND	1500	ND	ND	ND	ND
alpha-BHC	ug/L	0.24	72	0.74	0.18	100	0.72

J = Estimated
ND = Not detected

*All laboratory data received from Kiber Analytical Services.

ATT. ... 4A: ORGANICS
GILL CREEK REMEDIATION PREDICTED STRIPPER EFFLUENT QUALITY

COLUMN:	B	C	D	E	F	G	H	I	J	K
Contaminant	INFLUENT CONC. FROM REMEDIATION WATERS (AS TOTAL PPB)	INFLUENT CONC. FROM GW WELLS (TOT. PPB)	EXPECTED STRIPPER EFFLUENT QUALITY ppb(2)	ppd(1)	REGULATORY CONSTRAINTS (4) CONC. (ppb)	MASS (ppd) max	avg	BASIS (MAIL, 023 023+024)	1991 ANNUAL DISCHARGE IN PPD	ACTUAL MAX DAY IN 90-91 IN PPD
FLOW (MGD)	0.2304	0.0432		0.2808						
ORGANICS (ppb)										
ppm suspended solids	258		50	161.871						
alpha-BHC	180		9.e-06	2.9e-08	1	0.014		MAIL		<0.002
PCB-1248	950		0.0871	0.00028		0.05	0.02	023	0.009	<.014
vinyl chloride	2830	2204	6.e-09	1.9e-11	38	0.03		MAIL		0.107
cis-1,2-Dichloroethene	5501	40278	0.00004	1.1e-07		2.1	0.84	023+024	0.022	0.13
trichloroethene	22624	35300	1.1e-07	3.4e-10		13	5.18	023+024	2.48	6.28
benzene	5477		0.00003	8.4e-08	25	0.062		MAIL		<.007
tetrachloroethene	7205	14290	7.8e-10	2.5e-12		5.73	2.29	023	0.81	1.92
1,1,2,2-tetrachloroethane	7076	1259	0.0822	0.00027		5.33	2.13	023	1.33	3.41
chlorobenzene	1959		0.00044	1.4e-06	25	0.02		MAIL		0.336
1,3-dichlorobenzene	175		2.1e-07	6.7e-10	3	0.016		MAIL		<.015
1,4-dichlorobenzene	387		6.3e-07	2.e-09	3	0.016		MAIL		<.015
1,2-dichlorobenzene	558		2.2e-06	7.1e-09	3	0.016		MAIL		<.015
1,2,4 trichlorobenzene	894		4.7e-10	1.5e-12	3	0.016		MAIL		<.015
napthalene	3.85		0.00107	3.5e-06	10	0.022		MAIL		<.015
hexachlorobutadiene	357	54	5.5e-12	1.8e-14	3	0.009		MAIL	0.03	0.055
hexachlorbenzene	16.5		1.5e-13	0	3	0.009		MAIL	0.17	0.28
TOTAL PHENOL	380		313.1	1.01363		7.05	2.82	023	0.03	0.041
1,1 DICHLOROETHENE	148		1.8e-12	0		2.1	0.84	023+024	0.022	0.13
METHYLENE CHLORIDE	2649	2465	7.3e-06	2.4e-08	***	0.15		MAIL	0.116	0.48
CHLOROFORM	862	28777	5.e-06	1.6e-08		19.2	7.69	023+024	1.67	3.92
1,1,1 TRICHLOROETHANE	296	175	1.2e-11	4.e-14		0.73	0.292	023+024		0.028
CARBON TETRACHLORIDE	136	19	4.3e-12	1.4e-14		1.1	0.44	023	0.05	0.23
HEXACHLOROETHANE	111	85	0	0						<0.015
GAMMA-BHC	30		20.2*	0.0654*	1	0.014		MAIL		<0.002
BETA-BHC	181		2.5e-09	8.e-12	1	0.014		MAIL		<0.002
DELTA-BHC	58.6		0.00028	9.e-07	1	0.014		MAIL		<0.002
PCB 1254	41.3	0	@			0.05	0.02	023	0.009	<.014
BIS(2-ETHYLHEXYL)PHTHALATE	5.07		4.1	0.01327		1.25	0.5	023+024	0.53#	1.02
ACETONE	1.24		1	0.00324	3	0.009		MAIL		<0.015
PHENANTHRENE	3.76		0.00038	1.2e-06	3	0.017		MAIL		<0.015
FLUORANTHENE	6.8		0.0122	0.00004	3	0.009		MAIL		<0.015
PYRENE	3.8		0.0001	3.2e-07	10	0.009		MAIL		<0.015
ANTHRACENE	0.46			0	3	0.009		MAIL		<0.015
1,4 dichlorobutane	500	634	4.3e-07	1.4e-09						
acenaphthene	1.36		3.7e-06	1.2e-08	10	0.024		MAIL		<0.015
Fluorene	0.82		4.9e-06	1.6e-08						<0.015
tetrahydrothiophene	492	1630	0.0278	0.00009						
2-chlorophenol	8.58		0	0	10	0.063		MAIL		<0.015
1,2,3 Trichlorobenzene	499		198*	0.64101*	3	0.076		MAIL		
chloromethane	0	356	5.7e-12	1.8e-14						
methanol	1218		1005	3.2536						
trans 1, 2 Dichloroethene		261	##			2.1	0.84	023+024	0.022	0.13

ATTACHMENT 4A: ORGANICS
GILL CREEK REMEDIATION PREDICTED STRIPPER EFFLUENT QUALITY

COLUMN:	B	C	D	E	F	G	H	I	J	K
	INFLUENT CONC. FROM REMEDIATION WATERS (AS TOTAL PPB)	INFLUENT CONC. FROM GW WELLS (TOT. PPB)	EXPECTED STRIPPER EFFLUENT QUALITY		REGULATORY CONSTRAINTS (4)				1991 ANNUAL DISCHARGE IN PPD	ACTUAL MAX DAY IN 90-91 IN PPD
Contaminant			ppb(2)	ppd(1)	CONC. (ppb)		MASS (ppd) max	avg	BASIS (MAIL, 023 023+024)		

NOTES:

(1) THE COMPLIANCE ASSESSMENT WAS PERFORMED BY CONSERVATIVELY ASSUMING A GILL CREEK DEWATERING FLOW RATE OF 240 GPM IN ADDITION TO 30 GPM FROM GROUNDWATER RECOVERY WELLS
(2) EFFLUENT QUALITIES ARE PREDICTED ASSUMING INSOLUBLE FRACTION IS AS EASILY REMOVED AS SOLUBLE FRACTION AND USING [illegible] GPM [illegible] FLOW FROM REMEDIATION WATERS AND 30 GPM FROM RECOVERY WELLS
(3) * = EX [illegible] THE APPROPRIATE REGULATORY CONSTRAINTS

(4) # = ESTIMATED RESULTS [illegible] MDL BUT NOT QUANTIFIABLE
@ = assumed that 1248 and 1254 PCBs are equally well removed and thus 1254 reported w/ 1248 results
= INCLUDED W/ CONTRIBUTIONS FROM CIS ISOMER

FILE: POTW.W20

ATTACHMENT 4B: INORGANICS

GILL CREEK REMEDIATION PREDICTED STRIPPER EFFLUENT QUALITY

Contaminant	EXPECTED STRIPPER EFFLUENT Average Total ppm	ppd @165 gpm	ppd @240 gpm	REGULATORY CONSTRAINTS CONC. (ppb)	MASS (ppd) max (I)	avg (J)	BASIS (MAIL, 023 023+024)	1991 ANNUAL DISCH. IN PPD	ACTUAL MAX DAY IN 90-91 IN PPD
INORGANICS									
Susp. Solids	258	510.4317	742.446						
Aluminum	73.2	144.8201	210.647						
Arsenic	0.1	0.197842	0.28777						
Barium	0.75	1.483813	2.15827						
Cadmium	0.01	0.019784*	0.02878*	0.01	0.008		MAIL	0.006	0.006
Calcium	235	464.9281	676.259						
Chromium	0.09	0.178058	0.25899		2	0.8	023	0.2	0.23
Cobalt	0.31	0.613309	0.89209						
Copper	2.1*	4.154676*	6.04317*	0.04	0.965		MAIL	0.2	0.2
Iron	114	225.5396	328.058						
Lead	1.61	3.185252	4.63309		19.5	7.8	023	1.6	2.09
Magnesium	67.5	133.5432	194.245						
Manganese	4.21	8.329137	12.1151						
Mercury	0.0227	0.04491	0.06532		0.9	0.36	023	0.018	0.072
Nickle	0.53*	1.048561*	1.52518*	0.5	0.4		MAIL	1.29	0.264
Potassium	9.58	18.95324	27.5683						
Silver	0.01	0.019784	0.02878						
Vanadium	0.06	0.118705	0.17266						
Zinc	4.59	9.080935*	13.2086*		9	3.6	023	0.06	0.24

NOTE:
1. *= EXCEEDS ONE OR MORE OF THE APPROPRIATE REGULATORY CONSTRAINTS
2. PREDICTIONS ARE VERY CONSERVATIVE SINCE THEY DO NOT CONSIDER THE SUBSTANTIAL REMOVALS EXPECTED BY PRETREATMENT FOR SOLIDS REMOVAL

FILE POTW2.W20

Dalton

City of Niagara Falls, New York Constable

May 28, 1992

Mr. David E. Leemhuis
NYS Department of Environmental Conservation
270 Michigan Avenue
Buffalo, NY 14208

RE: SIU Permit No. 7 Modification
Gill Creek Remediation
City of Niagara Falls POTW
SPDES No. NY 0026336

Dear Mr. Leemhuis:

Introduction: Attached is a proposal from the E. I. DuPont Co. to reroute Gill Creek to the City of Niagara Falls Diversion Sewer for the purpose of remediating contaminated sediments in the creek bed. DuPont (SIU Discharge Permit No. 7) has entered into agreement with the Olin Corporation (SIU Discharge Permit No. 23) and the NYSDEC to remediate two area's of the creek. The removal of the contaminated soil will be performed in the "dry" by diverting creek waters to the City's diversion sewer via an "inlet structure". The inlet structure was installed in 1981 when DuPont/Olin conducted a similar project to remediate other areas of the creek. The area's of concern for the city are the potential contamination inherent in the creek waters upstream of Buffalo Avenue, the capacity of the diversion sewer and it's ability to accept creek waters, particularly during storm events, and where excavation site remedial waters will be treated. These concerns are addressed in the ensuing discussion.

History: The 1981 remedial project progressed over a period of fourteen months. DuPont voluntarily remediated portions of Gill Creek along the plant property. To accomplish this an inlet structure (slidegate) was installed (figure 1 of proposal) to allow Creek water to be diverted into a 36" sewer leading to the Buffalo Avenue Diversion Sewer. The inlet structure was designed to allow a maximum of 19.4 MGD to flow to the diversion sewer.

During the 1981 clean out, the remedial area diversion structure (dam) was overflowed on two occasions. The first was due to a spring thaw in conjunction with a storm event, and the second caused by release of water from a settling basin during clean up work on Hyde Park. However, in no circumstance was capacity of the diversion sewer exceeded. The clean up was completed in 1981. Since that time additional areas of the creek have been identified as requiring remediation.

Treatability: The City's treatability review focused on three area's of concern:

a) Capacity of the diversion sewer to accept creek waters
b) Potential for contaminated waters to enter City's Diversion Sewer
c) City's ability to treat miscellaneous remedial waters after pretreatment with DuPont's ground water stream stripper unit.

a) Diversion Sewer Capacity:
The capacity of the inlet structure leading to the Diversion Sewer is 19.4 MGD. The capacity of the Diversion Sewer is 35.8 MGD. However present remaining capacity of the sewer is 20.3 MGD. "Dry" weather flow of the creek is approximately 2 MGD. Dry weather creek flows will not pose a problem to the Diversion Sewer. Storm event flows from the creek could range from 6.5 MGD up to 58.1 MGD. In extreme cases would exceed the capacity of the inlet structure as well as the Diversion sewer capacity. Consequently the City has required DuPont to develop a monitoring plan to continuously monitor flow in the diversion sewer to preclude flooding during storm events. The system is described in detail in DuPont's April 30, 1992 letter to the City. The system consists of a remote high level probe which sounds an alarm in DuPont;s control room. Should the creek flows approach sewer capacity, the slidegate on the inlet structure would be manually closed and creek water wold flow into the remedial area. Based on these safeguards, plus past experience during the 1981 remediation the City is confident the sewer will be protected. It should be noted that DuPont does not wish to overflow the diversion dam releasing creek water into the remedial area. This poses a safety issue for personnel and equipment. Such overflows wold also cause project delays. To prevent this, DuPont is currently seeking permission to partially dewater Hyde Park Lake and use it as a retention pond for the purpose of flood control. Storm water could be held back until after the initial first flush and then slowly released in a controlled manner. However, this issue is still under discussion and the City has not yet granted permission.

b) Contamination Upstream of Inlet Structure:
Although the creek waters will end up in the same receiving water (Niagara River), the City was concerned about contaminated creek water passing through a City sewer. Consequently, DuPont was required to submit analysis of the creek waters upstream of the inlet structure. The results of the analysis are shown in Appendix B of the January 17, 1992 proposal. Both water and soil samples were collected in the creek on November 15 and 16, 1990. The samples were split with the NYSDEC. DEC had the samples analyzed by VERSAR Laboratories, Inc. while Olin utilized IT Laboratory. The analytical results showed conflicting data for soil sample analysis. This made interpretation of the data difficult. In general it could be assumed that the soil is contaminated with several volatile, semi-volatile and metal pollutants. Conversely, the results of water sample analysis of the two labs did agree. More importantly the results indicate no contamination with the exception of Hexachlorocyclohexane. This suggests that although soil samples show low level contamination, the pollutants tend to remain stable in the soil and do not leach into the water.

c) Miscellaneous Flow to the Steam Stripper
Throughout the remedial project there will be flows entering the remedial site; groundwater infiltration, run off, dredged soil drainage and seepage through diversion structures. Because these waters will enter the remedial site, they must be removed. Because the existing groundwater steam stripper does not possess sufficient capacity, DuPont has proposed to install an air stripper unit followed by activated carbon treatment. The resulting discharge will contain additional pollutant loads. However, most pollutants will be covered by DuPont's existing permit limits at MS #2 (023). Those pollutants which will exceed existing permit limits will need temporary modification. These pollutants are: chromium, copper, lead, mercury, nickel, zinc, trichlorobenzenes, dichlorophenol and Hexachlorocyclohexane. The attached MAIL/RAIL Table shows sufficient reserve exists for the additional pollutant loads.

Approval: The importance of this project from an environmental viewpoint cannot be underestimated. The removal of contaminated soil form the Creek bed requires the creek water to be diverted during the clean up. The Gill Creek water has been analyzed and shows no significant pollutant loads. The City will require flow monitoring throughout the project to prevent surcharging of the diversion sewer especially during storm events. The pollutants expected from miscellaneous waters expected to enter the remedial site shall be pumped to an air stripper unit followed by treatment using granular activated carbon to ensure no slug loadings are discharged to the POTW. Based on the environmental benefit and the POTW's ability to adequately treat the discharge, the City is willing to accept this wastestream on a temporary basis pending USEPA and NYSDEC approval pursuant to Section XII of Consent Decree Civil No. 81-363C.

Sincerely,

DEPARTMENT OF WASTEWATER FACILITIES

Albert C Zaepfel

Albert C. Zaepfel
Industrial Monitoring Coordinator

ACZ:mjl

cc: File 7

az161

City of Niagara Falls, New York

May 27, 1992

E. I. DuPont de Nemours & Co. Inc. Significant Industrial User Permit No. 7 is hereby amended as follows:

Permission is hereby granted to discharge, to the City's combined sewer on Buffalo Avenue, pretreated wastewater generated from the remediation of Gill Creek, subject to the following conditions:

A) This approval is temporary and is granted only for the life of the creek remediation project.

B) Wastewater from infiltration, storm water run-off, dredged creek bed soil drainage, seepage from the diversion (dam) structures, etc. shall receive pretreatment via an air stripper unit followed by granular activated carbon, prior to discharge to the City sewer via outfall 023 (MS #2).

C) Because this pretreated wastewater is expected to contain additional pollutant loads, the discharge limitations and monitoring requirements at 023 (MS #2) have been modified. The new (temporary) limits and monitoring frequencies are listed on the table entitled "Temporary Limitations at 023 Gill Creek Remediation." Upon completion of project discharge limitations, monitoring, and reporting requirements shall revert to the original limits and requirements.

D) Both monthly and quarterly monitoring results shall be reported in the company's Quarterly Self-Monitoring Report.

E) DuPont shall continuously monitor creek flow to the diversion sewer by use of a remote flow level sensor located in the sewer which detects high flow levels. In the event of high flow levels (storms), DuPont personnel shall act immediately to take all necessary actions to prevent a surcharged condition in the diversion sewer.

TEMPORARY LIMITATIONS AT 023

GILL CREEK REMEDIATION

POLLUTANT MONITORING AT 023 (MS #2)	ANNUAL AVG	DAILY MAX	UNITS	MEASUREMT FREQUENCY	SAMPLE TYPE
Phosphorous	15.0	38.0	lbs/d	1/Qtr	3
Carbon Tetrachloride	0.44	1.10	lbs/d	1/Qtr	2
Dichlorobromomethane	0.144	0.36	lbs/d	1/Qtr	2
Tetrachloroethylenes	2.29	5.73	lbs/d	1/Qtr	2
Tetrachloroethane	2.13	5.33	lbs/d	1/Qtr	2
Hexachlorobutadiene	0.40	1.00	lbs/d	1/Qtr	2
PCB's	0.02	0.05	lbs/d	1/Qtr	3
T. Phenols	2.82	7.05	lbs/d	1/Qtr	3
*Chromium	1.0	2.0	lbs/d	1/mo	3
*Lead	10.0	19.5	lbs/d	1/mo	3
*Mercury	0.6	1.5	lbs/d	1/mo	3
*Zinc	25.0	30.0	lbs/d	1/mo	3
Residual Chlorine	300	750	lbs/d	2/shift	Gra
Hexachlorobenzene	1.00	2.50	lbs/d	1/Qtr	3
**Copper	13.0	18.0	lbs/d	1/mo	3
**Nickel	4.0	6.0	lbs/d	1/mo	3
**Trichlorobenzenes	4.0	8.0	lbs/d	1/mo	2
**Hexachlorocyclohexane	0.16	0.25	lbs/d	1/mo	3
**Dichlorophenol	0.1	0.2	lbs/d	1/mo	3

* Existing Pollutant Limitations modified for Gill Creek Project

**Pollutant Limitations added for Gill Creek Project

Woodward-Clyde Consultants

Engineering & sciences applied to the earth & its environment

File 5215D

June 2, 1992

Mr. William Hinkle
Regional Real Estate Administrator
New York Power Authority
P.O. Box 277
Niagara Falls, NY 14302

Subject: Gill Creek Remediation, Niagara Falls, New York
Application For Permit To Do Work Under
The Jurisdiction Of NYPA And NYSOPRHP

Dear Mr. Hinkle:

On April 20, 1992, E.I. du Pont de Nemours and Company, Inc. (Du Pont) and Olin Corporation submitted the above-referenced application for activities related to the remediation of contaminated sediments in Gill Creek. A portion of the activities subject to your review involves constructing a temporary cofferdam in the Niagara River at the mouth of Gill Creek. The cofferdam design submitted in the Application consists of a zoned embankment with a riverside rockfill zone and a creekside earthfill zone. (Refer to Section E in the Application.) As an alternative to the rockfill and earthfill design, Du Pont and Olin have evaluated constructing a cellular cofferdam using sheet piles, low permeability geomembrane and earthfill. In general, the advantages of using a cellular cofferdam are: lower risk of release to the river of suspended solids during installation and removal; lower volume of materials needed for construction; lower risk of cofferdam material contamination during sediment removal; faster drawdown of water in Gill Creek; and a shorter cofferdam construction schedule. The Applicants respectfully request your review and approval of a cellular cofferdam in lieu of the rock and earthfill cofferdam.

Enclosed for your review is a revised Section E which describes the construction and removal of a cellular cofferdam. Figures 9 and 10 (revised) illustrate the plan view, profile and typical section of the cellular cofferdam. The crest and spillway elevations will be the same as the rockfill and earthfill design. The cellular cofferdam will, however, require considerably less fill material to be placed in the Niagara River; approximately 4,000 cubic yards versus 13,000 cubic yards for the rockfill and earthfill design. Fewer truck trips will be necessary to transport materials to the site. The

22915/LE44 06-02-92/RPT/6

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extent of excavation of the Niagara River bank will be similar to the excavation that was proposed to install the sheet pile cutoff wall in the rockfill cofferdam design. The seepage into the remediation areas will also be approximately the same in both designs. The function of both structures is identical and there is no change to the other remediation activities or construction sequence.

We appreciate your review of the enclosed revision to the Application For Permit To Do Work. If you have any questions or comments, please call Leslie Warner, Du Pont, at 716-278-5452 or me at 303-740-3896.

Sincerely,

Paula Daukas

Paula Daukas
Senior Project Scientist

PD:hb

Enclosure (8 copies)

1c: J. Ford, NYPA
D. Violanti, Niagara Frontier Park (3 copies)
M. Piastru, Niagara Frontier Park
Y. Erk, NYSDEC (2 copies)
L. Warner, Du Pont
J. Brown, Olin
M. Vermersch, WCC
Binder

SECTION E (REVISED)
CELLULAR COFFERDAM CONSTRUCTION AND REMOVAL

Temporary diversion structures will be constructed to divert Gill Creek normal flows and the Niagara River from the remediation area and to manage water handling operations during the remediation of Gill Creek. A cofferdam (diversion structure No. 2) will be constructed in the Niagara River at the mouth of Gill Creek to separate the river water from the creek channel. This section outlines the details associated with the construction and removal of the cofferdam.

EQUIPMENT AND MATERIAL STORAGE AREAS

Equipment and material storage areas near Gill Creek, along the banks of the Niagara River, will be needed for construction and removal of the cofferdam. The proposed areas are shown in Figure 6. The areas will be used for storing equipment, stockpiling dam materials (e.g., rockfill, earthfill, sheet piles), and for accessing the dam with heavy equipment. Staked hay bales will be placed between the river banks and the staging areas to control silt transport into the Niagara River.

CONSTRUCTION

The cellular cofferdam will be constructed in the Niagara River to retain the river water from Gill Creek as shown in Figure 7 (revised). The crest of the dam will be at elevation 565.5 feet or about 2.5 feet above the ordinary high water (OHW) level of the Niagara River as defined by the U.S. Army Corps of Engineers (El. 563.0 feet). The cofferdam will be constructed using sheet piles, geomembrane, and earthfill. The earthfill will consist of clayey sands or clayey gravels with approximately 20% fines (percent passing No. 200 sieve) and maximum size of 3 inches. The crest of the dam will be covered with a layer of soil cement approximately 6 inches thick. The interior of the creekside face of the cellular cofferdam will be lined with a geomembrane to protect the earthfill inside the sheet piling from contamination due to the remediation activities and also to divert any seepage to a drain at the toe of the cofferdam. The drain system, consisting of a slotted 6-inch PVC pipe embedded in clean sands and gravels, will collect seepage and route it to a sump from which it will be pumped back into the Niagara River. The bedrock below the cellular cofferdam will be grouted to minimize foundation seepage. The earthfill and drain material for cofferdam construction will be obtained from off-site borrow sources.

A spillway section will be constructed to pass storm waters from Gill Creek that exceed the upstream creek diversion and storage capacity. The spillway has been designed to handle, at a minimum, a 10-year storm occurring during the remediation. The crest of the spillway will be located at elevation 563.0 feet and a sandbag dike will be placed across the spillway section from elevation 563.0 feet to elevation 564.0 feet to minimize the risk of overtopping from the Niagara River side due to potentially higher water levels than the OHW level (El. 563.0). Figure 8 (revised) shows a cross-section at the location of the spillway. The sandbags will be removed in the event of an overflow from the creek side.

A 50-foot-wide emergency-breach section will be provided to increase flood handling capacity. The top of the sheet piles of the two westernmost cells will be cut at elevation 561.0 feet. The upper portion of the sheet pile sections, along with the backfill above 561.0 feet, will be removed by a backhoe in accordance with the flood mitigation plan being developed for the City of Niagara Falls and NYSDEC, should any large flood occur.

The sheet piling, earthfill, and other materials will be transported to the cofferdam site using barges or trucks and stockpiled adjacent to the Niagara River in the equipment and material storage areas shown in Figure 6. A total of approximately 4,000 cubic yards of material is estimated to construct the cofferdam. Equipment used to construct the cellular cofferdam, sheet pile cutoff wall, and grout curtain will include a crane, backhoe, drill rig, dump trucks, and possibly a barge.

Construction will start at the bank of the Niagara River. Construction of the first cell at each end of the cofferdam will involve excavation of the river bank to install the sheet piles. For each cell of the cofferdam, a template will be set up to allow the sheet piles to be connected together as a self-standing cylinder. After the cell is constructed, a secured diver will be sent down into the cell to determine if any openings exist between the bottom of the sheet piles and the bedrock river bottom. If significant openings are apparent, the appropriate sheet piles will be driven again to reduce the opening size. A geomembrane will then be placed on the inside of the cell by attaching it to a separate template that is lowered from above the cell with a crane. The geomembrane will only cover the creekside portion of the inside of the cell. The geomembrane will be attached to the top of the sheet piling with clamps and a diver will be sent into the cell to secure the bottom of the geomembrane with sandbags. The cell will then be filled with earthfill material using a crane-operated clamshell. After adjacent cells are constructed, sheet piles will be driven to connect the cells. The geomembrane and earthfill will be placed inside the connecting arc walls as was done for the cells. After the cofferdam cells are constructed and after completion of the cell fill placement, the bedrock will be grouted to form a seepage barrier below the cofferdam. This will be accomplished by drilling and grouting through pipes attached to the sheet piles on the interior side of the cell.

As shown on Figure 7 (revised), the cellular cofferdam will extend into the bank of the Niagara River and tie-in to a sheet pile wall constructed along the bank of the Niagara River. The sheet pile walls along the river bank will extend to the wing walls of the RMP. The sheet pile walls will be constructed by excavating a trench, backfilling the trench with earthfill material and driving sheet piles to form a cutoff wall. Boreholes will then be drilled adjacent to the sheet pile wall to allow grouting to be performed in the upper 30 feet of bedrock.

REMOVAL

After completion of the sediment removal activities in Gill Creek, the cofferdam in the Niagara River will be removed and the normal Gill Creek flow will be restored. The following paragraphs summarize the sequence of activities that will be used for removal of the cofferdam.

The first step in the removal of the cofferdam will be to remove the toe drain materials. After removal of the toe drain, Gill Creek will be rewatered by pumping water over diversion structure No. 1 (just upstream of Buffalo Avenue) and over diversion structure No. 2 (Cofferdam).

Excavation of the earthfill in the cofferdam will start at the center cell. The layer of soil cement covering the cell will be removed and the earthfill within the cell will be excavated with a crane clamshell and loaded onto trucks located on the crest. The earthfill will be temporarily stored at the material and equipment storage areas shown in Figure 6. Two representative samples of the earthfill material will be collected and analyzed for relevant compounds. The results from these analyses will be used to identify the disposal requirements for the earthfill materials.

After excavation of the earthfill from the center cell and the two adjacent connecting arcs, the geomembrane will be removed from inside the cells using a crane and diver, if necessary. The sheet piling will then be removed and stored at the material and equipment storage areas. Removal of the cells will proceed outward from the center cell. After removal of the sheet piling, the clamshell will be used, if necessary, to scrape the river bottom for excess materials from the cofferdam. A post-removal survey of the river bottom may be performed to ensure that the cofferdam materials have been adequately removed.

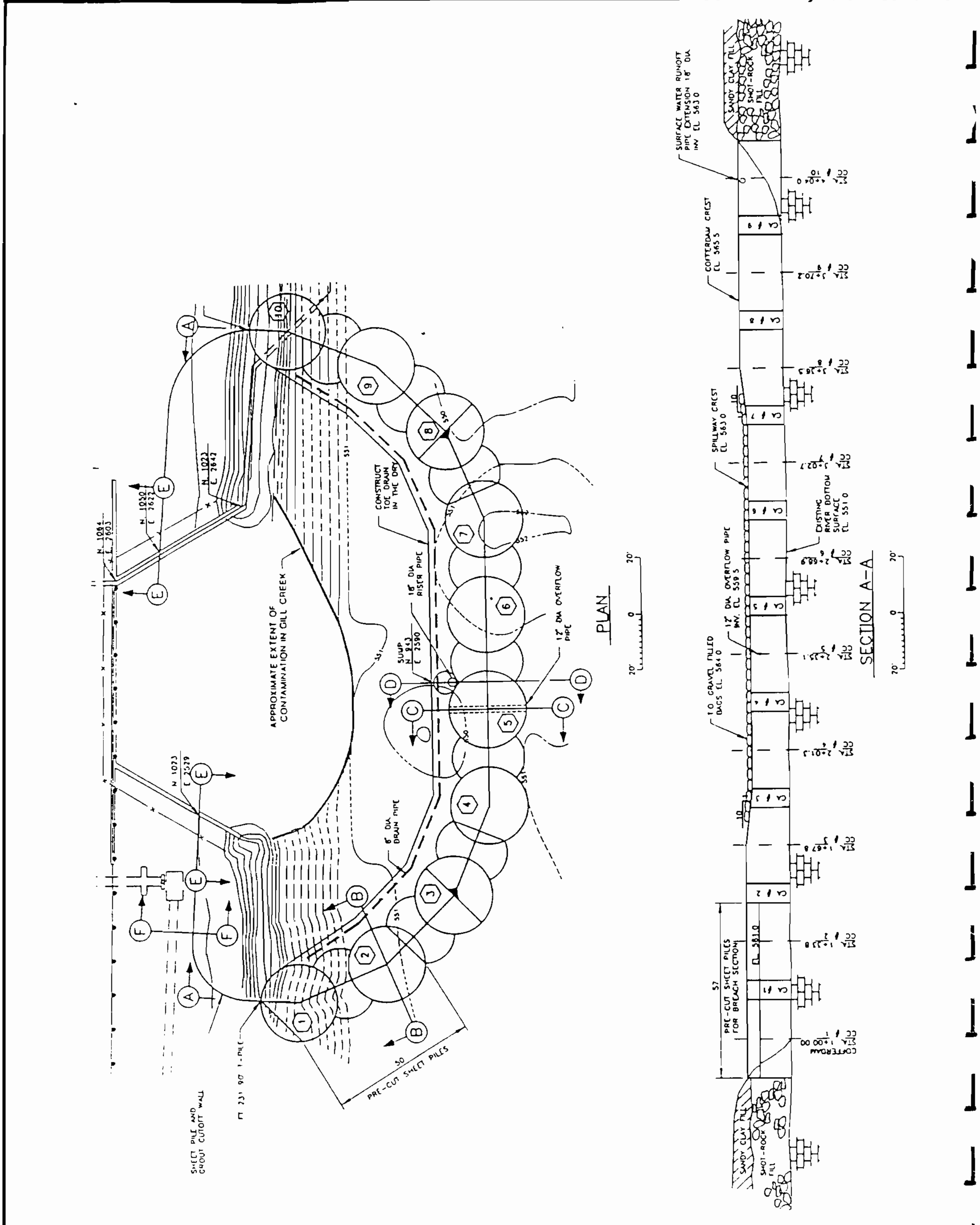
Following removal of the cofferdam materials from the site, the storage areas and the river banks will be returned to their pre-construction conditions. The equipment and material storage areas and other areas disturbed by construction activity will be regraded to match the natural topography, surfaced with topsoil, and seeded.

In response to public concern expressed about the potential impact on recreational fishing, Du Pont and Olin are evaluating the possible restoration of the cobble bar that will be removed with the sediments in Area 1. The cobble bar is composed of "shot rock" that has eroded out of the fill shoreline adjacent to the creek confluence. The U.S. Army Corps of Engineers has been requested to make a determination regarding the regulatory requirements for replacing the cobble bar to its approximate original condition. A final decision will be made prior to completion of the sediment removal. The project proponents request an opinion from the New York Power Authority (NYPA) regarding the replacement of the cobble bar.

SECURITY

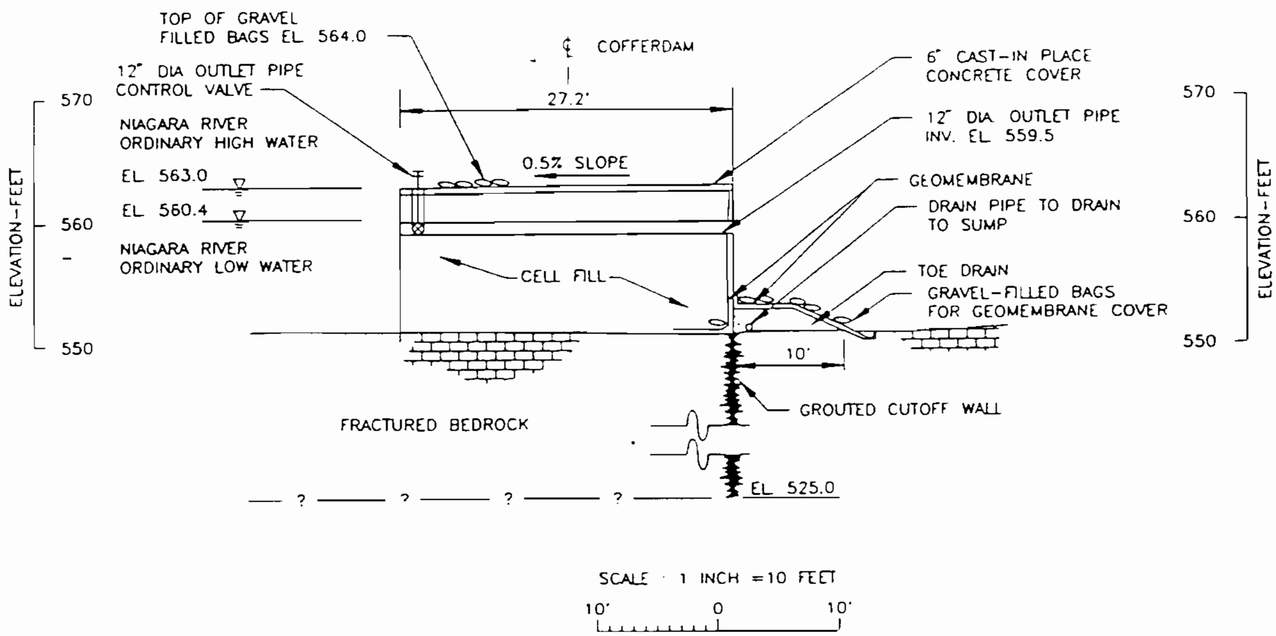
Precautions will be taken to inhibit public access to the cofferdam. As shown in Figure 6, fencing will surround the equipment and material storage areas and extend to the Niagara River. Signs will be placed around the site indicating that public access is not permitted. Surveillance by plant security personnel will be scheduled.

Lighting will be placed on the cofferdam. The lighting plan will adhere to guidelines specified by the U.S. Coast Guard.



Job No : 22915	GILL CREEK REMEDIATION CELLULAR COFFERDAM PLAN AND PROFILE
Prepared by : D.J.B.	
Date 5/6/92	

FIG. 7 (REVISED



Job No 22915	GILL CREEK REMEDIATION SPILLWAY AND OUTLET PIPE SECTION
Prepared by D.J.B	
Date 5/6/92	

FIG. 8 (REVISED)

File 52150

Woodward-Clyde Consultants

Engineering & sciences applied to the earth & its environment

June 2, 1992

Mr. Gary McDannell
Department of the Army
Buffalo District, Corps of Engineers
1776 Niagara Street
Buffalo, NY 14207

Subject: Gill Creek Remediation, Niagara Falls, New York
COE Application No. 9298642
Project No. 22915 (T109)

Dear Mr. McDannell:

On April 14, 1992, E.I. du Pont de Nemours and Company, Inc. (Du Pont) and Olin Corporation submitted a Joint Application For Permit for activities related to the remediation of contaminated sediments in Gill Creek. A portion of the activities subject to U.S. Army Corps of Engineers' (COE) jurisdiction involves constructing a temporary cofferdam in the Niagara River at the mouth of Gill Creek. The cofferdam design submitted in the Application consists of a zoned embankment with a riverside rockfill zone and a creekside earthfill zone. (Refer to Section 4.7.3 in the Application.) As an alternative to the rockfill and earthfill design, Du Pont and Olin have evaluated constructing a cellular cofferdam using sheet piles, low permeability geomembrane and earthfill. In general, the advantages of using a cellular cofferdam are: lower risk of release to the river of suspended solids during installation and removal; lower volume of materials needed for construction; lower risk of cofferdam material contamination during sediment removal; faster drawdown of water in Gill Creek; and a shorter cofferdam construction schedule. The Applicants respectfully request your review and approval of a cellular cofferdam in lieu of the rock and earthfill cofferdam.

Enclosed for your review is a revised Section 4.7.3 which describes the construction and removal of a cellular cofferdam. Figures 9 and 10 (revised) illustrate the plan view, profile and typical section of the cellular cofferdam. The crest and spillway elevations will be the same as the rockfill and earthfill design. The cellular cofferdam will, however, require considerably less fill material to be placed in the Niagara River; approximately 3,600 cubic yards below the ordinary high water elevation versus 12,000 cubic yards for the rockfill and earthfill design. (Refer to the attached revised Table

22915/LE41 06-02-92/RPT/6

Stanford Place 3, Suite 1000 • 4582 South Ulster Street • Denver, Colorado 80237-2637
303-694-2770 • Fax 303-694-3946

2.) Fewer truck trips will be necessary to transport materials to the site. The extent of excavation of the Niagara River bank will be similar to the excavation that was proposed to install the sheet pile cutoff wall in the rockfill cofferdam design. The seepage into the remediation areas will also be approximately the same in both designs. The function of both structures is identical and there is no change to the other remediation activities or construction sequence. The cellular cofferdam design will meet all the general conditions as described in Section 5.0 of the Application. In addition, the Applicants believe the change in cofferdam design will not affect the Section 401 Water Quality Certification or the coastal consistency assessment.

We appreciate your review of the enclosed revision to the Joint Application For Permit. If you have any questions or comments, please call Leslie Warner, Du Pont, at 716-278-5452 or me at 303-740-3896.

Sincerely,

Paula Daukas

Paula Daukas
Senior Project Scientist

PD:hb

Enclosure (3 copies)

1c: Paul Eismann, NYSDEC (2 copies)
Mike Corey, NYSDOS
Leslie Warner, Du Pont
Jim Brown, Olin
Max Vermersch, WCC
Binder

4.7.3 Diversion Structure No. 2 (Cellular Cofferdam) in Niagara River (REVISED)

The cellular cofferdam will be constructed in the Niagara River to retain the river water from Gill Creek as shown in Figure 9 (revised). The crest of the dam will be at elevation 565.5 feet or about 2.5 feet above the ordinary high water (OHW) level of the Niagara River as defined by the U.S. Army Corps of Engineers (El. 563.0 feet). The cofferdam will be constructed using sheet piles, geomembrane, and earthfill. The earthfill will consist of clayey sands or clayey gravels with approximately 20% fines (percent passing No. 200 sieve) and maximum size of 3 inches. The crest of the dam will be covered with a layer of soil cement approximately 6 inches thick. The interior of the creekside face of the cellular cofferdam will be lined with a geomembrane to protect the earthfill inside the sheet piling from contamination due to the remediation activities and also to divert any seepage to a drain at the toe of the cofferdam. The drain system, consisting of a slotted 6-inch PVC pipe embedded in clean sands and gravels, will collect seepage and route it to a sump from which it will be pumped back into the Niagara River. The bedrock below the cellular cofferdam will be grouted to minimize foundation seepage. The earthfill and drain material for cofferdam construction will be obtained from off-site borrow sources.

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A 50-foot-wide emergency-breach section will be provided to increase flood handling capacity. The top of the sheet piles of the two westernmost cells will be cut at elevation 561.0 feet. The upper portion of the sheet pile sections, along with the backfill above 561.0 feet, will be removed by a backhoe in accordance with the flood mitigation plan being developed for the City of Niagara Falls and NYSDEC, should any large flood occur.

The sheet piling, earthfill, and other materials will be transported to the cofferdam site using barges or trucks and stockpiled adjacent to the Niagara River in the equipment and material storage areas shown in Figure 6. A total of approximately 4,000 cubic yards (3,600 cubic yards below the OHW elevation) of material is estimated to construct the cofferdam. (Refer to revised Table 2). Equipment used to construct the cellular cofferdam, sheet pile cutoff wall, and grout curtain will include a crane, backhoe, drill rig, dump trucks, and possibly a barge.

Construction will start at the bank of the Niagara River. Construction of the first cell at each end of the cofferdam will involve excavation of the river bank to install the sheet piles. For each cell of the cofferdam, a template will be set up to allow the sheet piles to be connected together as a self-standing cylinder. After the cell is constructed, a secured diver will be sent down into the cell to determine if any openings exist between the bottom of the sheet piles and the bedrock river bottom. If significant openings are apparent, the appropriate sheet piles will be driven again to reduce the opening size. A geomembrane will then be placed on the inside of the cell by attaching it to a separate template that is lowered from above the cell with a crane. The geomembrane will only cover the creekside portion of the inside of the cell. The geomembrane will be attached to the top of the sheet piling with clamps and a diver will be sent into the cell to secure the bottom of the geomembrane with sandbags. The cell will then be filled with earthfill material using a crane-operated clamshell. After adjacent cells are constructed, sheet piles will be driven to connect the cells. The geomembrane and earthfill will be placed inside the connecting arc walls as was done for the cells. After the cofferdam cells are constructed and after completion of the cell fill placement, the bedrock will be grouted to form a seepage barrier below the cofferdam. This will be accomplished by drilling and grouting through pipes attached to the sheet piles on the interior side of the cell.

As shown on Figure 9 (revised), the cellular cofferdam will extend into the bank of the Niagara River and tie-in to a sheet pile wall constructed along the bank of the Niagara River. The sheet pile walls along the river bank will extend to the wing walls of the RMP. The sheet pile walls will be constructed by excavating a trench, backfilling the trench with earthfill material and driving sheet piles to form a cutoff wall. Boreholes will then be drilled adjacent to the sheet pile wall to allow grouting to be performed in the upper 30 feet of bedrock.

After completion of the sediment removal activities in Gill Creek, the cofferdam in the Niagara River will be removed and the normal Gill Creek flow will be restored. The following paragraphs summarize the sequence of activities that will be used for removal of the cofferdam.

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After excavation of the earthfill from the center cell and the two adjacent connecting arcs, the geomembrane will be removed from inside the cells using a crane and diver, if necessary. The sheet piling will then be removed and stored at the material and equipment storage areas. Removal of the cells will proceed outward from the center cell. After removal of the sheet piling, the clamshell will be used, if necessary, to scrape the river bottom for excess materials from the cofferdam. A post-removal survey of the river bottom may be performed to ensure that the cofferdam materials have been adequately removed.

Following removal of the cofferdam materials from the site, the storage areas and the river banks will be returned to their pre-construction conditions. The equipment and material storage areas and other areas disturbed by construction activity will be regraded to match the natural topography, surfaced with topsoil, and seeded.

TABLE 2 (REVISED)

QUANTITIES OF FILL ASSOCIATED WITH DIVERSION STRUCTURES

Diversion Structure		Fill Material	Total Quantity (cu yds)	Quantity Below OHW El.[1] (cu yds)
No. 1 -	Buffalo Ave.	Sandbags	65	60
No. 2 -	Earth & Rockfill Cofferdam	Rockfill, earthfill, filter material, soil cement, sandbags	13,000	12,000
	Cellular Cofferdam	Earthfill, filter material, soil cement, sandbags	7,000	6,000
No. 3 -	Adams Ave. (south)	Sandbags	20	20
No. 3a -	Adams Ave. (north)	Sandbags	35	35
No. 4 -	Staub Road	Sandbags	190	190

NOTES: All quantities are approximate.
[1] Ordinary high water (OHW) elevation for Niagara River and Gill Creek is 563.0 feet (EDASD).

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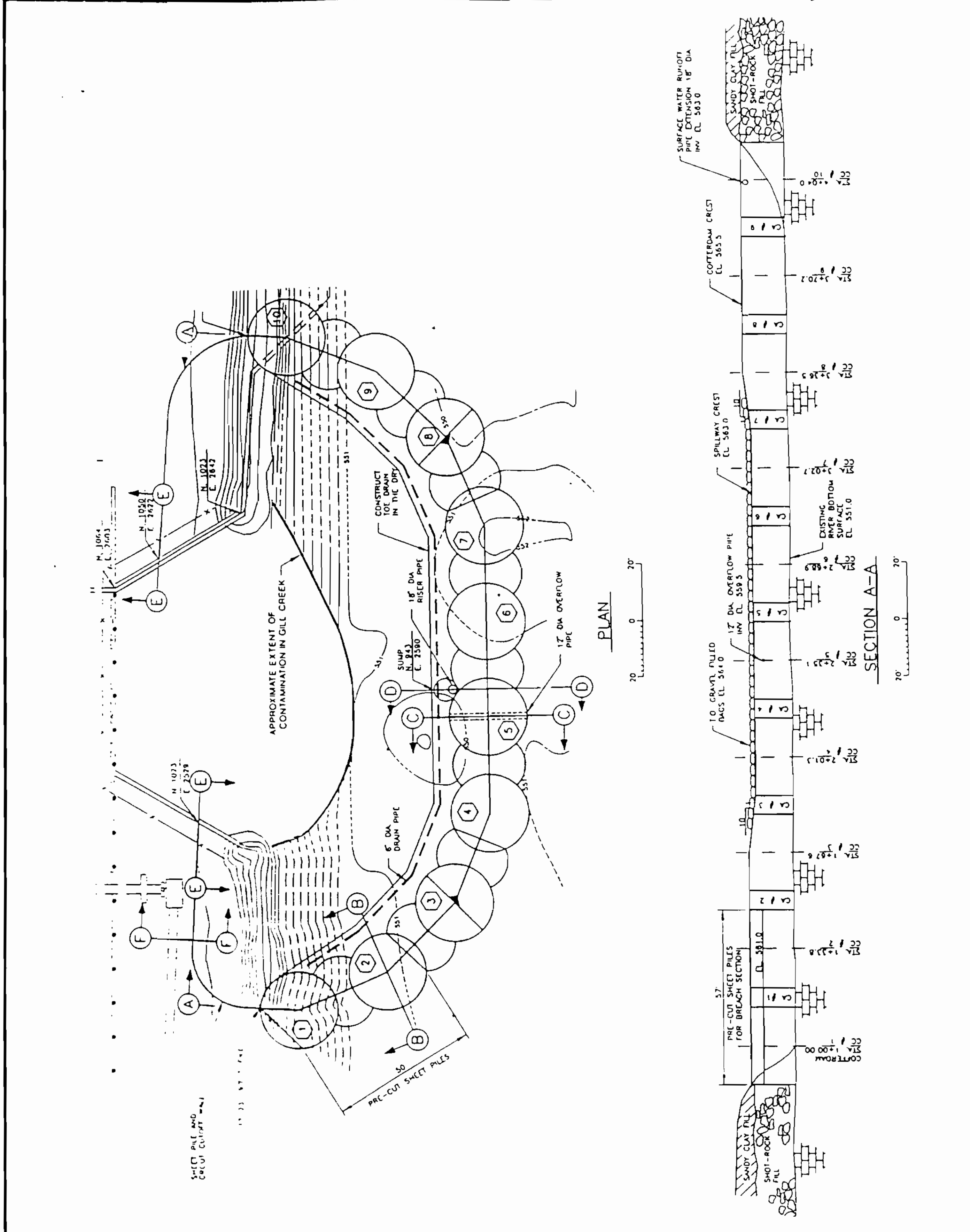
Woodward-Clyde Consultants



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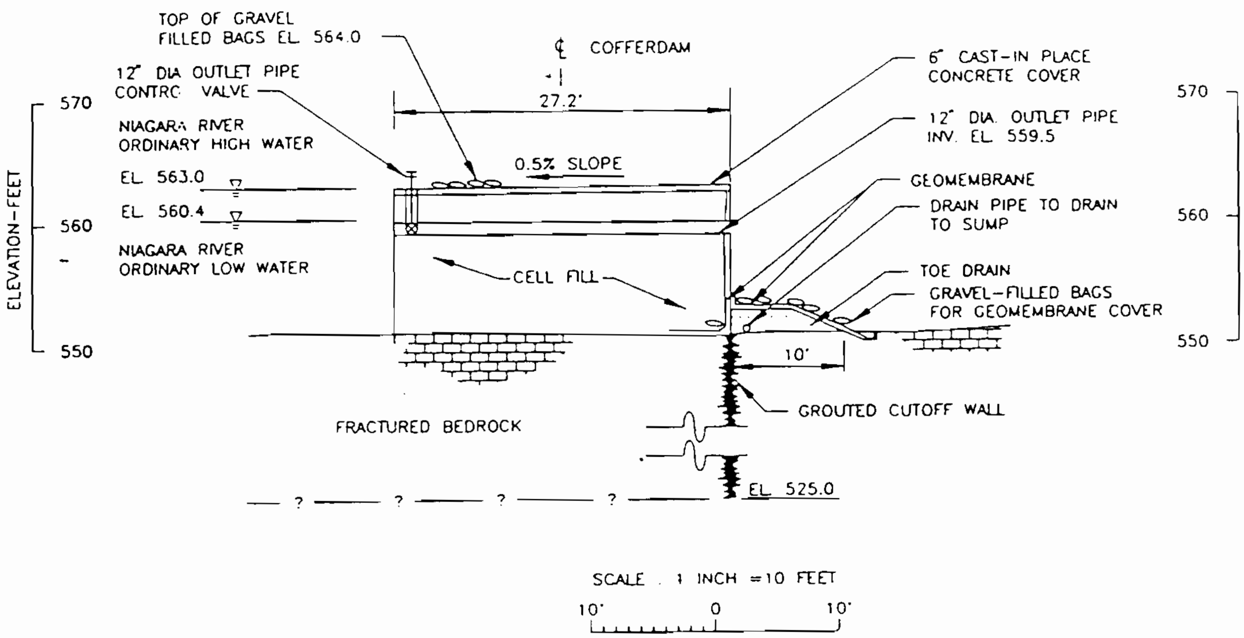
Prepared by · D.J.B.	
Date · 5/6/92	

FIG. 9 (REVISED)



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Prepared by D.J.B.	
Date 5/6/92	

FIG 10 (REVISED)

DU PONT

CHEMICALS

P.O. Box 787
Buffalo Ave & 26th Street
Niagara Falls, NY 14302-0787
(716) 278-5100

bcc: DMDarragh+
MVermersch - WCC
REAustin - Legal, D7016-1+
DEEllis - Engg, L3382
JELeemann - Chem, B16271+
PBButler - Chem, BOD918-4
RWPorter/DEShimp+
RJGentilucci/File 52150
JDClark

+Cover letter only

June 5, 1992

Mr. Michael J. Hinton, P.E.
NYS Dept. of Environmental Conservation
Division of Hazardous Waste Remediation
270 Michigan Avenue
Buffalo, NY 14203-2999

Dear Mr. Hinton:

DU PONT/OLIN GILL CREEK REMEDIATION PROGRAM

Du Pont and Olin, in preparing for remediation of the contaminated sediments in Gill Creek, submit the enclosed three copies of "Gill Creek Remediation Safety & Health Plan" for your review. As indicated in my letter of April 28, 1992, this plan is submitted as Appendix A of the "Gill Creek Remediation Plans and Specifications."

This plan has been developed to guide operations during the remediation project. It indicates the minimum requirements for worker and community safety and is consistent with Du Pont Niagara site rules for safety. Occupational Safety and Health requirements are included as well as general safety rules.

DEC reviewers will most likely want to focus on the section addressing air monitoring, action levels, and responses. Pages 19-25 provide this information. In addition, brief resumes of Du Pont and contractor personnel who will be responsible for safety compliance are included at the end of the text.

If you have any questions, please contact me at (716) 278-5452.

Sincerely,

Leslie A. Warner / klf

Leslie A. Warner
Senior Engineer, Engineering
and Environmental Affairs

LAW:klf
Enc.
19206

cc: Vallabh Thakkar - NYSDEC - Division of Air (Albany)
NYSDEC - Division of Environmental Enforcement (Buffalo)*
NYSDEC - Division of Hazardous Waste Remediation (Albany)*
Al Wakeman - NYSDOH - Bureau of Environmental Exposure Investigation (Albany)*
James Brown - Olin

*Two copies per order on consent

E. I. DuPont de Nemours

Niagara Falls, NY

Gill Creek Remediation

Safety & Health Plan

GILL CREEK REMEDIATION

SAFETY & HEALTH PLAN

Table of Contents

GILL CREEK REMEDIATION
SAFETY & HEALTH PLAN

I. INTRODUCTION

This document presents a safety and health plan to be adopted for Remedial Work Activities associated with Gill Creek Remediation Project, Niagara Falls, New York. Basic requirements to be addressed by this Health and Safety Plan/Accident Prevention Program have been stipulated within the industry standards. The Health and Safety Plan/ Accident Prevention Program meets the requirements of all governmental regulations. It will provide for a safe and minimal risk working environment for on-site personnel. It also provides for emergency response procedures necessary to minimize the potential of adverse impact of work activities on the general public. All site personnel will be required to comply with provisions of this Health and Safety Plan and Accident Prevention Program.

Basis

The Occupational Safety and Health Act (OSHA) and its regulations provide the basis for the safety and health program. Additional specifications within this section are in addition to the OSHA regulations and reflect the positions of the United States Environmental Protection Agency (EPA), the National Institute for Occupational Safety and Health (NIOSH), and American Conference of Governmental Industrial Hygienists (ACGIH) regarding procedures required to insure safe operations. In addition, work will be completed in accordance to all other applicable federal, state, municipality and local laws, ordinances, codes and other regulations. Where any of these are in conflict, the more stringent requirement will take precedence.

The safety and health of the public and on-site personnel and the protection of the environment will take precedence over other considerations for all project work. The Project Team Leader, Field Team Leader, Occupational Health Coordinator and Site Safety Construction Supervisor will be responsible for decisions regarding when work will be stopped or started for health or safety reasons.

E. I. du Pont de Nemours and Company, Inc. (DuPont) and Olin Corporation (Olin) will be conducting the remediation of contaminated sediments in Gill Creek in 1992. In accordance with the terms of the Order on Consent No. B9-0206-90-01, DuPont and Olin agree to cooperate with the New York State Department of Environmental Conservation (NYSDEC) in implementing the remedial alternative selected. The project is scheduled for completion in December 1992.

II. PROJECT BACKGROUND

Remediation Area

Gill Creek is located in the City of Niagara Falls (New York) and is a small tributary of the Niagara River. Its lower reaches traverse the DuPont Niagara Plant and Olin Buffalo Avenue Plant.

In the section of Gill Creek passing through the DuPont and Olin plants, three sediment contamination areas have been delineated. Area 1 is between the Niagara River and the south side of Staub Road; the northern end of Area 1 corresponds to the edge of the clay layer placed over the creek bottom after the 1981 sediment removal. Area 2 downstream (2D) which covers the area adjacent to the DuPont plant, and which starts south of Staub Road and ends just south of Adams Avenue. Area 3 is located below and south of Adams Avenue (Figure 1-2). Access to the creek is restricted by a chainlink fence and posted warning signs have been installed at the Niagara River confluence. The depth of water in the creek varies from very shallow (1 foot or less) around Buffalo Avenue to 5 to 13 feet deep around the mouth of the creek at the Niagara River.

Prior Remediation Effort

In 1981, DuPont and Olin undertook voluntary programs to remediate contaminated sediments from portions of Gill Creek which pass through their plant sites. Contaminated sediments were excavated from the creek bed and adjacent areas and then disposed off site in a secure landfill. The areas of remediation efforts of both companies are shown in Figure 1-3.

Post-1981 Remediation Studies

In 1988, an additional Gill Creek investigation was undertaken by DuPont and Olin. This was prompted when very high levels of polychlorinated biphenyls (PCBs) were detected in sediments and various aquatic plants in the mouth of Gill Creek by the NYSDEC and the Ontario Ministry of the Environment. The NYSDEC study also indicated the contaminants present in the sediments are bioavailable to benthic organisms. A supplementary sediment and surface water investigation was carried out in 1990 to define the contaminated areas in the creek bed and to determine how sediments are transported in the creek. This remedial investigation also included health and environmental risk assessment and bench scale studies to assess the treatability of creek sediments. A feasibility study evaluating alternatives for remedial design was approved. After a period of public comments, the Record of Decision was issued on March 30, 1992 (NYSDEC, 1992a).

General Site Conditions

1. Surface Water

Gill Creek enters the City of Niagara Falls at its northern corporate limits, and flows south 3.7 miles through residential, undeveloped, industrial and park areas before emptying into the Niagara River [Federal Emergency Management Agency (FEMA)]. Industrial and residential areas are located along Gill Creek on flat floodplains and low terraces. The normal stream flow of Gill Creek is estimated to be 1 to 3 cubic feet per second (cfs). This flow is maintained during non-winter months by a discharge from the New York Power Authority (NYPA) reservoir at the Robert Moses Power Station.

Non-contact cooling water from the Niachlor operation, a joint venture between Olin and DuPont, flows into the creek, adding approximately 67 cfs south of Adams Avenue. This discharge will be relocated for the duration of the project and will be returned to the creek until a permanent relocation to the Niagara River is constructed.

2. Geology

Since 1895, the shoreline has encroached approximately 900 feet upon the Niagara River through filling along the shoreline. The overburden along the banks of Gill Creek has been classified into four basic material types: (1) fill, (2) alluvium, (3) glaciolacustrine deposit, and (4) till. Most of the overburden along the Niagara River is fill.

The fill at the site consists of large boulders, shot rock, cinders in mixture of sand, silt and clay and lesser amounts of brick, stone, and slag. Its thickness varies from 7 to 13 feet near Gill Creek.

Alluvial deposits, when encountered, are composed of up to 2 to 3 feet of brown silt and clay, locally containing fine sand and gravel. These deposits unconformably overlie both the glaciolacustrine and till deposits.

Two types of glacial deposits are encountered in some areas on Olin and DuPont property. The glaciolacustrine deposit, when present, is estimated to consist of less than 1 foot to about 4 feet of brown silt and red clay. This deposit also includes clay and silt, with mixtures containing sand and gravel, locally. Glacial till, the lowermost overburden deposit, is estimated to consist of up to 2 to 8 feet of material composed of brown to gray silty clay/silt, containing rock fragments and sand. The till may also consist of red--brown silt, sand, gravel and clay containing occasional boulders.

The overburden at the site is underlain by the Lockport Formation of middle Silurian age (320 to 350 million years old). The Lockport Formation is principally a dolomite (calcium-magnesium carbonate). In the vicinity of Gill Creek, the bedrock surface generally slopes to the south, having localized slope reversals. The bedrock is jointed and fissured. Top of rock elevations are generally between Elevation 557 and 560 feet (Figure 1-5).

3. Groundwater

Groundwater in the vicinity of the site is encountered in both the unconsolidated overburden soils and in the underlying fractured dolomite of the Lockport Formation. The source of groundwater recharge for the overburden is from direct infiltration of precipitation. The source of groundwater recharge in the underlying Lockport Formation is from induced infiltration of water from the Niagara River and to a lesser extent from leakage downward from the overlying overburden groundwater flow regime (WCC 1983). Groundwater elevations in the fill and overburden near Gill Creek are approximately 561 to 564 feet.

4. Niagara River Influence

The creek water level is influenced by the water level in the Niagara River within the area to be remediated. The New York Power Authority (NYPA) has indicated that the controlled range of river level fluctuations is between Elevation 560.4 feet and 563.9 feet. The U.S. Corps of Engineers had indicated that ordinary river level fluctuations are within the range of Elevations 561.4 feet to Elevation 563.0 feet. The Niagara River level fluctuates within this range on a daily basis. According to the NYPA, the river level is controlled to limit the river level fluctuations to 1.5 feet per day.

Flow in Gill Creek is typically less than 0.4 feet per second (fps); velocities in the adjacent Niagara River are much higher (1.0 to 1.5 fps). The river bottom in this area is generally flat, with water depths in the the river at about 13 feet.

The edge of the fill that forms the river bank adjacent to the south wing-walls of the Robert Moses Parkway (RMP) bridge is eroding to the east under the influence of waves and ice. More than 60 percent of the mouth of the creek is now restricted by a partially submerged bar extending obliquely from the east shore. The bar is composed of shot rock that has eroded out of the fill shoreline adjacent to the creek entrance. The size of the cobbles making up this bar decreases with distance from the shoreline. Cobbles also have accumulated inside both wing-walls and throughout the eastern culvert of the RMP bridge.

Nature and Extent of Contamination

Environmental data have been collected regarding Gill Creek since the late 1970s. The database is composed of sediment and water analytical data, sediment EP Toxicity data, sediment Toxicity Characteristic Leaching Procedure (TCLP) data, biomonitoring studies, and benthic sampling and analysis. This information is summarized in the "Gill Creek Sediment Study" (WCC 1989), "Supplemental Sampling Results, Gill Creek at Adams Avenue" (WCC 1990a), "Risk Assessment for Remedial Options, Gill Creek at Adams Avenue" (WCC 1990b), "Treatability Study Report for Gill Creek" (WCC 1991a), and the "Gill Creek Sediment and Drain Water Sampling Summary Report" (WCC 1991b).

Most of the sediment contamination within Gill Creek is confined to the mouth area of the creek from the confluence with the Niagara River north to Staub Road (Figure 1-2). A layer of black sandy silt, ranging in thickness from 3 to 4 feet, is characteristic of the contaminated sediments in Area 1. The sediments in Area 1 are characterized by the presence of PCB-1248, chlorobenzene compounds, BHCs, volatile organic compounds, and mercury at elevated concentrations. Trace levels of polychlorinated dibenzo-p-dioxins (PCDD) and polychlorinated dibenzofurans (PCDF) were measured in the sediments at less than 1 part per billion (ppb) toxic equivalents.

Since the 1981 remediation, there has been some redeposition of sediment from the mouth area into Area 2D due to flow reversal as the river level fluctuates. Sediments in Area 2D are characterized by lower concentrations of the indicator contaminants identified in Area 1. These sediments have been deposited in a thin veneer less than 1 inch to a few inches thick.

Supplemental sediment sampling performed in the upstream portions of Gill Creek during May and August 1990 delineated a stretch of the creek immediately downstream of Adams Avenue which was not addressed during the 1981 remediation. This area of contaminated sediments (Area 3) extends from 5 feet under the Adams Avenue Bridge to 35 feet downstream of the bridge. The thickness of the contaminated sediments in Area 3 is 1 foot or less. The extent of Area 3 is easily distinguished from the previously remediated areas by the color and texture of the sediments.

Table A-1 presents ranges of sediment contaminant concentrations for selected indicator chemicals for Areas 1, 2D and 3. Table A-3 presents other analyses for sample collected to represent the highest levels of contamination that may be found. Actual excavated sediments are expected to have lower concentrations.

III. REMEDIATION DESCRIPTION

Objectives of Remediation

The goals of the remediation, as stated in the Record of Decision (NYSDEC 1992a), are to:

1. Minimize the potential for both the short and long term human exposure to chemicals in the creek sediments.

2. Reduce to the maximum extent practicable the exposure of chemicals to aquatic environment by removing sediments in the creek, therefore, restoring the affected area to a productive aquatic environment.

3. Minimize and/or stop the potential of migration of chemicals/sediments to the Niagara River.

4. Permanently treat and/or dispose of sediments in a manner consistent with all state and federal regulations.

5. Restore the site to a condition allowing productive use in accordance with local zoning laws and with minimal site restrictions or institutional controls.

Remediation Description

The remediation will include Areas 1, 2D and 3. The sediments in Areas 1 and 3 will be mechanically excavated after the creek has been diverted and the remaining creek water removed. The thin layer of sediments in Area 2D will be removed by vacuum dredging technique. Remediation water will be treated on site and discharged to the Publicly Owned Treatment Works (POTW). The sediments from Area 1 and 2D will be disposed at an off-site permitted landfill. The sediments from Area 3 will also be disposed at an off-site permitted landfill except that sediments from Area 3 that fail the EP Toxicity Test for gamma-BHC are prohibited from land disposal and will be treated to meet applicable Best Demonstrated Available Treatment (BDAT) standards prior to land disposal. Sediments requiring such treatment may be accumulated as hazardous waste in accordance with relevant NYSDEC and federal regulations prior to treatment and disposal.

The sediment waste from Areas 1 and 3 will be identified with EPA Hazardous Waste Codes D039 and D040 (tetrachloroethylene and trichloroethylene) as well as NYSDEC Hazardous Waste Code B007 (polychlorinated biphenyls). Levels of PCB have been found to vary from 1 to 10,700 ppm. Trace levels of dioxin (PCDD) have been detected.

IV. SITE SAFETY AND HEALTH PLANNING ORGANIZATION

The following people are responsible for the administration and operation of the Site Safety and Health and emergencies.

Project Team Leader	Jim McClincy
	Leslie Warner
Scientific Advisor	Steve Constable
	Robert Giraud
Occupational Health Coord.	Alvin Frith, CIH*
Site Safety Supervisor	Abiye Obunge*
Security Officer	Daryl Eddings
	B30 Security Center
Recordkeeper	Chris Lukasik
Field Team Leader	Peter Palczynski
Time Keeper	Contractor
Signal Coordinator	Contractor
Field Team Members	Ed Lilly
	Steve O'Connor
	Mike Patton
	Chuck Stroh
	Sam Snyder

* See resumes in the attachments

V. 1910.120 TRAINING REQUIREMENTS

Prior to performing any job tasks required for the Gill Creek Remediation Project personnel must receive a minimum of 40 hours of health and safety training, consistent with the requirements of OSHA 29 CFR 1910.120 and the worker's job function and responsibilities. Topics required in this 40-hour course include personal protective equipment (PPE), decontamination procedures, heat stress monitoring, and many other specific to the Gill Creek Remediation Project. Workers shall not be permitted to work in this area until they have completed this training. Workers shall also receive a minimum of three days of on-site field experience under the direct supervision of a trained, qualified supervisor.

Employees who can show through explicit documentation, by their work experience and/or prior training, that they have had prior training equivalent to that as specified above will be considered as meeting the minimum of 40 hours of health and safety training required under OSHA 1910.120.

Workers shall also receive eight hours of refresher training annually on items specified in this Plan and other relevant topics. Documentation that workers have received required training shall be kept in contractor's and DuPont's files.

Site Supervisor Training

Supervisors directly responsible for or who supervise employees working in this operating area shall receive 40 hours initial training, three days of supervised field experience, and at least eight additional hours of specialized training at the time of job assignment as required under OSHA 1910.120.

Topics for this specialized training include safety and health program, PPE program, spill containment program, health hazard monitoring program, and other relevant topics specific to the Gill Creek Remediation Project.

Site Specific Training

Prior to initiation of field activities, all field personnel will attend training sessions taught specifically to address the Gill Creek Remediation. These sessions will include, but are not necessarily limited to, the following:

- Work rules and safety policies
- Proper use, storage and care of PPE
- Types of potential hazardous chemicals
- Location and use of emergency equipment
- Importance/urgency of mandatory reporting of injuries and illnesses
- Emergency procedures/medical training
- Job assignments
- Personal hygiene
- Motor vehicular equipment
- Monitoring equipment
- Decontamination procedures
- Handling, storage and labeling of hazardous material containers

VI. PERSONAL PROTECTIVE EQUIPMENT (PPE)

A PPE equipment program that complies with 29 CFR 1910.120 (g) will be developed and implemented. The program will also include the provisions of selecting and using PPE as required by 29 CFR 1910 Subpart I.

Definition of Levels of Protection

Site and task specific ensembles of PPE will be defined. Minimum requirements for this site are given below. Upgrades and downgrades of PPE must be based on appropriate action levels.

Minimum Personal Protective Equipment Requirements

Minimum PPE is as follows:

- Hard hats must be worn in all operating areas and on all plant walkways. The only exceptions are; control rooms, offices, lunchrooms and restrooms.*
- Long-sleeved shirts must be worn in all operating areas.

- Approved safety spectacles with side shields are the minimum eye protection required in all areas. The only exceptions are; control rooms, offices, lunchrooms and restrooms.*
- North escape respirators must be carried at all times. They provide protection against chlorine gas and are only to be worn for escape purposes. They provide no protection for an organic vapor release.
- Leather gloves while using hand tools, operating valves or handling dry chemicals (unless restricted by other rules).

* The exceptions listed above for wearing hard had and spectacles will be rescinded whenever work being done in these areas may create an abnormal hazard.

1. Level D shall consist of:
   - Disposable coveralls or work clothes
   - Chemical resistant leather boots with disposable boot covers worn over them
   - Leather gloves

2. Modified Level D shall consist of:
   - Saranex-coated Tyvek
   - Nitrile outer gloves and neoprene boots
   - Latex or nitrile inner gloves
   - Tape (will be used to seal the joints between coveralls and protective gloves and boots)
   - Hard hat
   - Safety glasses with side shields
   - Splash resistant goggles or a face shield (will be worn if a splash hazard exists)

3. Level C shall consist of:
   - Saranex-coated Tyvek
   - Nitrile outer gloves and neoprene boots
   - Latex or nitrile inner gloves
   - Tape (will be used to seal the joints between coveralls and protective gloves or boots)
   - Hard hat (shall be required when overhead hazards exist)
   - Full-face respirator and cartridges. The standard cartridges used at this site will be approved for protection in atmospheres containing less than 0.1 percent (1000 ppm) organic vapors by volume, pesticides, paint, lacquer, and enamel mists and dusts, fumes, mists, asbestos, containing dusts and mists and radionuclides.

4. Level B shall consist of:
   - Saranex-coated Tyvek with hood
   - Nitrile outer gloves and neoprene boots
   - Latex or nitrile inner gloves
   - Tape (will be used to seal the joints between coveralls and protective gloves or boots)
   - Hard hat (shall be required when overhead hazards exists)

- Pressure-demanded, full-facepiece, self-contained breathing apparatus (SCBA) or full facepiece supplied air respirator with escape cylinder

5. Minimum levels of protection

The following shall be initial levels of protection for specified exposures and/or areas. These requirements establish only minimum protection levels. Actual field conditions and/or air monitoring may dictate upgrades and downgrades.

Many compounds on this site have low exposure limits or are otherwise not detected with direct reading instruments. The contractor must verify, through integrated sampling, that airborne concentrations are below desired action levels before downgrading PPE levels.

Additional protective equipment may be required for specific task based on site conditions.

POTENTIAL EXPOSURE	INITIAL PPE Level
Location - Exclusion Zone	
Limited exposure - contact with surface water only	Level D
Exposure to visible concentrations of airborne dust	Level C
Exposure to contaminated sediments/ groundwater in Area 2D	Level C
Exposure to contaminated sediments/ groundwater in Areas 1 and 3	Level B
Working in the waste water treatment area	Level Modified
Contamination Reduction Zone	
Areas 1 and 3	Level D
Area 2D	Level D
Sediment staging area	Level D
Water treatment area	Level D

Respiratory Protection Program

The contractor shall have a written respiratory protection program as specified in 29 CFR 1910.134 and shall comply with requirements established by 29 CFR 1926.103. Due to the vinyl chloride and benzene concentrations on site, the respiratory protection program must comply with the contaminant-specific regulations in 29 CFR 1910.1017 and 1910.1028. Requirements for this site shall include the following:

1. Written standard operating procedures governing the selection and use of respirators shall be established.
2. Respirators shall be selected on the basis of hazards to which the worker is exposed.
3. The user shall be instructed and trained in proper use of respirators and their limitations.
4. Respirators shall be regularly cleaned and disinfected. Those used by more than one worker shall be thoroughly cleaned and disinfected after each use.
5. Respirators shall be stored in a convenient, clean and sanitary location.
6. Respirators used routinely shall be inspected during cleaning. Worn or deteriorated parts shall be replaced. Respirators for emergency use such as self-contained devices shall be thoroughly inspected at least once a month and after each use.
7. Appropriate surveillance of work area conditions and degree of employee exposure or stress shall be maintained.
8. There shall be regular inspection and evaluation to determine the continued effectiveness of the program.
9. Personnel shall not be assigned to tasks requiring respirators unless it has been determined that they are physically able to perform the work and use the equipment.
10. Only respirators and respirator cartridges with National Institute of Occupational Health and Safety and/or Mine Health and Safety Administration approvals shall be used at this site.
11. Eyeglasses with conventional temple pieces will not be worn under full face piece respirators. Provisions will be made for utilizing spectacle insert kits produced by the respirator manufacturer for the specific model respirator being employed.

Hearing Protection

Procedures will be established that incorporate requirements specified in 29 CFR 1926.101. Hearing protection will be required during this remediation for exposures of greater than 90 dBA for any length of time. In the absence of instrumentation, when normal conversation is difficult at a distance of greater than two or three feet, hearing protection will be required. The contractor shall have hearing protection available on site at all times for their employees.

Closed Chamber

The safety equipment required for entry into a closed chamber is as follows:

- Safety harness with life line rope tripod
- Fog horn, North escape respirator, flashlight

- SCBA
- Portable air blower with elephant trunk
- Electrical ground fault detector
- Portable extension light
- Straight ladder with scaffold plank
- Explosimeter
- Dummy test

Have all disconnects as close to vessel as possible.

Respiratory Equipment

1. Bottled Breathable Air Stations

   Bottle breathable air stations are to be located as close to the remediation area as physically possible.

2. Self-Contained Breathing Apparatus (SCBA) Respirators

   SCBA respirators are to be strategically located near the remediation area. They are to be used when necessary to do emergency work in an atmosphere containing unknown concentrations of air contaminants or in atmospheres which could be deficient in oxygen. They can also be used when breaking into a line or vessel containing organic material.

   Each operator must know the location of this equipment and demonstrate their ability to use it as part of their job training. Review of SCBA use is required every six months.

   SCBAs are to be inspected by the user before each use.

3. Buddy System

   The buddy system is to be used to assist with the removal of SCBA equipment. Whenever a person is required to wear a SCBA, another person, equipped with all the required PPE for the work zone, will be present. This additional person will aid the person donning the SCBA when removing the SCBA. After each use, SCBAs are to be sent to the contractor Safety Office for cleaning the masks and for refilling the air tanks.

   No person(s) should enter a contaminated area wearing this equipment unless a person with another SCBA readily available (should have equipment beside him) is standing by in case assistance is needed.

4. Communication Procedures

   Personnel in the exclusion zone will remain in constant radio contact or line of sight with the stand by man or field team leader outside of the exclusion zone. Any failure of radio communication will require an evaluation of whether personnel should leave exclusion zone.

A separate radio channel will be designated as the radio frequency for personnel in the exclusion zone. All other communications on the site will use other channels.

DuPont will supply the contractor with the proper frequency to be used for this operation and the contractor will supply the required radios for their own people.

In the case of radio failure, the following hand signals will be used:

Hand gripping throat	Out of air - can't breathe
Grip partners wrist or both hands around waist	Leave area immediately
Hands on top of head	Need assistance
Thumbs up	OK, I'm alright, I understand
Thumbs down	No - negative

5. Full-face and Half-facepiece Filter and Organic Cartridge Respirators

No one may use these respirators without having first received proper training and fit testing as outlined in Standard 6.2, Respiratory Protection, of the S&H Manual.

Prior to donning, inspect respirator to be sure that:
- Respirator is clean
- Facepiece is free of cracks, tears or distortion
- Rubber inhalation and exhalation valves are in place and not stuck in closed position
- Exhalation valve cover is in position
- Filters/cartridges are secure (gasket in place is required)
- Head straps are in proper position and in good condition

Damaged respirators should be discarded. Fit testing will be required for a new respirator.

These respirators can only be worn by persons who are clean shaven in the seal area (where the rubber contacts the face).

To don respirator, follow this procedure:

- Place respirator on face with narrow end on nose and wide end under chin.

- Place bottom strap around head (under ears) and top strap around head (over ears).

- Tighten straps as necessary to obtain good seal.

- Check facepiece seal by holding hand over exhalation valve cover and exhaling rapidly several times. If air leakage is detected around the seal, tighten straps and repeat check procedure until a good seal is obtained.

The filter or cartridge elements (MSA combination cartridges type GMC-H) should be changed whenever breathing becomes difficult or the odor or taste of the contaminant is detected.

The respirator should be cleaned after each day's use or more often if necessary. To clean, remove air purifying elements, gaskets, straps, valves and valve covers. Immerse facepiece in warm water and scrub with soap and soft brush. Then rinse, dry, reassemble and inspect the respirator.

Respirators should be stored in clean, dry locations. Place in a plastic bag when not in use.

VII. DECONTAMINATION OF PPE AND PERSONNEL

PPE Decontamination

All decontamination equipment and procedures are to be in place before entering a work zone. As required under OSHA 1910.120, decontamination will take place in the work zone to isolate and remove any hazardous substances and to prevent any contaminated material from leaving the work zone.

A portable water container and a water tub are to be used for rinsing contaminated boots, gloves and other PPE while in a work zone. The water tub will contain any run off of contaminated water. After the PPE (boots, gloves, Saranex suit) has been rinsed, it can be removed. Water used for decontamination is to be transported from the work zone to the sediment staging pad where it will be recycled back through the Water Treatment Facility. If boots are grossly contaminated, they should be removed very carefully (gloves should remain on person removing the boots) and placed in a plastic bag which is to be sealed and carried to a proper drum used for disposal of PPE.

Contaminated gloves and Saranex suits are to be removed very carefully after they have been rinsed off with clean water so as not to cause any exposure of contaminants to the skin. The suits and gloves should be taken off inside out. They should then be placed in plastic bags and transported to a proper drum used for disposal of PPE.

Personnel Decontamination

Exposure to chemicals can occur in several ways:
1. Contact through inhalation
2. Contact through skin
3. Contact through ingestion

Injuries from chemical inhalation can only be treated by qualified physicians. If the contaminant is on the skin or in the eyes, immediate measures must be taken to counteract this effect. First aid treatment usually involves flooding other affected area with water for at least 15 minutes. Safety showers are to be located in the Water Treatment Facility area and the sediment staging areas.

Anyone getting wet to the skin with groundwater must wash the affected area immediately. If clothes in touch with the skin are wet, they must be changed. Any skin contact with groundwater should be dealt with immediately and as completely as possible. If irritation or redness develops, medical attention should be sought immediately. When protective clothing is grossly contaminated, contaminants may be transferred to the wearer or to treatment personnel and cause injuries. Unless severe medical problems could be created by splashing, the protective clothing should be washed off as rapidly as possible and carefully removed.

Anyone contacting any materials in this area through ingestion should seek medical help immediately. Personnel shall then be taken to the Niagara Falls Memorial Medical Center Occupational Health Care Clinic.

As required under OSHA 1910.120 regulations, all employees that may have been potentially exposed to groundwater or the organics must take a shower when they leave the area.

Shower facilities, containing changing rooms separated by the showers, will be located in the east side of the Water Treatment Facility. The first change room is used to change out of work clothes and the second change room or "clean room" is used to store clean street clothes. This type of shower facility is spelled out in the OSHA 1910.120 regulations.

VIII MEDICAL

If treatment is needed beyond the capability of the on-site first aid personnel, the injured will be transported to Niagara Falls Memorial Medical Center.

All personnel working within those areas of the Gill Creek Remediation Project where remediation activities are being conducted shall be trained in accordance with OSHA 1910.120. Medical surveillance will be instituted for all employees directly involved in the excavation and processing of contaminated soil or water. Medical surveillance will consist of an examination conducted before work commences and at the completion of the job. Examination details are listed below:

- Completion of health history questionnaire
- Examination by a physician
- Posterior-anterior chest x-ray (not required if x-ray has been taken within six months and results are available)
- Urinalysis (albumin and sugar)
- White blood cell count and hemoglobin or hematocrit
- A series of blood chemistry tests which determine glucose, SGOT, alkaline phosphotase, bilirubin, creatinine, or BUN
- Electrocardiogram
- Pulmonary function studies

<u>Medical Surveillance Requirements</u>

1. Baseline Monitoring

   As regulated by OSHA 1910.120, employees working in this area must have had a pre-employment medical examination to establish the individual's state of health and baseline physiological data and ability to wear PPE. The medical examination shall be based on many parameters determined by the attending physician. Employee's medical examination records must be kept on file in the DuPont Niagara Contracts Department.

2. Periodic Monitoring

   Employees must be in a periodic medical monitoring program. The frequency and type of examination to be conducted is determined by medical personnel knowledgeable in the area of toxicology and occupational exposure.

3. Non-Routine Monitoring

   Whenever an incident occurs which may pose a significantly increased health risk to personnel or whenever personnel exhibit an apparent job-related medical condition, the supervisor shall recommend that any such individual consult with the examining physician or physician group for examination and treatment in accordance with good medical practice.

<u>Heat Stress</u>

In addition to protection against chemical exposure, PPE will decrease body ventilation potentially resulting in heat stress. Heat stress can result in serious injury or death. As part of the 40 hour safety and health training required under OSHA 1910.120, area personnel are instructed in the identification of symptoms of heat stress, the first-aid treatment procedures for the victim, and the prevention of heat stress casualties.

1. Identification and Treatment

Symptoms potentially indicative of the onset of heat stress include elevated heart beat, profuse perspiration, muscle cramps, or fatigue. Heat stress, if allowed to persist, may result in the dangerous conditions described below.

Heat Exhaustion

a. Symptoms

Usually begins with muscular weakness, dizziness, nausea and a staggering gait. Vomiting is frequent. The bowels may move involuntarily. The victim is very pale, their skin is clammy and they may perspire profusely. The pulse is weak and fast, their breathing is shallow. They may faint unless they lie down. This may pass, but sometimes it remains and death could occur.

b. First Aid

Immediately move the victim to a cool and shady area with good air circulation. Remove all protective outerwear. Take measures as necessary to cool the victim, including spraying or splashing with water. Call a physician. Treat the victim for shock. (Make them lie down and raise their feet 6-12 inches). If the victim is conscious, it may be helpful to give them sips of a salt water solution (1 teaspoon of salt to 1 glass of water). Transport victim to a medical facility as soon as possible.

Heat Stroke

a. Symptoms

This is the most serious of heat casualties due to the fact that the body excessively overheats. Body temperatures often are between 107°-110°F. First there is often pain in the head, dizziness,, nausea, oppression, and the skin is dry, red, and hot. Unconsciousness follows quickly and death is imminent if exposure continues. The attacks will usually appear to occur suddenly. Lack of perspiration may differentiate heat stroke from heat exhaustion.

b. First Aid

Immediately move the victim to a cool and shady area. Remove all protective outerwear and loosen/remove clothing. Lay them on their back with the head and shoulders slightly elevated. It is imperative that the body temperature be lowered immediately. This can be accomplished by applying cold wet towels, ice bags, etc., to the head. Sponge off the bare skin with cool water or rubbing alcohol, if available, or even place the victim in a tub of cool water. The main objective is to cool them without chilling them to the point where shock is induced. Give no stimulants. Call professional medical personnel immediately.

2. Prevention of Heat Stress

One of the major causes of heat casualties is the depletion of body fluids. Personnel should replace water and salt loss from sweating. Salts can be replaced either by 0.1 percent salt solution, heavily salted foods, or commercial mixes such as Gatorade. The commercial mixes are advised for personnel on low sodium diets.

The recommended work/rest guideline for personnel using a respirator with supplied air or SCBA while wearing a Saranex suit is a follows:

Ambient Temperatures	Maximum Wearing Time
Above 90° F	1/2 hour
80° - 90° F	1 hour
70° - 80° F	2 hours
60° - 70° F	3 hours
50° - 60° F	4 hours
40° - 50° F	5 hours
30° - 40° F	6 hours
Below 30° F	8 hours

A sufficient period will be allowed for personnel to "cool down".

3. Heat Stress Monitoring

Heat stress monitoring will be performed periodically by the contractor safety personnel once the ambient temperature is 70° F or above for those employees required to wear Saranex suits and/or SCBAs during their work shift.

IX. EXPOSURE MONITORING/AIR SAMPLING PROGRAM

Personnel Monitoring

A reading is defined as the average concentration monitored over a 15 minute period. Both direct reading (real-time) air monitoring instruments (PID and OVA) and integrated time-weighted average (TWA) air sampling shall be employed. Direct reading instruments selected for use will be listed and a discussion of the instrument's sensitivity, selectivity, and interferences shall be included. National Institute of Occupational Health and Safety (NIOSH) sampling methodologies will be used to conduct integrated sampling. Integrated samples considered to be representative of an employee's exposure will be analyzed by a laboratory participating in and meeting the requirements of the American Industrial Hygiene Association's (AIHA) Proficiency Analytical Testing (PAT) or Laboratory Accreditation program. Results of personnel exposure monitoring will be used to select the appropriate combination of engineering controls, work practices and personal protective equipment to reduce and maintain employee exposure levels at or below the permissible exposure limits for substances specified in 29 CFR 1910 and at or below published exposure limits for substances not regulated by 29 CFR 1910.

Monitoring of the worker's breathing zone must be conducted periodically throughout the project to verify employee exposures. The following monitoring procedures must be followed as a minimum.

1. Photo Ionization Detector (PID) or Organic Vapor Analyzer (OVA)

   A PID or OVA will initially be used during all intrusive activities to determine personnel exposure levels to organic contaminants. Continuous monitoring of the work site and a minimum of one documented reading every 15 minutes for one hour in the breathing zone of the worker with the greatest potential for exposure will be required during the start of all intrusive activities. The PID or OVA will also be used to monitor emission levels at the exclusion zone boundary. Personnel and boundary monitoring frequency will be reduced, based on experience, to a minimum of once every two hours and less if readings indicate a known source or decreased exposure level.

2. Integrated Sampling

   A minimum of six 8-hour time-weighted average sample will be collected in the breathing zone of remediation workers with the greatest potential for exposure in areas 1 and 3 only (12 total). Samples will be analyzed by a laboratory to determine employee exposures to all potential chemical contaminants. Initial samples must be collected during the start of intrusive activities. All six samples will be taken during the first half of the remediation project's life. If necessary, additional sampling will be done in order to determine whether more engineering controls or more protective equipment is required. The following methods should be used to document exposures to certain potential contaminants:

COMPOUND	SAMPLING METHODOLOGY
Hexachlorabutadiene	NIOSH 307
Vinyl Chloride	NIOSH 1007
Benzene Hydrocarbons	NIOSH 1500
Chlorinated Biphenyls	NIOSH 5503
1,1,2,2-Tetrachloroethane	NIOSH 1019
Tetrachloroethane	NIOSH 1003

   Samples may be collected on a 3 stage carbon molecular sieve adsorption tube or other methods. The sample shall be analyzed by thermal desorption and mass spectrometer analysis or other appropriate methods. This methodology will detect vinyl chloride, 1,1,2,2-tetrachloroethane and benzene. Some unknown contaminants on site may also be identified by this method. Contractor will develop sampling plan.

Action Levels for Remediation Workers

Acceptable limits for contaminants on this site are those recommended in the most recent Permissible Exposure Limits listed in 29 CFR 1910.1000 and/or American Conference of Governmental Industrial Hygienists "Threshold LImit Values for Chemical Substances and Physical Agents and Biological Exposure Indices". Action levels will be set at the more restrictive value [PEL or TLV or DuPont's Acceptable Exposure Limit (AEL)]. Remediation workers minimum action levels for changes in PPE levels and for stop work requirements are presented below. The site Occupational Health Coordinator (a certified industrial hygienist) will evaluate on site conditions and determine whether revisions to these action levels are necessary.

MONITORING METHOD	COMPOUND	LEVEL C	LEVEL B	STOP WORK
PID or OVA	Volatile Organics	1 ppm- 50 ppm	50 ppm- 500 ppm	500 ppm
Integrated	Vinyl Chloride	Not allowed	0.5 ppm- 500 ppm	500 ppm
Integrated	Hexachloro- butadiene	Not allowed	0.01 ppm- 500 ppm	500 ppm
Integrated	Benzene	Not allowed	0.5 ppm- 500 ppm	500 ppm
Integrated	Chlorinated Biphenlys	0.25 ppm- 15 ppm	15 ppm- 500 ppm	500 ppm
Integrated	1,1,2,2- Tetrachloro ethane	0.5 ppm- 25 ppm	25 ppm 500 ppm	500 ppm
Hg Vapor Detector Tubes	Mercury	.05-.5 mg/m^3	>.50 mg/m^3	

Air Monitoring - Response Levels

PID readings will also be taken at least once every 2 hours during each active remediation construction day at the boundary of the remediation work are depicted on drawing LOCMAP8. PID reading will determine whether to initiate contingency actions if above the levels prescribed in the contingency plan. Thereafter, chemical specific results from a portable GC will deterimine follow up actions.

X. CONTINGENCY PLAN FOR REMEDIATION AIR EMISSIONS

The following contingency plan, which applies to all remediation work, was developed based on the PEL's, TLV's, etc. of volatile chemicals found in the Gill Creek sediments and also on considerations for protecting the health of remediation workers, plant personnel and the community.

The three work zones defined in the Safety and Health Plan for the remediation project are the Exclusion Zone (EZ), Hot Line Zone (HL) and the Contamination Reduction Zone (CR). Another perimeter requiring consideration for the contingency plan is the Security Zone (plant or site property line).

Response levels are levels above background. The appropriate readings will be taken continuously - while in the contingency operation - 50 foot increments downwind from the defined boundaries, at the site property line and at the edge of the R. M. Parkway (Area 1). Background data will be established upwind at the CR and site property boundaries before sediment removal activities begin and at the start of each work shift. A portable GC will be available for rapid analysis of emissions that may occur during a response level.

Response Level	I	II	III
Location	EZ Boundary	CR Boundary	Site Property Line
Action Level	5 ppm (PID OR OVA)	PEL any constituent	PEL any constituent

In the affected remediation area, work will continue during Response Level I, stop during Response Level II (except for suppression of vapors) and communication to site and non-site personnel (including agencies) will begin if Response Level III is reached. The contingency activities for each response level include, but are not limited to, the following actions:

Response Level I
Triggered by a PID or OVA reading exceeding 5 ppm for 15 minutes at the Exclusion Zone boundary.

1. Monitor(s) must analyze the vapor emissions immediately to determine the quantitative amounts of each specification chemical(s) causing the reading at the Contamination Reduction (CR) Zone Boundary. Compare the PEL's of each chemical constituent found with the quantitative amounts determined.
2. Continue remediation activity if no PEL limit exceeded at the CR boundary. Dredged material on the staging pad will be covered with a vapor barrier such as plastic sheet or foam. Areas of the creek bed where sediments are not actively being removed will also be covered with a vapor barrier.
3. Monitor must stop all remediation work in the affected area and workers must start suppressing emissions if the PEL limit of any chemical constituent is exceeded at the CR boundary and go to Response Level II or III.
4. Contact another area monitor(s) to help with monitoring the affected area and beyond if needed.

Response Level II
Triggered by a PEL limit being exceeded at the Contamination Reduction (CR) Zone.

1. Monitor the site property line downwind for the specific chemical(s) whose PEL was exceeded at the CR Zone Boundary. Compare the PEL's of each chemical constituent found with the quantitative amounts determined.
2. Contact another area monitor(s) to help with monitor the affected area and site property line.
3. If the PEL of any remediation chemical constituent is exceeded at the site property line, stop remediation activities and begin suppressing emissions in the creek bed and the staging area by covering with a vapor barrier, foam or the prescribed method of suppressing emissions.
4. Restrict access by personnel/traffic not having the proper personal protective equipment in any area exceeding PEL.

Response Level III
Triggered by an instrument reading exceeding PEL at the site boundary.

1. Monitor site property line downwind and elsewhere to determine the extent of emissions. Determine distance to where PEL's of each chemical constituent found with the quantitative amounts are no longer exceeded.
2. Contact another area monitor(s) to help with monitoring the affected area and beyond. A plant emergency may exist.
3. Stop sediment removal work in the affected area and start suppressing emissions in the creek bed and the staging area until the emissions leaving the site stop.
4. Monitor or helper in remediation area with emission must contact the Project Team Leader or Field Team Leader and notify them of the situation and area affected.
5. The Field Team Leader or Project Team Leader will contact B29 Security Center, who will make the following contacts:

- Niagara Falls Fire Department (Community Emergency Response)
- Environmental duty person
- Conrail yard
- Olin and other surrounding businesses
- Niagara Falls Police
- Memorial Medical Center and plant doctor (if necessary)
- Niagara County Health Department and the DEC (if unable to contact the Environmental duty person)
- Other site safety, security and Occupational Health personnel and other plant personnel, if necessary.

6. If the Robert Moses Parkway will be affected (Area 1), guards will also contact the following for coordination of traffic diversion and evacuation:
   - o New York State Police
   - o New York Power Authority (285-2711)
   - o Department of Transportation
   - o Niagara County Office of Emergency Services
   - o Niagara Falls Police Department
7. The Environmental duty person will notify the Niagara County Health Department, the DEC and other appropriate agencies.
8. Do not resume remediation activities in the area until a work continuation plan is approved to minimize future recurrences. Approval will come through the Environmental Group.

NOTE: Response Level III message for guard and others: There is a fugitive organic vapor emission from the Gill Creek sediment removal project at the DuPont site. Emergency measures are being activated.

NOTE: FOR THOSE NOT COMING ON PLANT TO THE SCENE, GUARDS WILL GIVE THE ADDITIONAL INFORMATION: Keep clear of the area downwind of the DuPont site until notified that the area is cleared. Give wind direction.

XI. STANDARD OPERATING PROCEDURES, ENGINEERING CONTROLS AND WORK PRACTICES

Prohibitions During Field Activities

Specific prohibitions not addressed elsewhere in the site-specific health and safety plan shall be listed here. The following items will be listed within this section if they would not otherwise be addressed in the plan.

1. No running or horseplay.
2. Eating, drinking, chewing gum or tobacco, smoking, or any practice that increases the probability of hand-to-mouth transfer and ingestion of material in prohibited in the exclusion zone and the contamination reduction zone.
3. Smoking, carrying lighters and/or matches is prohibited in the exclusion zone and the contamination reduction zone.

4. No jewelry may be worn by personnel engaged in field work, except for watches, which will be disposed of if they become contaminated.
5. Medicine and alcohol can potentiate the effects from exposure to toxic chemicals. Prescribed drugs should not be taken by personnel during operations where the potential for absorption, inhalation or ingestion of toxic substances exists unless specifically approved by a qualified physician. Alcoholic beverages will not be allowed during breaks.
6. No person will enter an exclusion zone alone.
7. Safety devices on equipment will be left intact and used as designed.
8. No contact lenses shall be worn on site.

Dust Control

The contractor shall prepare a dust control plan to prevent dispersion of visible dusts from contaminated sediment during all remediation activities. While particulate emissions from remediation activities are not expected, ambient particulate monitoring will be conducted during active remediation construction periods through the use of a Portable Particulate Monitor.

On active remediation construction days when the prevailing wind direction at the beginning of the work day is not toward the river, downwind particulate samples will be collected using device(s) described above. Prevailing wind will be determined using a wind sock on site. If a high volume sampler is used, a 12-hour integrated sample will be collected. If the results of downwind ambient total nuisance particulates (dust) monitoring for this project exceed the background (upwind) ambient particulate concentration by more than 10 milligram/cubic meter, dust suppression control measures will be conducted.

Control measures which may be used for soil piles include wetting down the excavation area and/or covering the soil piles with vapor barriers. Soils removed from excavations may be kept moist to further assure particulate control. Measures for control of dusting from roadways, when required, may include limiting vehicle speeds, wetting and/or sweeping of plant roadways.

Heavy Equipment Operation

1. A competent person will be designated to inspect all equipment and machinery daily to insure it is in safe operating condition. As a minimum, tests shall be made to determine that the brakes and operating systems are in proper working condition. Records of inspections will be maintained at the site by the contractor and shall become part of the official project file.
2. Procedures shall be established to ensure that machinery found to be defective is removed from service until the

unsafe condition has been corrected. The usage of accident prevention signs and tags, as described in 29 CFR 1926.200 will be incorporated into the procedures to be established.

3. All belts, gears, shafts, pulleys, sprockets, spindles, drums, flywheels, chains, or other reciprocating, rotating or moving parts of equipment shall be guarded when exposed to contact by persons or otherwise creates a hazard. Guarding shall meet the requirements of ANSI B15.1, "Safety Standards for Mechanical Power Transmission Apparatus".
4. All hot surfaces of equipment shall be guarded or insulated to prevent injury or fire.
5. Fuel tanks shall be located in a manner which will not allow spills or overflow to run onto the engine, exhaust or electrical lines.
6. Platforms, footwalks, steps, handholds, guardrails, and toeboards shall be provided on machinery to promote safe footing. Accumulations of snow, ice, oils, grease, or any substance likely to increase the likelihood of a slip will be removed before such surfaces are used.

Fall Prevention/Protection

Procedures to identify and eliminate or clearly mark tripping hazards and slippery surfaces will be established.

Visitors

A means will be devised and implemented to insure all visitors sign-in on a visitors log. A method will also be devised and implemented to insure visitors to hazardous field activities are medically qualified and have the health and safety training prerequisites required to visit hazardous waste operations.

Illumination of Work Areas

Work areas shall be illuminated per table C-1 (attached).

Contamination Prevention

Guidance provided in DHHS (NIOSH) Publication No. 85-115, Section 10, page 10-1, will be implemented as a minimum.

Heavy Material Handling

Procedures for implementing 29 CFR 1926.250(a) and (b) will be included. Procedures for periodically briefing proper lifting techniques designed to reduce back injury will be devised and implemented.

Housekeeping

Procedures for implementing requirements contained in 29 CFR 1926.25 shall be included in the HSP.

Geophysics and Clearing

Procedures for verifying the absence of buried utility lines and plumbing at sites of intrusive activities shall be implemented.

Use of Tools

All hand tools shall be in good repair and used only for the purpose for which designed. Power tools shall be inspected, tested, and determined to be in safe operating condition prior to use. Continued periodic inspections shall be made to assure safe operating condition and proper maintenance.

XII. SITE CONTROL MEASURES

Site control procedures shall be described. These will include a site map with work zones and access points delineated. Site security (physical and procedural) will also be described.

A minimum of three work zones will be routinely be to reduce the accidental spread of hazardous substances from contaminated areas. Criteria for the establishment of an exclusion zone, a contamination reduction zone and a support zone will be established. Guidance presented in DHHS (NIOSH) publication No. 85-115, Section 9, will be used.

The guidance provided in DHHS (NIOSH) Publication 85-115 shall be used as the basis for devising a communications system that includes a method of internal communications between field teams and the base of field operations and that includes external communications between on-site personnel and off-site personnel. The combination on this site of heavy equipment and personnel in Level B is potentially very dangerous. Clear communications, including well defined hand signals and nonverbal warning systems, will be critical to safe operations on this site.

Remediation Decontamination

1. Personal Protective Equipment and Sampling Equipment Decontamination

   A personal decontamination zone and a small equipment decontamination zone will be established prior to commencement of work. No contaminated equipment will be carried off-site. Used personal protective equipment will be placed in plastic bags and disposed of at the end of each day. No disposable item will be reused. Ultimate disposal of these materials are the responsibility of the clients. All non-disposable items will be thoroughly washed with Alconox and water and a hexane rinse. Used water must be collected for proper disposal by the clients. Equipment decontamination will be performed at a level of protection equal or greater than that used during sediment sampling. Air monitoring instrumentation will be wiped clean with baby wipes.

The specific steps for personal decontamination are as follows:

- Deposit equipment (tools, sampling devices, clipboards, etc.) that need to be decontaminated on plastic drop cloths.
- Discard outer latex boots.
- Wash steel-toe boots and gloves with long handled brushes (in a tub or other available water holding device) using an Alconox solution and water.
- Rinse boots and gloves in a separate tub or container. Use long handled brushes and plain water.
- Rinse boots and gloves in another tub or container using plain water or a sprayer.
- Decontaminate small pieces of equipment using Alconox and water.
- Discard outer gloves and Saranex coveralls.
- Remove respirator and place on table to be decontaminated later.
- Remover inner gloves and place in disposal drum or container.
- Wash hands and face.

2. Large Equipment Decontamination

Brushing will be the primary method, but if inadequate, steam or water cleaning may follow. A decontamination zone for large pieces of equipment (ponar dredge, hand push core) will be setup at the plant. As with the personal decontamination zone, all liquids generated during cleanup will be contained for disposal by the client. Large equipment decontamination will be performed in a level of personal protection equal to that used during sampling.

Further equipment decontamination may proceed as described below:
- Alconox and potable water wash.
- Distilled water rinse.
- Final distilled water rinse.

<u>Post-Remediation Decontamination</u>

1. General

a. Description

After completion of the project, contractor shall decontaminate all process equipment, tanks, piping, pumps, valves, equipment pad, etc. This shall be limited to all equipment and appurtenances provided and/or operated by contractor.

b. Quality
Contractor shall perform appropriate tests to demonstrate and document that all applicable components have been adequately decontaminated.

c. Submittals
Contractor shall provide detailed descriptions of the decontamination procedures he intends to use. This shall include estimates of the time required and quantity of wastes that will be produced.

2. Products

a. Labor and Equipment

Contractor shall provide all labor and special equipment required. Equipment shall include, but not limited to, the following:
- Chemicals without organic solvents
- High pressure spraying equipment
- Steam cleaning equipment
- Industrial cleaning equipment
- Sand blasting equipment
- Brushes, scrapers and other tools
- Vacuum truck

b. Concrete Structure Decontamination

Alkaline industrial cleaner, high pressure spraying, steam cleaning, brushing, scraping, and sand blasting will be used, as appropriate to decontaminate all concrete structures. In cases where the alkaline industrial cleaner is not compatible with the waste residues, other solutions, such as detergents, surfactants and degreasers will be used.

The decontamination procedure for concrete surfaces will be as follows:
- The exposed surfaces of the concrete structure including drainage trenches and sumps will be washed with a high pressure spray of the alkaline cleaner solution.
- The alkaline cleaner will be allowed to soak the concrete surfaces for about 15 minutes.
- The concrete surfaces will then be examined to locate remaining areas of contamination, if any. These areas will be scrubbed, scraped or sand blasted to remove the contamination.
- The concrete surfaces will then be washed a second time using a high pressure spray and the alkaline solution.

- The concrete surfaces will finally be cleaned using steam. Rinse the surface afterwards using potable water and collect samples for analysis.
- The debris and liquid resulting from decontamination will be collected in the sump, removed by vacuum trucks and treated either on-site or disposed of off-site at an appropriate treatment facility or landfill.
- Once the contractor considers the surface to be adequately decontaminated, concrete chip samples will be obtained for TCLP analysis, making sure the sample equipment is cleaned between samples.
- Resurface concrete where samples are taken.

The procedure used to collect chip samples of the concrete structures will be as follows:

- Divide the entire concrete area into 4 smaller areas. Take a sample from the center of each area and one where all four intersect.
- Concrete will be chipped within the cleaned area. An electric jack hammer or other tools will be used to chip the concrete to a depth of about 0.5 inch. Sampling tools will be decontaminated prior to obtaining each sample by steaming for 10 minutes.
- The concrete chips will be collected by a rubber gloved hand and put directly into a glass jar (2x16 oz). Crush chips into as small a size as possible using a decontamined hammer.

c. Tanks, Process Equipment, Pumps and Piping Decontamination

This section applies to all plastic or metal tanks, vessels, pumps, piping, valves, structural steel, ductwork, hoppers, bins, silos, platforms, racks and other appurtenances. High-pressure spraying, steam cleaning, detergent solutions, wire brushing, scraping and sand blasting will be used, as appropriate, to decontaminate the internal and external surfaces of all the above mentioned items. Surfactants, degreasers or solvents may be used if visible contamination cannot be readily removed by the technique described above.

The decontamination procedures for metal and plastic structures will be as follows:

- All external and internal surfaces will be washed with a high-pressure spray of water and detergent solution, and brushed, as needed, to remove visible residues and contamination. Solvents, such as fuel oil may be needed. DO NOT USE TCLP SOLVENTS.
- The component will then be rinsed with a high-pressure spray of potable water or steam cleaned to remove residual cleaning solutions.

- The surfaces will then be examined to determine areas of contamination, if any. These areas will be scrubbed, scraped or sand blasted to remove contamination.
- The debris and liquids resulting from decontamination will be collected and removed by vacuum trucks and treated in the on-site treatment facility or at an appropriate off-site disposal facility.
- Final rinsate sample (2 gallon) will be collected in an 8x16 oz. glass jar and analyzed according to TCLP analytical procedures.

The decontamination procedures for metal and plastic equipment will be as follows:

- The inside of metal and plastic equipment (pumps, piping, valves, etc.) will be flushed first with water or a detergent solution followed by a triple rinse with potable water. Final rinsate samples (2 gallon) will be collected in an 8x16 oz. glass jar and analyzed according to TCLP analytical procedures. The washwater and residues will be collected and treated. A 2 gallon sample of the washwater rinse will be collected in an 8x16 oz. glass jar, analyzed and disposed of off-site as appropriate based on analytical results.

The decontamination procedure for the sand filters will be as follows:

- Backwash all filters with potable water.
- Rinse filters with three or more bed volumes of potable water.
- Collect a sample of sand and perform TCLP analysis.
- Remove sand and dispose of as appropriate based on TCLP tests results.
- Continue decontamination procedures for filter vessels as described previously.

The decontamination for the carbon filters will be as follows:

- Remove carbon and return to supplier for regeneration.
- Continue decontamination procedure for carbon vessels as described previously.

<u>Execution</u>

1. As stated herein, provide all equipment and labor required. A detailed procedure shall be prepared and submitted to purchaser for review and approval prior to any decontamination operations.

2. All personnel shall be adequately trained and wear suitable personal protective equipment in accordance with all OSHA requirements.

3. Evaluating Concrete Decontamination

   Evaluation of the success of the decontamination of concrete structures will be based on analytical results of rinsate and/or concrete chip or samples. Criteria for successful decontamination area as follows.

   A concrete structure will be considered decontaminated based on chip sample analysis if, for the analyses performed, the analytical results are below the regulatory threshold levels for all TCLP parameters. The number and location of chip samples will be determined by purchaser and collected by contractor.

   Failure of the TCLP will require that the contractor carry out additional decontamination procedures until the TCLP test is passed.

4. Evaluating Metal or Plastic Components Decontamination

   A metal or plastic structure, such as tanks and equipment, will be considered decontaminated based on a rinsate sample analysis if the analytical results are below the regulatory threshold levels for all TCLP parameters.

DUPONT CHEMICAL COMPANY - OLIN CHEMICAL CORPORATION
NIAGARA FALLS PLANTS
GILL CREEK REMEDIATION PROJECT

OCCUPATIONAL HEALTH COORDINATOR
SITE SAFETY CONSTRUCTION SUPERVISOR

INDIVIDUAL RESUME'

MR. ALVIN FRITH, B.S., CIH - INDUSTRIAL HYGIENE SPECIALIST
OCCUPATIONAL HEALTH GROUP COORDINATOR

Mr. Frith has a Bachelor of Science Degree in Industrial Hygiene from Purdue University and is the Coordinator of DuPont's Niagara Falls plant Occupational Health Group. He is also a "CERTIFIED INDUSTRIAL HYGIENIST" by the American Board of Industrial Hygiene and a diplomate of the American Academy of Industrial Hygiene. He has been employed by Du Pont for over 25 years. The first 13 years of his career was spent working in our quality assurance/quality control (QA/QC) laboratory. For the past 12 years he has been involved in the practice, development and management of industrial hygiene programs at Niagara and continues this work at 12 other Du Pont sites located around the country. He has developed and implemented working documents that achieved the protection of employees along with assurance of compliance with applicable legal requirements. Experience also includes presentations and training on occupational health, OSHA regulations, reproductive hazards in the workplace, asbestos management, respiratory protection, radon, lead, electric and magnetic fields, and laboratory safety, etc. Mr. Frith is also a member of the local chapter and national American Industrial Hygiene Association and a member of the Chlorine Institute's Safety, Health and Environmental Committee.

MR. ABIYE O. OBUNGE - SITE SAFETY SPECIALIST (CONSTRUCTION)

Mr. Obunge has a Bachelor of Science Degree in safety engineering and an associate degree in electronic engineering. He has had extensive training on various safety related subjects which include construction safety and OSHA, 40 hour hazardous waste site worker training program 1910.120, electrical safety training for supervisors, excavation competency, industrial safety, and risk management and analysis. Mr. Obunge has been the site safety specialist for the Niagara construction group for three years and his primary responsibility is contractor safety. He is involved in construction continuous improvement audit processes at other Du Pont sites. His present duties include coordinating the interpretation of local legislation and Du Pont policies pertinent to safety, health and the environment. He is also responsible for contractors site safety orientations, and implements the site contractor drug and substance abuse program.

Prior to working at Du Pont, he spent five years working at Sima Construction/Reima Industries in London and NIgeria where his duties included managing and coordinating various programs and operations.

PAUL J. HITCHO, Ph.D., C.I.H.

GENERAL

Dr. Hitcho is Director of Occupational Health and Safety for Sevenson Environmental Services, Inc. He develops and implements site safety plans, provides consultative services on occupational health matters, coordinates and supervises a comprehensive employee medical surveillance program, and supervises a staff of site safety officers.

EXPERIENCE SUMMARY

Dr. Hitcho's career in the field of occupational health and safety has been very active and diverse. He has conducted extensive research as a National Institute of Health Postdoctoral Fellow, taught on the university level, conducted numerous health assessments as a regional field industrial hygienist prior to entering management. While the industrial hygiene department head for the United Steelworkers of America, Dr. Hitcho served as the liaison between the union and the coal carbonization (coking) and related chemical industries. He is recognized as a world expert in this field by the International Agency for the Research on Cancer (IARC). The IARC monographs developed while he was an active participant are used by OSHA in their hazardous communications standard 1910.1200 as a cited reference to determine whether a substance is a carcinogen. Also, Dr. Hitcho interfaced with pesticide and herbicide manufacturers to conduct occupational health studies and develop hazard analyses for some of the processes in this industry.

CREDENTIALS

Ph.D., Biology, Notre Dame University, Notre Dame, Indiana (1971)
A.B. Biology, St. Vincent College, Latrobe, Pennsylvania (1966)

EMPLOYMENT HISTORY

1986-Present	SEVENSON ENVIRONMENTAL SERVICES, INC. Niagara Falls, New York
1979-1986	UNITED STEELWORKERS OF AMERICA, Pittsburgh, Pennsylvania
1974-1979	OCCUPATIONAL SAFETY AND HEALTH ADMINISTRATION (OSHA) Pittsburgh, Pennsylvania
1971-1974	NATIONAL INSTITUTES OF HEALTH POSTDOCTURAL RESEARCH FELLOW University of Massachusetts Amherst, Massachusetts

KEY PROJECTS

1989 - Sealand Restoration, Lisbon, NY
1988 - New Lyme Landfill Site, Ashtabula, Ohio
1988 - Lang Property Site, Pemberton, New Jersey
1988 - Metaltec/Aerosystems Site, Franklin, New Jersey
1988 - Love Canal Site, Niagara Falls, New York
1988 - Union Carbide Corporation, Ponce, Puerto Rico
1987 - Maxus Energy, Painesville, Ohio
1987 - IBM, Poughkeepsie, New York
1987 - New York State DEC (Love Canal), Niagara Falls, New York
1987 - Universal Manufacturing, Bridgeport, Connecticut
1987 - FMC Corporation, Middleport, New York
1986 - Confidential Client, Crawfordsville, Indiana
1986 - Allied Corporation, Ironton, Ohio
1986 - Confidential Client, Staten Island, New York
1986 - Regional Municipality of Ottawa-Carlton, Ottawa, Ontario
1986 - U.S. Army Corps of Engineers, Council Bluffs, Iowa
1986 - New York State DEC (Love Canal), Niagara Falls, New York

CERTIFICATIONS & HONORS

- BOARD CERTIFIED INDUSTRIAL HYGIENIST
  AMERICAN BOARD OF INDUSTRIAL HYGIENE

- NATIONAL INSTITUTES OF HEALTH POSTDOCTORAL FELLOW
  UNIVERSITY OF MASSACHUSETTS

- NATIONAL SCIENCE FOUNDATION FELLOW
  UNIVERSITY OF NOTRE DAME

- DIPLOMATE: AMERICAN ACADEMY OF INDUSTRIAL HYGIENE

- CERTIFICATE OF APPRECIATION
  U.S. DEPARTMENT OF LABOR

GARY ROSE - SAFETY OFFICER

GENERAL

Mr. Rose is an Assistant Superintendent for Sevenson Environmental Services, Inc. As an Assistant Superintendent, Mr. Rose's responsibilities are to implement the construction schedule working in conjunction with the project manager; supervise and oversee specific field construction activities and determine equipment needs to complete tasks.

EXPERIENCE SUMMARY

Mr. Rose has gained significant experience in construction project management and health and safety protocols while working on a variety of remedial action projects involving: drum excavation, characterization and disposal; facilities decontamination and dismantlement; contaminated soil removal; and sludge solidification. During 1990 and 1991, he was actively involved in the Mercury Cell Facility Decommissioning and Dismantlement project.

CREDENTIALS

B.S. - Special Studies (1988), Fredonia State College, Fredonia, New York

EMPLOYMENT HISTORY

1987-Present	SEVENSON ENVIRONMENTAL SERVICES, INC. Niagara Falls, New York
1986	MODERN WASTE DISPOSAL COMPANY Model City, New York

KEY PROJECTS

1991:	Confidential Client, Niagara Falls, New York
1990:	Confidential Client, Massena, New York
1990:	Confidential Client, Niagara Falls, New York
1989:	Sealand Restoration Site, Lisbon, New York
1989:	Confidential Client, Avon Lake, Ohio
1988:	Metaltec/Aerospace Site, Franklin, New Jersey

TABLE A-1

GILL CREEK SEDIMENT SAMPLE AND CONCENTRATION RANGES FOR AREAS 1, 2D AND 3

Parameter	Area 1 (µg/kg)	Area 2D (µg/kg)	Area 3 (µg/kg)
a-BHC	1,160-440,000	130-610,000	410,000-13,000,000
b-BHC	ND(2,000)-142,000	ND(200)-51,000	61,000-460,000
PCB-1248	20,200-10,700,000	410-97,000(3)	11,000-140,000
Hexachlorobutadiene	22,500-1,740,000	ND(430)-6,900(4)	1,200(8)
Hexachlorobenzene	3,630-580,000	320-1100(5)	ND(540)-ND(220,000)(7)
Mercury	1,600-274,000	130-37,600	440-14,400
Vinyl Chloride	8,900-168,000(1)	ND(12)-ND(10,000)	130-53,000
Total 1,2-Dichloroethene	7,500-2,300,000(2)	36-16,000(2)	570-22,000(2)
Trichloroethene	5,400-3,460,000	6-16,200	62-83,000
Tetrachloroethene	47,900-11,600,000	8-22,000	310-110,000
1,1,2,2-Tetrachloroethane	ND(5000)-181,000	13-440(6)	86-9,200
Benzene	ND(5000)-10,200	ND(6)-54(7)	110-110,000
2,3,7,8-TCDD Toxic Equivalents(9)	0.052-0.442	0.012	NA(10)

(1) 1 ND at 10,000
(2) Values are for trans-1,2-Dichloroethene
(3) 1 ND at 2000
(4) 2 ND at 8000
(5) 2 ND at 8000, 1 ND at 16000
(6) 1 ND at 5000
(7) 1 ND at 5000
(8) 2 ND at 60,000, 1 ND at 77,000, 86,000, and 220,000
(9) The toxic equivalent for a sample is the sum of the homolog or isomer concentration times the corresponding multiplication factor.
(10) Data not available.

Reference: Feasibility Study (WCC 1991)
Gill Creek Sediment Study (WCC 1989)

TABLE A-3

GILL CREEK SURFACE WATER QUALITY

Parameter	Concentration Range ug/l
Acetone	2JB-19
1,2-Dichloroethene	5U-61
Chloroform	1J-15
Trichloroethene	5U-240E
Tetrachloroethene	5U-92
1,1,2,2-Tetrachloroethane	5U-190

J = estimated value
B = compound present in blank

Source: Gill Creek Final Design Concepts Report (WCC 1992)
References:
1. 1990 Data: WCC gill Creek Water Sampling 1990 (n=11 unfiltered and 9 filtered)
2. 1929/1980 Data: DuPont Gill Creek Water Sampling 1979/1980 (2 sampling events, 4 sample locations for PCBs, 8 sampling events, 4 sample locations for turbidity and TSS)
3. 188 Data: Gill Creek Sediment Study (WCC 1989)
4. Proposal to the City of Niagara Falls for Routing Gill Creek into the Buffalo Avenue Diversion Sewer during sediment removal from Gill Creek (DuPont and Olin, 1992)

Average and range calculated from all available data at or above reporting limits if the chemical was detected in any sample.
Average assumed to be undetected at the lower detection limit value, if it was not detected in any of the samples.

TABLE B-1
EXPOSURE LIMITS

Compound	CAS #	OSHA PEL	ACGIH TLV	IDLH	VAPOR PRESS. in mm @ 68°F	SPEC. GRAVITY @ 68°F	SKIN HAZARD	ODOR THRESHOLD (PPM)	CARC CAT.	HNu % RESPONSE (BENZENE)		OVA % (METHANE) RESPONSE	IP (eV)
										10.2 eV	11.7 eV		
Acetone	67641	750 ppm 1000 ppm S	750 ppm 1000 ppm S	2000 ppm	180	0.79	No	mint like 40.1 - 650 ppm	IRIS D	6.3	5.7	60	9.69
Aroclor 1248	12672296	NE	NE	NE	0.0049 @ 25C	1.4 @ 15.5C		~odorless	IRIS B2	NA	NA	NA	NA
Aroclor 1254 (Polychlorinated Biphenyls, 54%)	11097691	0.5 mg/m³	0.5 mg/m³	5 mg/m³	0.000006	1.38 @ 77F	Yes	~odorless	IRIS B2	NA	NA	NA	NA
Benzene	71432	0.1 ppm* 1 ppm 5 ppm S	10 ppm	3000 ppm	75	0.88	Yes	aromatic 5 - 119 ppm	IRIS A	10	12.2	150	9.24
Alpha-BHC (alpha-hexachlorocyclohexane)	319846	NE	NE	NE	0.02 mm @ 20C	1.87 @ 20C		0.088 ppm	IRIS B2	NE	NE	NE	
Beta-BHC (trans-alpha-benzene hexachloride)	319857	5 mg/m³	NE	NE	NE	NE	NE		IRIS C	NA	NA	NA	NA
bis (2-ethyl hexyl) Phthalate	117817	5 mg/m³	5 mg/m³	NE	NE	NE	NE	odorless	NE	NA	NA	NA	NA
Carbon Tetrachloride	56235	2 ppm	5 ppm	300 ppm	91	1.59	Yes	sweet, aromatic 21.4 ppm	IRIS B2	NE	9	10	11.47
Chlorobenzene (monochlorobenzene)	108907	75 ppm	10 ppm	2400 ppm	12	1.11	No		IRIS D	NE	NE	200	0.07
Chloroform	67663	2 ppm	10 ppm	1000 ppm	160	1.48	No	pleasant 130 - 1000 ppm	IRIS B2	NE	6	65	11.42

TABLE B-1
(Continued)

Compound		CAS #	OSHA PEL	ACGIH TLV	IDLH	VAPOR PRESS. in mm @ 68°F	SPEC. GRAVITY @ 68°F	SKIN HAZARD	ODOR THRESHOLD (PPM)	CARC CAT.	HNu % RESPONSE (BENZENE)		OVA % (METHANE) RESPONSE	IP (eV)
											10.2 eV	11.7 eV		
2-Chlorophenol		95578	NE	NE	NE	2.2	1.26	Yes	unpleasant, penetrating 0.00018 mg/l	NE	NE	NE	NE	
Cyanide	KCN	168055	5 mg/m³	5 mg/m³	5 mg/m³	0	1.55	No	faint, bitter, almond	IRIS D	NE	NE	NE	NA
	NaCN	168955					1.60				NE	NE	NE	
1,2-Dichlorobenze		95501	50 ppm	25 ppm 50 ppm C	1000 ppm	1	1.3	No	aromatic 50 ppm	IRIS D	NE	NE	50	9.06
1,3-Dichlorobenze		541731	NE	NE	NE	2.3 @ 25C	1.2884			IRIS D	NE	NE	NE	9.12
1,4-Dichlorobenze		106467	75 ppm 110 ppm S	75 ppm	1000 ppm	10 @ 54.8C	1.25	No	aromatic (strong at 30 - 60 ppm)	IARC 2B	NE	NE	113	8.98
1,2-Dichloroethylene		540590	200 ppm	200 ppm	4000 ppm	180-264	1.27 @ 77F	No	Chloroform-like	NE	NE	NE	50	
Hexachlorobenzene		118741	NE	0.025 mg/m³*	NE	0.000001 @ 20C	1.569 @ 23.6C	Yes		IRIS B2	NE	NE	NE	7
Hexachlorobutadiene		87683	0.02 ppm	0.02 ppm		0.15 @ 20C	1.5542 @ 20C	Yes	faint turpentine 12 mg/m³	IRIS C	NE	NE	71	
Hexachloroethane		67721	1 ppm	1 ppm	300 ppm	0.2	2.09	Yes	camphor-like 0.01 mg/l (in water)	IRIS C	NE	NE	NE	11.22

TABLE B-1
(Continued)

Compound	CAS #	OSHA PEL	ACGIH TLV	IDLH	VAPOR PRESS. in mm @ 68°F	SPEC. GRAVITY @ 68°F	SKIN HAZARD	ODOR THRESHOLD (PPM)	CARC CAT.	HNu % RESPONSE (BENZENE) 10.2 eV	HNu % RESPONSE (BENZENE) 11.7 eV	OVA % (METHANE) RESPONSE	IP (eV)
Lindane (gamma-BHC, gamma-hexachlorocyclohexane)	58899	0.5 mg/m³	0.5 mg/m³	1000 mg/m³	0.00001	1.85	Yes	slight musty odor	NE	NE	NE	NE	NA
Mercury (inorganic)	7439976	0.1 mg/m³ C	0.1 mg/m³	28 mg/m³	0.0012	13.6	Yes	odorless	IRIS D	NE	NE	NE	NA
Methanol	67561	200 ppm	200 ppm	25,000 ppm	100 mm @ 21.2C	0.8 @ 0C	Yes	alcoholic barely detect at 2000 ppm	NE	NE	NE	12	
Methylene Chloride	75092	500 ppm 1000 ppm C 2000 ppm S/5/2	50 ppm	5000 ppm	350	1.33	No	sweet, pleasant 160 - 307 ppm	IRIS B2	NE	9.4	90	11.32
Phenol	108952	5 ppm	5 ppm	250 ppm	0.4	1.06	Yes	sweet aromatic 0.06 - 0.8 ppm	IRIS D	NE	NE	54	8.50
1,1,2,2-Tetrachloroethane	79345	1 ppm	1 ppm	150 ppm	9 @ 86F	1.59 @77F	Yes	0.237 - 7.9 ppm	IRIS C	NE	6	100	11.1 0
2,3,7,8-Tetrachlorodibenzo-p-dioxin	1746016				~0		Yes		IARC B2	NE	NE	NE	
Tetrachloroethylene (Perchloroethylene)	127184	25 ppm	50 ppm 200 ppm	500 ppm	14	1.62	No	mildly sweet desensitizes olefactory 4.68 - 50 ppm	IARC 2B	NE	NE	70	9.32
Tetrahydrothiophene	110010	NE	NE	NE		0.9987 @ 20C	Yes	stench 1 ppb	NE	NE	NE	NE	7

TABLE B-1
(Continued)

Compound	CAS #	OSHA PEL	ACGIH TLV	IDLH	VAPOR PRESS. in mm @ 68°F	SPEC. GRAVITY @ 68°F	SKIN HAZARD	ODOR THRESHOLD (PPM)	CARC CAT.	HNu % RESPONSE (BENZENE)		OVA % (METHANE) RESPONSE	IP (eV)
										10.2 eV	11.7 eV		
1,2,3-Trichlorobenzene	87616	NE	NE	NE	0.07 @ 25C	1.69		NE	NE	NE	NE	100	
1,2,4-Trichlorobenzene	120821	NE	1 ppm 5 ppm C	NE	0.29 @ 25C	1.45 @ 20C	Yes	aromatic 3 ppm	IRIS D	NE	NE	100	
Trichloroethylene	79016	50 ppm 200 ppm C	50 ppm 200 ppm C	1000 ppm	58	1.46	No	sweet chloroform 21.4 - 82 ppm	3 IARC	8.9	NE	70	9.45
Toluene	108883	100 ppm 150 ppm C	50 ppm* 100 ppm 150 ppm C	2000 oom	20 @ 65F	0.87	Yes	sweet pungent 0.16 - 37 ppm	D IRIS	10	10	110	8.82
Vinyl Chloride (Chloroethylene)	75014	1 ppm 5 ppm C	5 ppm	NE	400 @ 28C	0.9106 @ 20C	No	sweet high threshold	Suspect Carcinogen ACGIH	5	NE	35	9.99

OSHA = Occupational Safety and Health Administration
ACGIH = American Conference of Governmental Industrial Hygienists
IRIS = Integrated Risk Information System
IARC = International Agency for Research on Cancer
PEL = Permissible Exposure Limit, unless noted is the TWA, Time Weighted Average (usually for 8 hours a day, 5 days a week), mandated by law
TLV = Threshold Limit Value, unless noted is the TWA, Time Weighted Average (usually for 8 hours a day, 5 days a week), recommended
IDLH = Immediately Dangerous to Life or Health
Skin Hazard = Contaminant is able to be absorbed through intact skin

TABLE B-1
(Concluded)

mg/m^3 = milligrams of contaminant per cubic meter of air
ppm = parts of contaminant per million parts of air
NE = Not Established
NA = Not Applicable
C = Ceiling Limit, shall not be exceeded at any time during the work day
S = Short Term Exposure Limit (STEL) usually 15 minutes, four times in one day
S/5/2 = STEL for 5 minutes, twice in one day
* = These TLV's have not yet been adopted. ACGIH has placed them under notice of intended changes.

<u>Carcinogenic Category</u>

IARC	IRIS	
1	As	Human Carcinogen
2A	B1	Probable Human Carcinogen (limited human data)
2B	B2	Probable Human Carcinogen (sufficient evidence in animals, inadequate evidence in humans).
3	C	Possible Human Carcinogen
4	D	Not Classifiable
	E	Evidence of Non-Carcinogen

DRAFT

M/F	BLDG	PROJ	DA	TYPE	LOCMAP8	LAST REV

-V
-W
-X
-Y

MAP
NIAGARA PLANT
HEALTH & SAFETY PLAN
GILL CREEK REMEDIATION

DARDS	REFERENCE DRAWINGS

RAWING HAS BEEN FURNISHED BY E.I. DU PONT DE
S & CO. THE INFORMATION AND KNOW-HOW THEREON
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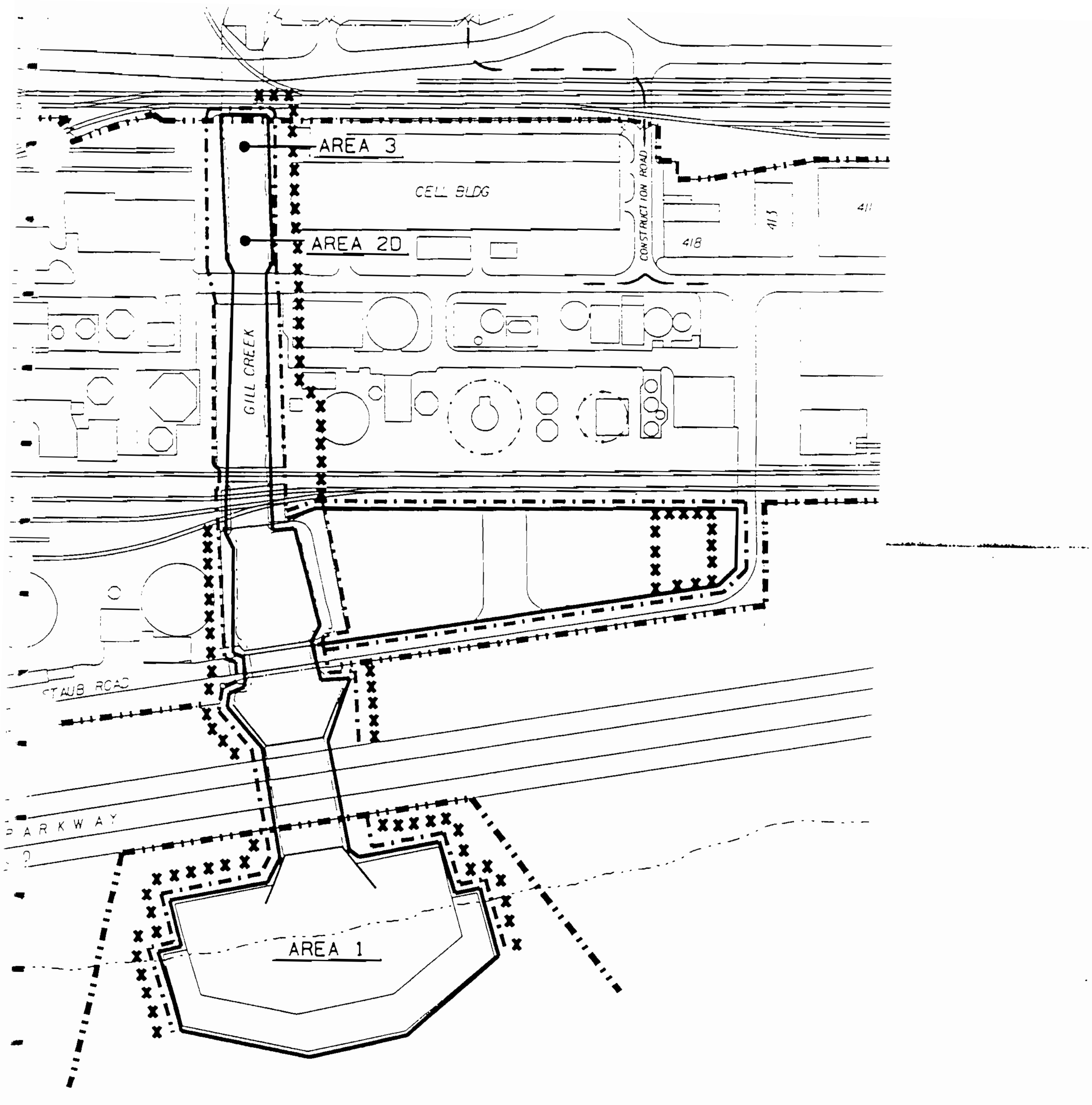
APH COMPUTER DRAWING PLOTTED 5/22/92

PROJECT		
SCALE	1"=120'-0"	DATE
DRAWN	L.WILSON	6-14-91
CHECKED		
APPROVED- DESIGN RELEASE		
APPROVED- CONSTR. RELEASE		

DUPONT
E.I.DU PONT DE NEMOURS & CO.,INC.
WILMINGTON, DELAWARE
ENGINEERING DEPARTMENT
LOCMAP8



LEGEND

- CONTAMINATION REDUCTION ZONE
- EXCLUSION ZONE
- HOT LINE BOUNDARY
- SECURITY ZONE
- ALTERNATE ENTRANCE FOR PLANT PERSONNEL DURING AREA 2 & 3 REMEDIATION

DU PONT

CHEMICALS

P.O. Box 787
Buffalo Ave. & 26th Street
Niagara Falls, NY 14302-0787
(716) 278-5100

bcc: DMDarragh
MVermersch - WCC
REAustin - Legal, D7016-1
DEEllis - Chem, Bellevue
JELeemann - Chem, B16271
PBButler - Chem, B12228
RWPorter/DEShimp
RJGentilucci/File 52150

June 18, 1992

Mr. Michael J. Hinton, P.E.
NYS Dept. of Environmental Conservation
Division of Hazardous Waste Remediation
270 Michigan Avenue
Buffalo, NY 14203-2999

Dear Mr. Hinton:

DU PONT/OLIN GILL CREEK REMEDIATION PROJECT

During the construction and implementation of the Gill Creek remediation project, Du Pont and Olin have proposed that the water management plans include utilizing Hyde Park Lake as a reservoir for precipitation. We have proposed this concept to the City of Niagara Falls (City) and with City approval have been proceeding with investigations to finalize a plan that would have provided us with 160 acre-feet of storage capacity.

We have recently been informed by the City that the amount of storage capacity available to us will be limited to approximately 50 acre-feet (ac-ft), provided as a two-foot lowering of the lake level which will be available after Labor Day. This limitation will increase the probability that precipitation and run-off from the Gill Creek watershed will overtop the diversion structure north of Buffalo Avenue and enter the project area. The attached table was developed by Woodward-Clyde Consultants and indicates the probabilities of overtopping events for various time periods.

Although 50 ac-ft probabilities were not calculated, simple interpolation can be applied to determine approximate probabilities associated with a 50 ac-ft storage capacity. The construction schedule currently assumes the need for watershed management will begin when the cofferdam is completed, projected for mid-August. Watershed management will become unnecessary once all sediments are removed and the creekbed has been restored, perhaps as late as early December. The probabilities associated with an August 1 to December 30 time frame are as follows: a 69 percent probability of overtopping once if 160 ac-ft are available and approximately 85 percent probability if 50 ac-ft are available. If the schedule is compressed so that watershed management is needed for September to October only, then the probabilities associated with all storage capacities are significantly reduced.

Any plan for implementing this project will have some risk of overtopping associated with it. Du Pont and Olin and the DEC Dam Safety Section have worked diligently to develop a plan providing greater storage capacity. The risk of overtopping events would be reduced if more than the 50 ac-ft of storage capacity were available, but Du Pont and Olin believe the risks associated with the 50 ac-ft capacity are acceptable. Overtopping events will lead to project delays and increased costs which can be accommodated in our current construction schedule and budget estimate.

We request that DEC quickly review this information and approve the project plans in light of this recent development.

Sincerely,

Leslie A. Warner

Leslie A. Warner
Senior Engineer, Engineering
and Environmental Affairs

LAW:klf
19387

cc: NYSDEC - Division of Hazardous Waste Remediation (Buffalo)
NYSDEC - Division of Environmental Enforcement (Buffalo)*
NYSDEC - Division of Hazardous Waste Remediation (Albany)*
NYSDOH - Bureau of Environmental Exposure Investigation (Albany)*
James C. Brown - Olin
Al Zaepfel - City

* Two copies per order on consent

TABLE 1

PROBABILITY OF OVERTOPPING DIVERSION STRUCTURE NO. 1 AT LEAST ONCE AND TWICE FOR VARIOUS STORAGE ALTERNATIVES AND CONSTRUCTION PERIODS

	Probability of Overtopping Diversion Structure No. 1 During the Following Construction Periods											
Amount of Storage (ac-ft)	May - Dec		July - Dec		Aug. - Dec.		Sept. - Dec.		Oct. - Dec.		Sept. - Oct.	
	Once	Twice	Once	Twice	Once	Twice	Once	Twice	Once	Twice	Once	Twice
0	100	85	96	73	92	58	69	46	69	35	54	23
100	96	54	88	42	77	35	58	19	46	15	38	12
160	85	35	77	23	69	23	46	15	35	15	31	12
260	46	19	46	12	38	8	15	8	15	4	8	4
50*	-		-		85	47	63	33	58	25	46	18

*Values estimated by interpolation

Woodward-Clyde Consultants

Engineering & sciences applied to the earth & its environment

June 18, 1992

Mr. Hank Mazzucca
U.S. Environmental Protection Agency
26 Federal Plaza
New York, NY 10278

Subject: Gill Creek Remediation Transmittal of Design Documents
Project No. 22915

Dear Mr Mazzucca:

We are submitting on behalf of Du Pont and Olin the following design documents prepared for the Gill Creek remediation water treatment system.

- Gill Creek Remediation Plans and Specifications - Sections 1, 2, 5 and 6 relating to water quality and treatment (April 1992).

- Gill Creek Remediation Drawings
  02-04-001 Instrumentation Legend
  02-04-002 Process Flow Diagram
  02-04-003 P&ID Sheet 1 of 3
  02-04-004 P&ID Sheet 2 of 3
  02-04-005 P&ID Sheet 3 of 3
  02-05-001 Piping and Mechanical Legend

- Draft Gill Creek Remediation Water Treatment Sampling and Analysis Plan

- OHM Proposal Information which includes equipment information and the following drawings:

  12722-103 Process Flow Diagram, Sheet 1 of 3
  12722-104 Process Flow Diagram, Sheet 2 of 3
  12722-105 Process Flow Diagram, Sheet 3 of 3
  12722-03 Water Treatment System - Plot Plan

22915/LE52 06-18-92/RPT/7

Stanford Place 3, Suite 1000 • 4582 South Ulster Street • Denver, Colorado 80237 2637
303-694-2770 • Fax 303-694-3946

If you have any questions, please call Leslie Warner at (716) 278-5452.

Sincerely,

Max. Vermersch

Max Vermersch
Associate and Project Manager

JHS:ana

Enclosures

1c: Leslie Warner, Du Pont
Jim Brown, Olin
David Leemhuis, NYSDEC
Mike Hinton, NYSDEC
E. Struzeski, SAIC
Al Zaepfel - WWTP
Marit Crowe, Du Pont
Steve Constable, Du Pont
Tony Wolfskill, WCC
Elaine Reilly, WCC
Binder

0 DPS

PROPOSAL FOR
CONTAMINATED WATER TREATMENT SYSTEM
AT DUPONT GILL CREEK
IN NIAGARA FALLS, NEW YORK

Submitted to:

Sevenson Environmental Services, Inc.
Niagara Falls, New York

Submitted by:

OHM Remediation Services Corp.
Princeton, New Jersey

June 8, 1992
OHM Proposal 0103328

4.0 CONTAMINATED WATER TREATMENT SYSTEM

4.1 SYSTEM PERFORMANCE

This section summarizes the factors which will influence system capacity and our guarantee of performance such as influent water quality, effluent water quality as required by Dupont, and rate of generation of contaminated water.

4.1.1 Influent Water Quality

The treatment system was designed to treat contaminated water with the quality presented in Table 4.1. This table was consolidated from Woodward-Clyde's Specifications, dated April 27, 1992, page numbers 11230-9, 10 and 11335-1, indicating the influent water quality to the air stripper and carbon vessel respectively. Also, OHM understands the influent inorganic compounds are mostly insoluble and will be precipitated out in the clarification processes.

4.1.2 Effluent Conditions

The treatment system was designed to meet site compliance limits for discharge of effluent to the City of Niagara Falls POTW through outfall 023. Effluent will be analyzed, prior to discharge, to ensure that all the parameters established by DuPont can be met by the treatment system.

4.1.3 System Capacity

The water treatment system has been designed for a nominal rate capacity of 360,000 gallons a day. In addition, the system can be operated at a peak capacity of 720,000 gallons a day.

TABLE 4.1
INFLUENT WATER QUALITY

Organic Compounds	ppb
1,1-Dichloroethene	148
PCB-1248	909
Vinyl Chloride	2,832
1,2-Dichloroethene	5,501
Trichloroethylene	22,624
Benzene	5,477
Tetrachloroethylene	7,205
1,1,2,2 - Tetrachloroethane	7,076
Chlorobenzene	1,959
1,3 Dichlorobenzene	173
1,4 Dichlorobenzene	387
1,2 Dichlorobenzene	558
1,1,1-Trichloroethane	296
Carbon Tetrachloride	136
Hexachlorobutadiene	357
Methylene Chloride	2,649
Chloroform	862
Hexachlorobenzene	16.5
Phenanthrene	ND
Fluoranthene	ND
Pyrene	ND

TABLE 4.1
INFLUENT WATER QUALITY

Inorganic Compounds	Total (ppm)	Estimated soluble (ppm)
Aluminum	73.2	
Arsenic	0.10	
Barium	0.75	≤ 0.09
Beryllium, Total	0.00	
Cadmium, Total	≤ 0.01	≤ 0.008
Calcium, Total	235	≤ 190
Chromium	0.09	< 0.009
Cobalt, Total	0.31	
Copper, Total	2.10	< 0.01
Iron, Total	114	< 0.41
Lead, Total	1.61	≤ 0.05
Magnesium, Total	67.5	≤ 21
Manganese, Total	4.21	≤ 0.33
Mercury	0.02	
Nickel, Total	0.53	≤ 0.012
Potassium, Total	9.58	≤ 11
Silver, Total	0.01	
Sodium, Total	109	
Vanadium, Total	0.06	
Zinc, Total	4.59	≤ 0.013
Alkalinity, Total	132	
Hardness, Total	502	
Total Suspended Solids	258	
Turbidity	119 NTU	

4.2 SYSTEM DESCRIPTION

This section briefly describes the components of the water treatment system specified for treatment of contaminated water pumped from Gill Creek.

4.2.1 Process Equipment and Operation

A process flow diagram (PFD) and process and instrumentation diagram (P&ID) showing the contaminated water treatment system is included in Appendix A. The major pieces of process equipment are described below. Please note that OHM's filter vessels are not ASME stamped.

Contaminated water will be pumped from Gill Creek to a horizontal-flow, rectangular clarifier (TK-101A). After the initial settling the flow is directed to two (2) 49,000 gallon nominal capacity, open top surge tanks in parallel. The tanks are square 40- by 40-foot "Modu-Tank" and 6-feet, 3-inches high. The clarifier measures 26 feet long, 8 feet wide, and 8 feet deep, and has a capacity of 12,000 gallons. The clarifier serves as a primary settling/clarification unit.

The flow is equalized in TK-101B and TK-101C, then pumped by a 6-inch submersible pump (P-102C) to two (2) Lamella clarifiers. Polymer will be injected at the inlet of the Lamella clarifiers independently via chemical pumps (P-109A/B). The pumps P-109A and P-109B draws polymer from chemical storage tanks TK-106 and TK-107, respectively. The Lamella inclined-plate clarifiers use inclined plates to enhance settling and slow water velocity. The sludge collects in a lower thickener, while the clarified water overflows from a weir into a transfer tank (TK-102).

A 6-inch submersible pump (P-103) located in the transfer tank will feed clarified water to three (3) sand filters for removal of residual suspended solids. Each filter vessel is a cylindrical carbon steel pressure vessel, 84 inches in diameter and 72 inches in column height, with flanged and dashed top and bottom heads. During the operation of peak flow rate at 500 gpm, each vessel has a design rate of 4.3 gpm/square foot when all three vessels are in service. Under the same condition, the design rate will increase to 6.5 gpm/square foot per vessel when one vessel is shut down for backwashing while the other two vessels are in service.

Filtered water enters a 12,000 gallon transfer tank (TK-105). Process water will then be pumped by a 6-inch submersible pump (P-107) to two (2) of the air strippers (T-201A/B). At this point, process water can be diverted to either the existing steam stripper or back to the surge tank (TK-101B/C) for recycling. The line to the existing steam stripper contains a pressure switch followed by a centrifugal pump (P-108) to pump the process water to the steam stripper, if necessary. The pressure switch is to ensure that the centrifugal pump can only be operated under adequate inlet pressure. Besides, the air strippers are designed so that they can be totally by-passed.

One 84-inch diameter and one 54-inch air strippers will be provided. The 54-inch unit will handle a low flow rate of 250 gpm while the 84-inch unit will handle a peak flow rate of 500 gpm. The contaminated water is pumped to the top of the column and then cascades downward over the packing material. At the same time, fresh air is blown counter-current to the water flow through the base of the air stripper. Typically, 75 to 99+ percent removal efficiencies are reached for volatile chemicals. The air strippers use Jaeger Tripacs packing material which allows for a high surface area and void volume, low pressure drop, and maximum-transfer capabilities for the volatile organics. The off-gas from the air strippers will be released to atmosphere.

The process water will be collected at the bottom of the air strippers and pumped again via 6-inch submersible pumps (P-201 A/B) to three sets of carbon units in parallel (V-202/203/204). Followed the three carbon units are another three sets of dual carbon units in parallel (V-201A/B, V-205A/B, and V-206A/B). Each 84-inch diameter carbon vessel has 38.5 square feet of surface area in a 6-foot column with a design rate of 2 to 4 gpm/square foot. Each vessel has a capacity of 8,000 pounds of activated carbon. The first three vessels are especially designed to remove and accumulate PCBs. The following three dual sets of carbon units are mainly for organics removal. The spent carbon from vessels will be disposed by Dupont.

The effluent of carbon cells will be discharged depending on spent carbon analysis to the location at Outfall 023. Sampling will be done from the discharge line to ensure the effluent meets the discharge criteria. The discharge line will also be branched to a 12,000 gallon holding tank (TK-120) which will be used to store the backwashing water for sand filters.

During normal operation, sludge will accumulate at the bottom of primary clarifier (TK-101A) and secondary Lamella clarifier (CL-101 A/B). Sludge will be pumped by air-operated diaphragm pumps (P-111 and P-104 A/B) respectively to a 10,000 gallon conical bottom (90 degree angle) sludge holding tank. Polymer will be injected into the feed line before the sludge holding tank to assist in achieving maximum sludge settlement. Decanted water will flow by gravity to recycle sump (TK-104). The pump (P-106) inside the sump will be used to pump the decanted water to surge tanks (TK-101B/C). A 2-inch diaphragm pump (P-105) will feed thickened sludge to the filter press (F-102).

A 60-cubic foot plate and frame filter press will be used to dewater the clarifier sludge. An electrically powered hydraulic ram, using 480 volt, 3-phase power, closes the plates. Enviroguard's Maxflow will be added as filter aid. Filtrate from the press will be directed to recycle sump (TK-104). When a filter press cycle is complete, the dewatered sludge cake will be dropped onto a belt conveyor (BC-101) and transferred to a rolloff container. The sludge cake then will be ready for off-site disposal by others.

4.2.2 Control System

Holding tanks in the system are equipped with level switches to prevent overfilling of the tanks. The high level switches trip an alarm to alert the operators that there is a problem, as well as deactivating other process pumps feeding the tank where the high level occurred. The low level switches are equipped to deactivate the pumps located at the same tank.

Flow indicators will be used to monitor the flow rate in the process. Pressure indicators will be provided to indicate the line pressure as well as the pressure drop across filters and carbon units.

APPENDIX C

EQUIPMENT INFORMATION SUMMARY

12722.001

HORIZONTAL CLARIFIER
TK-101A

TRANSFER TANK; 49,000 GALLON
TK-101B/C

MATERIALS OF CONSTRUCTION

Side Panels - 16 GA. mil galvanized wall panels
Hot-clip galvanized structural
Steel columns and rails, stainless
steel tension cables

Connector Pins - 3/8" Bolts
Liners - 30 mil Vinyl Double Lined
Base - Sand
Electrical - None required

EQUIPMENT DESCRIPTION

OHM 50,000 Gallon Portable Holding Pool, Open-top

INSULATION

None required

TRANSFER TANK; 12,000 GALLON
TK-102/TK-105/TK-120

1.0 MATERIALS OF CONSTRUCTION

Side Panels: 1/4" Aluminum Alloy 5052
2' x 4' Panels, 26 Panels per Tank

Connector Pins: 3/8" Bolts
Liners: 20 mil Vinyl Double Lined
Base: Sand

2.0 ELECTRICAL

Not required.

3.0 EQUIPMENT DESCRIPTION

OHM 12,000 Gallon Portable Holding Tanks, Open-top

4.0 INSULATION

Not required.

TANK MIXER PACKAGE; 1,000 GALLON
TK-106/TK-107/TK-108;
M-106/M-107/M-108

MATERIALS OF CONSTRUCTION

Tank - Polyethylene
Mixer - 316 Stainless Steel

ELECTRICAL

Mixer - 460V, 3 Phase

EQUIPMENT DESCRIPTION

Tank - Terrcon Corp. 1,000 Gallon Polyethylene
Storage Tank Model #210-00

Mixer - Neptune Mixer Model AG5.1
1 HP, 350 RPM
Shaft Length = 60", 12" propellers

INSULATION

None Required

IN-LINE STATIC MIXER; 4-INCH
SM-101, SM-102

MATERIAL OF CONSTRUCTION

Carbon Steel

ELECTRICAL

None Required

EQUIPMENT DESCRIPTION

Kenics Model 6HEV2 In-line Mixer
Overall Length = 9 3/4"

INSULATION

None Required

INCLINED CLARIFIER
CL-101A/B; M-101A/B

MATERIALS OF CONSTRUCTION

Settler Tank: ASTM A-36 Steel, Rubber Lined
Sludge Hopper: ASTM A-36 Steel, Rubber Lined

ELECTRICAL

460V 3 Phase 60 Hertz

EQUIPMENT DESCRIPTION

Parkson Corporation's Lamella Gravity Settler/Thickener
Model #570/55

INSULATION

Not Required

DIAPHRAGM PUMP; 2 INCH
P-101D/E/F/G; P-104A/B; P-111; P-112

MATERIALS OF COST

Wetted Metal Parts: Cast Iron
Elastomers: EPDM

ELECTRICAL

460V 3 Phase

EQUIPMENT DESCRIPTION

Roper 2" Double Diaphragm Pump Model #20DF70CCE
2" Discharge

INSULATION

Not Required

CHEMICAL FEED PUMP
P-109/P-110

MATERIALS OF CONSTRUCTION

Housing - Glass Fiber Reinforced Polypropylene
Head and Fittings - Polypropylene
Seal Rings - Teflon
Tubing - Discharge: Polyethylene .5" OD
Suction - Vinyl .938" OD

ELECTRICAL

115 VAC

EQUIPMENT DESCRIPTION

LMI Metering Pump Model #D131 25HV
Max Injection Pressure = 60 psi
Feed end designed for injection of high viscosity materials

INSULATION

None Required

SUBMERSIBLE PUMP; 6 INCH
P-102A/B/C; P-103; P-107; P-120

MATERIAL OF CONSTRUCTION

PART	MATERIAL
Motor Housing	Aluminum
Intermediate Bracket	Aluminum
Impeller	Ductile Iron
Suction Head	Ductile Iron
Diffuser	Ductile Iron
Hardware (Internal)	Stainless Steel
Bearings, Ball	Two, Single Row
Control Box	Standard
Hoisting Bail	Standard
Strainer 275 sq. in. area	5/8 inch sq. openings

ELECTRICAL

460V Three Phase 3 Wire

EQUIPMENT DESCRIPTION

35 HP 1750 RPM Gorman-Rupp Submersible
Pump Motel #S6C1
6" Discharge

INSULATION

Not Required

SAND FILTERS
F-101A/B/C

1.0 MATERIALS OF CONSTRUCTION

3/8" A36 Carbon Steel Sheets, Dished Heads
2" sch 40 Carbon Steel Bottom Collection Laterals

Interior Shell and Laterals Primed and Coated with
650 Ceilcote

2 Diameter Stainless Steel .010 Slot Screens on
Collection Laterals

3" sch 40 Black Iron Exterior Piping
3" 150# Flanged Butterfly Valves
3" Flange Connection

2.0 ELECTRICAL

Not required

3.0 EQUIPMENT DESCRIPTION

OHM Standard Filter Vessel
7 ft. Diameter, 8 ft. 3 in. Height
Bed Surface Area 38 sq. ft. per Cell
Process Flow Range 35-200 gpm Each Cell

See Attached Drawing

3/8" Pea Gravel to 1 ft. above Laterals
2 - 4 ft. 650 Silica Sand: See Attached Specification

4.0 INSULATION

Not required.

12722.013

FILTER PRESS; 60 CFT
F-102

DIAPHRAGM PUMP; 3 INCH
P-101A/B/C; P-105

MATERIALS OF CONSTRUCTION

Wetted Metal Parts: Cast Iron
Elastomers: EPDM

ELECTRICAL

460V 3 Phase

EQUIPMENT DESCRIPTION

Roper 3" Double Diaphragm Pump Model #30DF 70CCE
3" Discharge

INSULATION

Not Required

SUBMERSIBLE PUMP; 2 INCH
P-106

MATERIALS OF CONSTRUCTION

Motor Housing: Aluminum
Pump Body: Aluminum
Impeller: Cast Iron, Open Non-Clog
Replaceable Wear Plate: Cast Iron
Seal: Mechanical Type in Oil-Filled Chamber with Carbon and Ceramic Faces and Secondary Exclusion Seal
Hardware: Stainless Steel
Strainer: Aluminum - 3/8" x 3/8" openings

ELECTRICAL

460V Three Phase

EQUIPMENT DESCRIPTION

2 HP 3450 RPM Peabody Barnes Submersible Pump
Model #12ASE-4
2" Discharge

BELT CONVEYOR
BC-101

AIR STRIPPER
T-201A/B; BL-201A/B

1.0 MATERIALS OF CONSTRUCTION

Air Stripper Shell: 1/8" A36 Grade Carbon Steel
Packing: Polypropylene

See Attached Drawing

2.0 ELECTRICAL

Not required

3.0 EQUIPMENT DESCRIPTION

54" Diameter, 18' Packing Depth
84" Diameter, 18' Packing Depth

Packing: Jaeger 2" Tri-Packs - 54" Diameter
Jaeger 3 1/2" Tri-Packs - 84" Diameter

See Attached Drawing and Specifications for
Remaining Column Internals

4.0 INSULATION

Not required

LIQUID PHASE CARBON ABSORBERS
V201A/B; V205A/B; V206A/B

1.0 MATERIALS OF CONSTRUCTION

3/8" A36 Carbon Steel Sheets, Dished Heads
2" sch 40 Carbon Steel Bottom Collection Laterals

Interior Shell and Laterals Primed and Coated with
650 Ceilcote

2 Diameter Stainless Steel .010 Slot Screens on
Collection Laterals

3" sch 40 Black Iron Exterior Piping
3" 150# Flanged Butterfly Valves
3" Flange Connection

2.0 ELECTRICAL

Not required.

3.0 EQUIPMENT DESCRIPTION

OHM Standard Dual Cell Filter Vessel
7 ft Diameter, 8 ft 3 in Height
Carbon Capacity: 8,000 lbs per Cell
Process Flow Range 35 - 200 gpm

See Attached Drawing

Carbon: Calgon FS-200
See Attached Specification

4.0 INSULATION

Not required.

SUBMERSIBLE PUMP; 6 INCH
P-201A/B

Same as P-102A/B/C

CENTRIFUGAL PUMP
P-108

PCB GUARD CARBON FILTER
V-202/203/204

1.0 MATERIALS OF CONSTRUCTION

3/8" A36 Carbon Steel Sheets, Dished Heads
2" sch 40 Carbon Steel Bottom Collection Laterals

Interior Shell and Laterals Primed and Coated with 650 Ceilcote

2 Diameter Stainless Steel .010 Slot Screens on Collection Laterals

3" sch 40 Black Iron Exterior Piping
3" 150# Flanged Butterfly Valves
3" Flange Connection

2.0 ELECTRICAL

Not required

3.0 EQUIPMENT DESCRIPTION

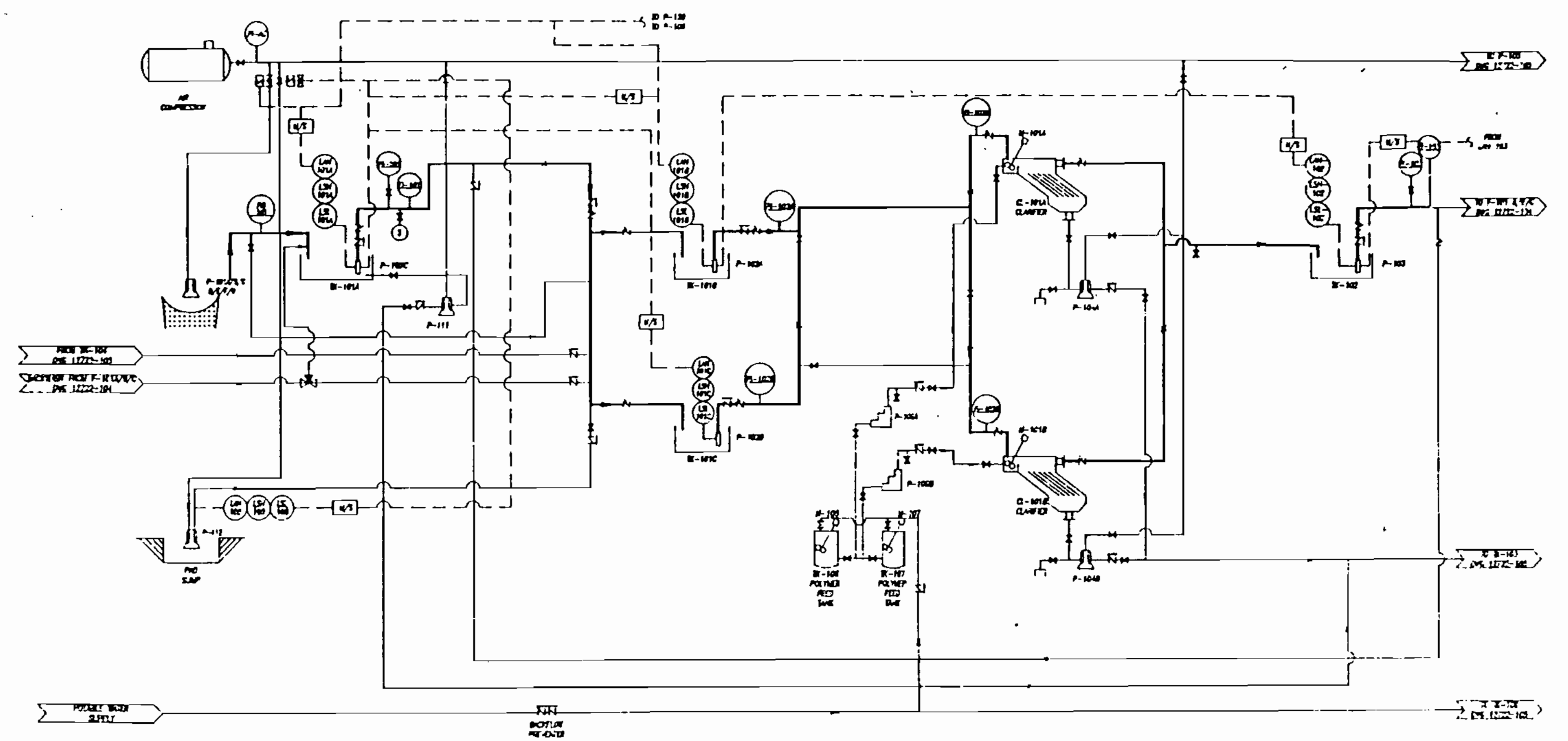
OHM Standard Filter Vessel
7 ft. Diameter, 8 ft. 3 in. Height
Bed Surface Area 38 sq. ft. per Cell
Process Flow Range 35 - 200 gpm Each Cell

See Attached Drawing

3/8" Peak Gravel to 1 ft. Above Laterals
2 - 4 ft. of Calgon FS-200 Carbon

4.0 INSULATION

Not required



LEGEND

(HH)	LEVEL SWITCH - HIGH HIGH	(pH)	ph CONTROLLER, INDICATOR OR ALARM
	ALARM	(FIQ)	FLOW TOTALIZER
	NORMALLY OPEN VALVE	(PI)	PRESSURE INDICATOR
	NORMALLY CLOSED VALVE	(PI)	PRESSURE INDICATOR PROCESS LINE
	CHECK VALVE		BUTTERFLY VALVE
	3-WAY VALVE		SOLENOID VALVE
	4-WAY VALVE		

DRAWING No.12722-103

GILL CREEK REMEDIATION
WATER TREATMENT SYSTEM
PROCESS FLOW DIAGRAM

SHEET 1 OF 3

PREPARED FOR

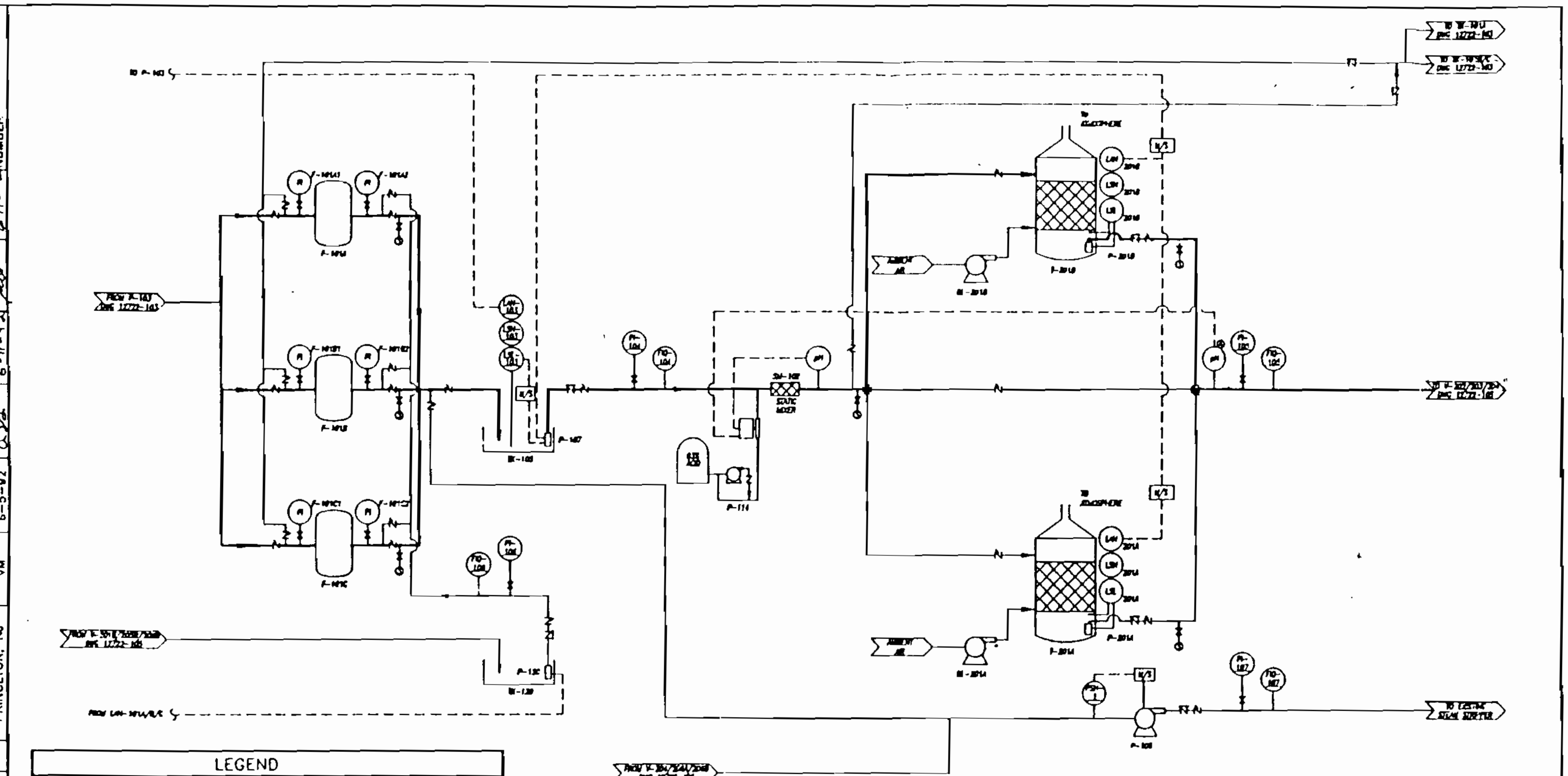
DUPONT/OLIN
NIAGARA FALLS, NY

OHM PROJECT 12722

OHM Corporation

OHM CORPORATION PRINCETON, NJ	DRAWN BY	REVISED BY	APPROVED BY	DRAWING NUMBER
	J.BARBERI 6-5-92	6-11-92		12722-103

PLOT SCALE: 1"=100'



LEGEND

- (HH) LEVEL SWITCH - HIGH HIGH
- ALARM
- NORMALLY OPEN VALVE
- NORMALLY CLOSED VALVE
- CHECK VALVE
- 3-WAY VALVE
- 4-WAY VALVE
- (pH) pH CONTROLLER, INDICATOR OR ALARM
- (FIQ) FLOW TOTALIZER
- (PI) PRESSURE INDICATOR
- (PI) PRESSURE INDICATOR PROCESS LINE
- BUTTERFLY VALVE
- SOLENOID VALVE

DRAWING No.12722-104

GILL CREEK REMEDIATION
WATER TREATMENT SYSTEM
PROCESS FLOW DIAGRAM

SHEET 2 OF 3

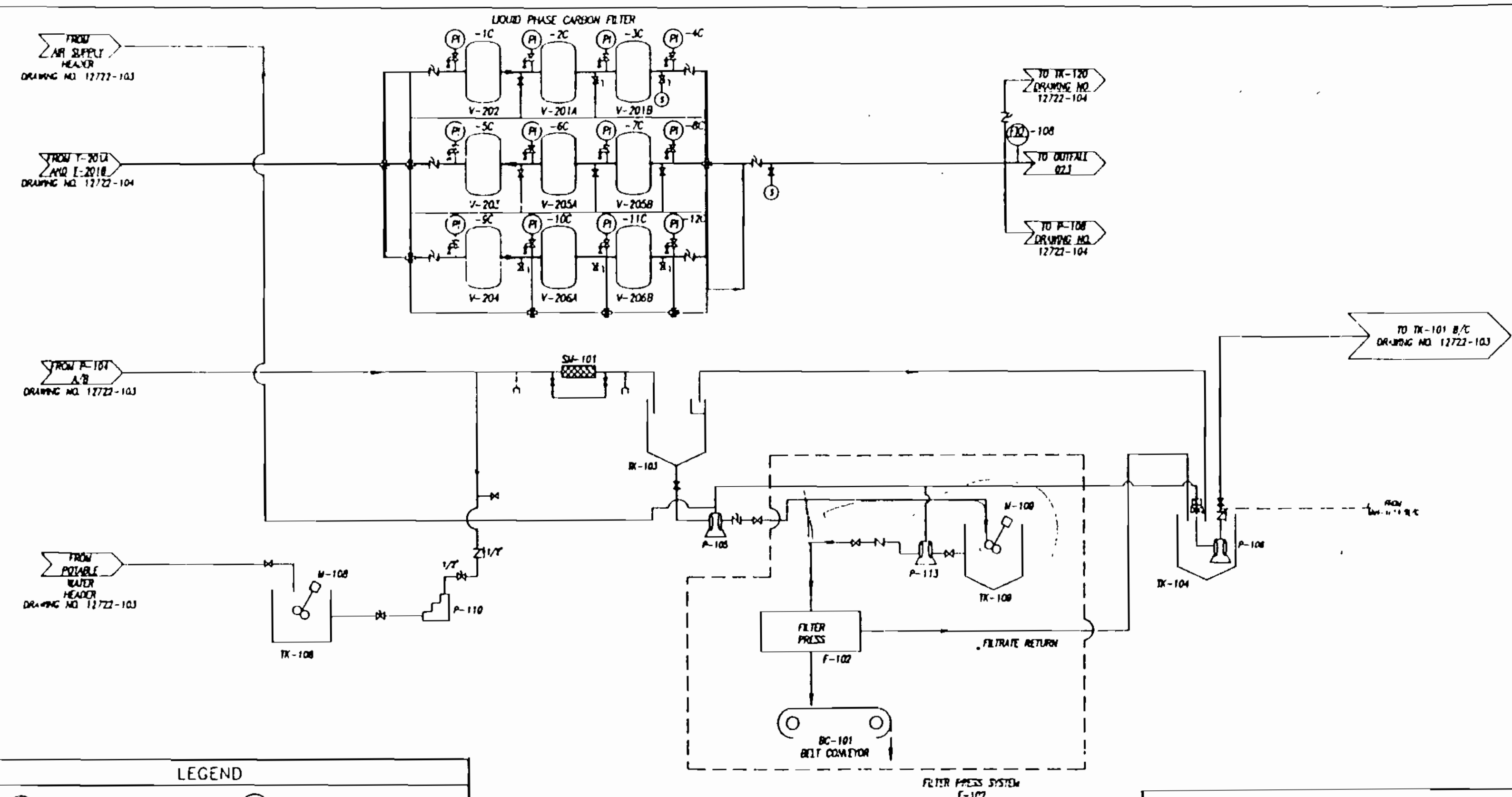
PREPARED FOR
DUPONT/OLIN
NIAGARA FALLS, NY

OHM PROJECT 12722

OHM Corporation

OHM CORPORATION PRINCETON, NJ	DRAWN BY	REVISED BY	APPROVED BY	DRAWING NUMBER
	VM 6-5-92	6-11-92		12722-104

PLOT SCALE 1"=100'



LEGEND

(HH)	LEVEL SWITCH – HIGH HIGH	(pH)	pH CONTROLLER, INDICATOR OR ALARM
(A)	ALARM	(FIQ)	FLOW TOTALIZER
	NORMALLY OPEN VALVE	(PI)	PRESSURE INDICATOR
	NORMALLY CLOSED VALVE	(PI)	PRESSURE INDICATOR PROCESS LINE
	CHECK VALVE		BUTTERFLY VALVE
	3-WAY VALVE		SOLENOID VALVE
	4-WAY VALVE		

DRAWING No.12722-105

GILL CREEK REMEDIATION
WATER TREATMENT SYSTEM
PROCESS FLOW DIAGRAM
SHEET 3 OF 3

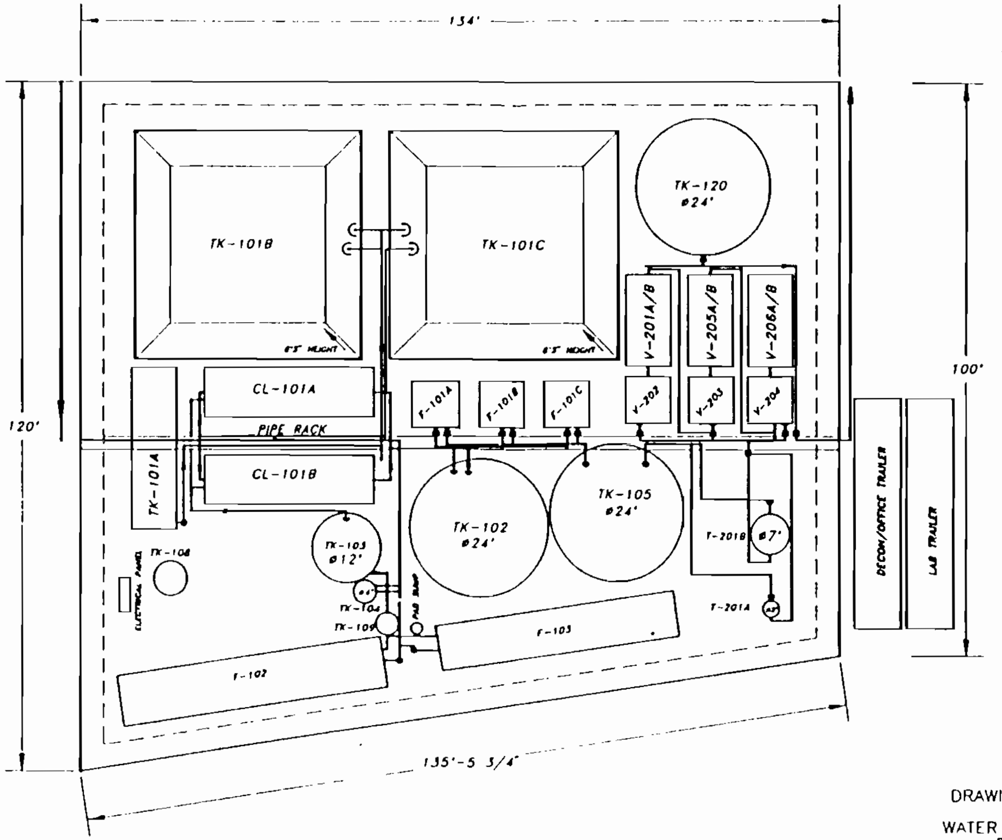
PREPARED FOR

DUPONT/OLIN
NIAGARA FALLS, NY
OHM PROJECT 12722

OHM Corporation

OHM CORPORATION PRINCETON, NJ	DRAWN BY	REVISED BY	APPROVED BY	DRAWING NUMBER
	VIA 6-6-92	GVB 6-11-92	6-11-92	12722-105

PLOT SCALE: 1"=100'



DRAWING NO. 12722-03

WATER TREATMENT SYSTEM
PLOT PLAN DRAWING
GILL CREEK REMEDIATION

PREPARED FOR

DU PONT/OLIN
NIAGARA FALLS, NEW YORK

OHM Corporation

OHM CORPORATION PRINCETON, NJ	DRAWN BY	CHECKED BY	APPROVED BY	DRAWING NUMBER
	VU 5-15-92	[illegible] 6-11-92	[illegible] 6-11-92	12722-03

PLOT SCALE 1" = 10'

DRAFT

GILL CREEK REMEDIATION WATER TREATMENT SAMPLING AND ANALYSIS PLAN

Prepared for
E.I. du Pont de Nemours and Co., Inc.
and Olin Corporation
June 1992

Woodward-Clyde

Woodward-Clyde Consultants
4582 South Ulster Street
Stanford Place 3, Suite 1000
Denver, Colorado 80237

22915

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1.0 INTRODUCTION

1.1 PURPOSE

E.I. du Pont de Nemours and Company, Inc. (Du Pont) and Olin Corporation (Olin) are undertaking the remediation of contaminated sediments in Gill Creek. This document outlines the environmental sampling and analysis procedures for the operation of a remediation water treatment system in conjunction with these remediation activities.

The purpose of this plan is to provide guidance for the sampling activities and procedures, and document analytical requirements associated with operation of the remediation water treatment system. The plan is not intended to constitute a state or federal regulatory requirement. This plan is to be used by personnel involved in sampling and/or analysis of the water treatment system during the remediation activities.

1.2 SAMPLING PLAN

Section 5.0 of this document describes the samples to be taken during startup and operation of the remediation water treatment system at the Gill Creek site. For each type of sample to be collected, the section defines the purpose of the samples, location and frequency of sample collection, sampling procedures, and sample designations.

1.2.1 Sample Locations and Frequencies

Sampling locations and frequencies are defined in Section 5.0 according to the purpose of each type of sample to be collected.

1.2.2 Sampling Procedures

Sampling procedures and the equipment needed for sampling specific to each type of sample are described in Section 2.0.

1.2.3 Sample Documentation and Chain of Custody

Each sample shall be documented on a Field Sampling Form (Figure 1-1). The documentation on the form includes the sample date, sample designation, sample location, brief sample description and description of any unusual conditions. The form shall be completed in the field and signed by the sampler.

Samples collected for chemical analysis will be continuously tracked from the field and in transit to the laboratory using the chain of custody procedure. A chain-of-custody form (Figure 1-2) will be completed for each group of samples collected. All information required by the form will be entered on the form. The completed chain-of-custody form will be signed, dated and enclosed in a sealable plastic bag and placed in the sample transport container prior to shipment to an off-site laboratory or delivery to an on-site laboratory. A copy of the completed chain-of-custody form will be retained by the field sampler and will be placed with other field documentation.

1.2.4 Sample Containers, Preservation, and Holding Times

Samples shall be collected in the appropriate containers. The specific containers to be used depend on the analyses to be performed. The correct containers for remediation water samples, defined in Table 1-1, will be obtained prior to sample collection. Preservatives will be supplied by the laboratory, in the sample containers or for addition following sample collection, as defined in Table 1-1. Table 1-1 also defines holding times for specific analyses. The holding time is the elapsed time from the time of sample collection to the laboratory analysis of the sample. It is important that samples be sent to the laboratory in a timely manner such that holding times are not exceeded. Sample containers, preservation, and holding times for spent carbon samples are defined in Table 1-10.

1.2.5 Quality Control (QC) Samples

Quality control (QC) samples, consisting of blanks, duplicate samples and matrix spike samples will be collected as a part of this sampling plan. The samples will be collected for each medium at the frequency defined in Table 1-2. The specific types of QC samples are discussed in Section 1.3 below.

1.2.6 Sample Analysis

The samples collected will be analyzed for the constituents identified for each sample type as described in Section 2.0 below. The analytical methods to be used for the samples are defined in Tables 1-3 and 1-10. The methods consist of standard EPA analytical methods.

1.3 QC SAMPLES

1.3.1 Blanks

Field blanks are prepared by pouring analyte-free water from a storage container into the sample container at the same location where a sample is collected. Analyte-free water is defined as water which does not contain a higher concentration of the analytes of interest than the recommended reporting limit.

Trip blanks are blanks for volatile organics analysis only that are placed in the same bottleware as the samples, by the laboratory, prior to the field sampling. These blanks accompany the sample bottles through the sampling and shipping process. They are not opened at any time after their preparation in the laboratory until they are analyzed.

1.3.2 Field Duplicates

Field duplicates are prepared in the field in order to assess the precision of the sampling procedures and the analytical system. Duplicates are prepared by placing equal amounts of a homogenized sample into two sets of glassware. When composite samples are being collected, the duplicate will come from the composited sample. Samples for volatile organic analysis and certain other parameters specified in Section 2.0 will not be homogenized or composited; therefore, a field duplicate will consist of a second grab sample taken from the same location immediately after the first.

1.3.3 Matrix Spikes

Samples designated for matrix spike analysis are sent to the laboratory from the field in order to assess laboratory accuracy. A sample designated for matrix spike analysis will consist of an additional amount of homogenized sample in duplicate bottleware. The sample will be identified for use as a matrix spike. The laboratory will be responsible for spiking and analyzing the sample according to analytical method protocols.

1.4 SAMPLE ANALYSIS

Samples for laboratory analysis will be sent to the laboratory specified by Du Pont. The laboratory will be responsible for providing sample containers and preservatives. Minimum turn-around time for analyses shall be as specified by Du Pont. As noted in Section 2.0, quick turnaround analysis and reporting of laboratory results need to be arranged with the laboratory in order to monitor startup of the remediation water treatment system. The analytical methods to be used for the samples are defined in Tables 1-3 and 1-10. The methods consist of standard EPA analytical methods. Project-specific reporting limits have been recommended for selected analytes in Table 1-4. It is recommended that laboratory detection or reporting limits be equal to or lower than the recommended reporting limits. Where analyte groups are specified for process water analysis (e.g., volatile organics, PCBs, etc.), Tables 1-5, 1-6, 1-7, and 1-8 specify the analytes for a particular group.

The reporting limits are necessary to achieve the project objectives of monitoring the water treatment process for compliance with discharge limits to the City of Niagara Falls Publicly Owned Treatment Works (POTW).

Reporting limits for analytes not specified in Table 1-4 are as suggested in the respective methods or laboratory standard operating procedures.

1.5 EQUIPMENT DECONTAMINATION

Sampling equipment will be decontaminated using the following procedure.

- Wash the equipment in detergent water followed by a distilled or deionized water rinse.

- A methanol rinse followed by an organic-free distilled or deionized water rinse may be used as a final rinse for sampling equipment used for sampling organics. Following a methanol rinse, the sampling equipment must be thoroughly rinsed with copious quantities of organic-free distilled or deionized water, to remove any trace quantities of methanol or other organics which might be present in the methanol.

- Store decontaminated equipment in such a way to avoid contact with potentially contaminated surfaces and potential cross-contamination (e.g., the equipment may be wrapped in new aluminum foil for storage).

TABLE 1-1

SAMPLE CONTAINERS, PRESERVATION, AND HOLDING TIMES FOR WATER SAMPLES GILL CREEK REMEDIATION

Method[1]	Parameter	Number of Containers/Sample	Preservation	Holding Time[2]
8240/8010/8020	Volatile organics	2-40 ml glass vials with Teflon-lined septa	4°C and 4 drops conc HCl[3]	14 days
8270/8120	Semivolatile organics	1-1 l glass bottle with Teflon-lined cap	4°C[3]	Extract - 7 days Analyze - 40 days
8080	Pesticides/PCBs	1-1 l glass bottle with Teflon-lined cap	4°C[3]	Extract - 7 days Analyze - 40 days
9065	Total Phenols	1-1 l glass bottle	4°C and H_2SO_4 to pH < 2	28 days
6010/7470	Metals	1-1 l HDPE[4]	4°C and HNO_3 to pH<2	6 months 28 days Hg
9010	Total and Amenable Cyanide	1-1 l HDPE[4]	4°C and NaOH to pH > 12 0.6 g asorbic acid	14 days
365.3	Total Phosphorus	1-1 l glass bottle	4°C and H_2SO_4 to pH<2	28 days
9060	Soluble Organic Carbon	1-1 l glass bottle	Filter sample then 4° and H_2SO_4 to pH < 2	28 days
9060	Total Organic Carbon	1-1 l glass bottle	Filter sample then 4° and H_2SO_4 to pH <2	28 days
160.1/160.2/310.1	TDS/TSS Alkalinity	1-l plastic or glass bottle	4°C	7 days 14 days

TABLE 1-1
(Concluded)

[1] Specific methods listed in Table 1-3.
[2] Time taken from date of sampling, analyze time is from extraction to analysis.
[3] If residual chlorine is present, samples will be dechlorinated with sodium thiosulfate as specified in SW-846 (third edition)
[4] HDPE = High Density Polyethylene

TABLE 1-2

FREQUENCY OF FIELD QC SAMPLES
GILL CREEK REMEDIATION

QC Sample Type	Sample Medium	Frequency
Field Blank	water	1 per 20 samples per analysis per medium
Field Duplicate	water	1 per 5 samples per analysis per medium
Trip Blank	water	1 per cooler of volatile organic samples submitted to laboratory
Matrix Spike/Matrix Spike Duplicate	water	1 per 20 samples per analysis per medium
TCLP Matrix Spike	spent carbon	1 per sample per analysis type

TABLE 1-3

ANALYTICAL PROCEDURES FOR GILL CREEK REMEDIATION CONFIRMATION SAMPLES

Parameter	Technique[1]	Extraction and Analysis Method[2]	
		Water	Spent Carbon
Volatile Organics			
Acetone Vinyl Chloride	GC/MS	5030/8240 w/ 25 ml purge	NA[3]
Other Volatile Organics	GC/MS	5030/8240	NA[3]
Semivolatile Organics			
2-Chlorophenol	GC	3510/8040 w/ 2nd col. confirmation	NA[3]
1,2-Dichlorobenzene 1,3-Dichlorobenzene 1,4-Dichlorobenzene 1,2,3-Trichlorobenzene[4] 1,2,4-Trichlorobenzene Hexachlorobutadiene Hexachlorobenzene	GC	3510/8120 w/ 2nd col. confirmation	NA[3]
Acenaphthene Anthracene[5] Fluoranthene Naphthalene Pyrene Phenanthrene[5]	GC	3510/8100 w/ 2nd col. confirmation	
Other Semi-Volatile Organics	GC/MS	3520/8270	NA[3]
Organochlorine Pesticides and PCBs	GC	3510/8080	3550/8080[6]
Total Phenols	Spectrophotometric	9065	NA[3]

TABLE 1-3
(Concluded)

Parameter	Technique[1]	Extraction and Analysis Method[2] Water	Extraction and Analysis Method[2] Spent Carbon
Metals			
Cadmium	GFAA	3020/7131	
Mercury	CV	7470	NA[3]
Other Metals	ICP	3010/6010	NA[3]
Total and Amenable Cyanide	Colorimetric	9010	NA[3]
Total Phosphorus	Colorimetric	365.3	NA[3]
Soluble Organic Carbon	Combustion or oxidation	9060 on filtered sample	NA[3]
Total Organic Carbon	Combustion or Oxidation	9060	NA[3]
Total Dissolved Solids	Gravimetric	160.1	NA[3]
Total Suspended Solids	Gravimetric	160.2	NA[3]
Alkalinity	Titrametric	310.1	NA[3]

1 GC/MS = gas chromatography/mass spectrometry; GC = gas chromatography; ICP = inductively coupled plasma; CV = cold vapor; GFAA = graphite furnace atomic absorption. Additional methods are listed to achieve lower reporting limits for specified indicator parameters, as recommended in Table 1-4.

2 All 3000 - 8000 series methods from SW-846, third edition. 100 - 300 series methods from EPA 600/4-79-020 (1983)

3 NA = not applicable

4 If 1,2,3-Trichlorobenzene cannot be quantitated in Method 8120, may be done by proposed Method 8260, SW-846 Nov. 1990 update.

5 If phenanthracene/anthracene are detected but not separated (separation capability for these is laboratory dependent), run method 8310 to separate and quantitate.

6 All solids must have % moisture determined.

TABLE 1-4

ANALYTES AND RECOMMENDED REPORTING LIMITS FOR SELECTED INDICATOR PARAMETERS[1] PROCESS WATER CONFIRMATION SAMPLES GILL CREEK REMEDIATION PROJECT

Parameter	Recommended Reporting Limits[2]
Volatile Organics	Water (μg/L)
Acetone	0.5[3,4]
Benzene	10
Carbon Tetrachloride	10
Chlorobenzene	5.0[4]
Chloroform	10
1,1-Dichloroethene	10
cis-1,2-Dichloroethene	10
trans-1,2-Dichloroethene	10
1,1,2,2-Tetrachloroethane	10
Tetrachloroethene	10
1,1,1-Trichloroethane	10
1,1,2-Trichloroethane	10
Trichloroethylene	10
Methylene Chloride	10
Vinyl Chloride	5.0[4]
Semivolatile Organics	
2-Chlorophenol	5.0[4]
1,2-Dichlorobenzene	2.0[4]
1,3-Dichlorobenzene	2.0[4]
1,4-Dichlorobenzene	2.0[4]
Acenaphthene	3.0[4]
Anthracene	3.0[4]

TABLE 1-4
(Continued)

Parameter	Recommended Reporting Limits[2]
Fluoranthene	1.0[4]
Naphthalene	1.0[4]
Pyrene	3.0[4]
Phenanthrene	1.0[4]
1,2,3-Trichlorobenzene	10
1,2,4-Trichlorobenzene	3.0[4]
Hexachlorobutadiene	1.0[4]
Hexachlorobenzene	1.0[4]
PCBs and Pesticides	
Hexachlorocyclohexane (BHC)	
alpha-BHC	0.05
beta-BHC	0.05
delta-BHC	0.05
gamma-BHC	0.05
PCBs	
Aroclor-1248	1.0
Aroclor-1254	1.0
Metals[4]	
Cadmium	0.5[4]
Total Chromium	10
Copper	25
Lead	100
Mercury	0.2
Nickel	40
Zinc	20

TABLE 1-4
(Concluded)

Parameter	Recommended Reporting Limits[2]
Other Parameters	
Total Alkalinity	10,000
Soluble organic carbon	500
Total cyanide	10
Total phosphorus	50
Total phenols	10
Total suspended solids (TSS)	10,000

1 Indicator parameters selected on basis of prior detection in water samples at site and existence of effluent limits for discharge to the Publicly Owned Treatment Works (POTW). The list of indicator parameters may be adjusted based on experience gained during remediation.

2 Based on limits for U.S. EPA Contract Laboratory Program (CLP) Statements of Work for Organic (3/90) and Inorganics (7/88). Reporting limits are highly matrix dependent. Reporting limits listed herein are provided for guidance are may not always be achievable on site samples.

3 Most laboratories cannot achieve the 0.5 $\mu g/L$ reporting limit on a routine basis for acetone because of laboratory contamination problems. Therefore, the acetone reporting limit is more laboratory-dependent than method-dependent. See Table 1-3 for recommended method to achieve a lower reporting limit than that recommended in CLP limit.

4 Detection limit lower than CLP limit recommended, based on Du Pont Waste Water Discharge Permit dated 9/20/90.

5 Metals samples are unfiltered (i.e., Total Metals).

TABLE 1-5

ANALYTES FOR VOLATILE ORGANIC TESTING STARTUP OF REMEDIATION WATER TREATMENT SYSTEM

Acetone[1]
Chloromethane
Bromomethane
Vinyl chloride[1]
Chloroethane
Acetone
Carbon disulfide
1,1-Dichloroethene[1]
1,1-Dichloroethane
cis-1,2-Dichloroethene[1]
trans-1,2-Dichloroethene[1]
Methylene Chloride[1]
Chloroform[1]
1,2-Dichloroethane
2-Butanone
1,1,1-Trichloroethane[1]
Carbon tetrachloride[1]
Bromodichloromethane
1,2-Dichloropropane
cis-1,3-Dichloropropene
Trichloroethene
Dibromochloromethane
1,1,2-Trichloroethane[1]
Benzene[1]
trans-1,3-Dichloropropene
Bromoform
4-Methyl-2-pentanone
2-Hexanone
Tetrachloroethene[1]
Toluene
1,1,2,2-Tetrachloroethane[1]
Chlorobenzene[1]
Ethyl benzene
Styrene
Xylenes (total)

[1] Recommended reporting limit in Table 1-4

TABLE 1-6

ANALYTES FOR SEMIVOLATILE ORGANIC TESTING
STARTUP OF REMEDIATION WATER TREATMENT SYSTEM

Phenol
bis (2-Chloroethyl)ether
2-Chlorophenol[1]
1,3-Dichlorobenzene[1]
1,4-Dichlorobenzene[1]

Benzyl alcohol
1,2-Dichlorobenzene[1]
2-Methylphenol
4-Methylphenol

N-Nitroso-di-n-dipropylamine
Hexachloroethane
Nitrobenzene
Isophorone
2-Nitrophenol

2,4-Dimethylphenol
Benzoic Acid
2,2'-Oxybis(1-chloropropane)
2,4-Dichlorophenol
1,2,3-Trichlorobenzene[1]
1,2,4-Trichlorobenzene[1]

Naphthalene[1]
4-Chloroaniline
Hexachlorobutadiene[1]
4-Chloro-3-methylphenol
2-Methylnaphthalene

Hexachlorocyclopentadiene
2,4,6-Trichlorophenol
2,4,5-Trichlorophenol
2-Chloronaphthalene
2-Nitroaniline

TABLE 1-6
(Continued)

Dimethylphthalate
Acenaphthylene
2,6-Dinitrotoluene
3-Nitroaniline
Acenaphthene[1]
2,4-Dinitrophenol
4-Nitrophenol
Dibenzofuran
2,4-Dinitrotoluene
Diethylphthalate

4-Chlorophenylphenyl ether
Fluorene
4-Nitroaniline
4,6-Dinitro-2-methylphenol
N-nitrosodiphenylamine

4-Bromophenylphenyl ether
Hexachlorobenzene[1]
Pentachlorophenol
Phenanthrene[1]
Anthracene[1]

Carbazole
Di-n-butylphthalate
Fluoranthene[1]
Pyrene[1]
Butylbenzylphthalate
3,3'-Dichlorobenzidine

Benzo(a)anthracene
Chrysene
bis(2-Ethylhexyl)phthalate
Di-n-octylphthalate
Benzo(b)fluoranthene

Benzo(k)fluoranthene
Benzo(a)pyrene
Indeno(1,2,3-cd)pyrene
Dibenz(a,h)anthracene
Benzo(g,h,i)perylene

TABLE 1-6
(Concluded)

1 Recommended reporting limit in Table 1-4.

TABLE 1-7

ANALYTES FOR PESTICIDES/PCBs TESTING
STARTUP OF REMEDIATION WATER TREATMENT SYSTEM

alpha-BHC[1]
beta-BHC[1]
delta-BHC[1]
gamma-BHC (Lindane)[1]
Heptachlor

Aldrin
Heptachlor epoxide
Endosulfan I
Dieldrin
4,4-DDE

Endrin
Endosulfan II
4,4-DDD
Endosulfan sulfate
4,4-DDT

Methoxychlor
Endrin ketone
Endrin aldehyde
gamma-Chlordane
Toxaphene
alpha-Chlordane

Polychlorinated Biphenyls (PCBs)
- Aroclor-1016
- Aroclor-1221
- Aroclor-1232
- Aroclor-1242
- Aroclor-1248[1]
- Aroclor-1254[1]
- Aroclor-1260

[1] Recommended reporting limit in Table 1-4.

TABLE 1-8

ANALTYES FOR METALS TESTING[1]
STARTUP OF REMEDIATION WATER TREATMENT SYSTEM

Aluminum
Antimony
Arsenic
Barium
Beryllium
Cadmium[2]
Calcium
Chromium[2]
Cobalt
Copper[2]
Iron
Lead
Magnesium
Manganese
Mercury[2]
Nickel[2]
Potassium
Selenium
Silver
Sodium
Thallium
Vanadium
Zinc[2]

1 Methods as specified in Table 1-3 on unfiltered samples.
2 Recommended reporting limit in Table 1-4.

TABLE 1-9

SAMPLE CONTAINERS, PRESERVATION, AND HOLDING TIMES FOR CARBON SAMPLES GILL CREEK REMEDIATION

Method[1]	Parameter	Number of Containers/Sample[2]	Preservation	Holding Time[3]
8240	Volatile organics	2-4 oz glass VOA vials with Teflon-lined septa[4].	4°C	14 days from collection
TCLP/8240	Volatile organics	As Above	4°C	Collection to TCLP Extraction - 14 days TCLP Extraction to Analysis - 14 days
8270/8080	Semivolatile organic[5]	1-8 oz wide-mouth glass jar with Teflon liner[4]	4°C	Extract - 14 days from collection Analyze - 40 days from collection
TCLP/8270/8080/8150	Semivolatile organic[5]	As Above	4°C	Collection to TCLP Extraction - 14 days TCLP Extraction to Method Extraction - 7 days; Method Extraction to Analysis - 40 days
6010/7471	Metals	1-8 oz wide-mouth glass jar with Teflon liner	4°C	Metals 6 months from collection; 28 days, TRPH, Hg from collection
TCLP/6010/7471/7060/7740	Metals	As above	4°C	Collection to TCLP Extraction (except Hg) - 180 days TCLP Extraction to Analysis (except Hg) - 180 days Collection to TCLP Extraction, Hg - 28 days TCLP Extraction to Analysis, Hg - 28 days

TABLE 1-9
(Concluded)

Method[1]	Parameter	Number of Containers/Sample[2]	Preservation	Holding Time[3]
Ignitibility/ Corrosivity/ Reactivity[1]		1-8oz wide-mouth glass jar with Teflon liner	4°C	14 days from collection

1 Specific methods listed in Table 1-10.
2 Separate sample volumes must be collected for each type of analysis if sample is analyzed for total analyte content as well as by TCLP procedures.
3 Time taken from date of sampling.
4 Or, submit sample canister collected per manufacturer's instructions.
5 Includes pesticides/PCBs.

TABLE 1-10

ANALYTICAL PROCEDURES FOR GILL CREEK REMEDIATION CONFIRMATION SAMPLES HAZARDOUS WASTE CHARACTERISTICS

		Extraction and Analysis Method[2]
Parameter	Technique[1]	Sediments/Solids
Ignitibility	Closed Cup Methods	1010 or 1020
Corrosivity	Electrometric pH	9045
Reactivity	Reactive Cyanide, Reactive Sulfide	(Sections 7.3.3 and 7.3.4 of SW-846)
TCLP[3]		
Volatile Organics[4]	GC/MS	TCLP[3]/8240
Semivolatile Organics	GC/MS	TCLP[3]/8270
Organochlorine Pesticides and PCBs	GC	TCLP[3]/8080
Chlorinated Herbicides	GC	TCLP[3]/8150
Metals		
Arsenic	GFAA	TCLP[3]/7060
Barium	ICP	TCLP[3]/6010
Cadmium	ICP	TCLP[3]/6010
Chromium	ICP	TCLP[3]/6010
Lead	ICP	TCLP[3]/6010
Mercury	CV	TCLP[3]/7470
Selenium	GFAA	TCLP[3]/7740
Silver	ICP	TCLP[3]/6010

1 GC = Gas chromatography; GC/MS = gas chromatography/mass spectrometry; ICP = inductively coupled plasma; GFAA = graphite furnace atomic absorption; CV = cold vapor.

TABLE 1-10
(Concluded)

2 The 1000 - 9000 methods are from SW-846 third edition.

3 TCLP samples extracted by Toxicity Characteristic Leaching Procedure (Federal Register, Vol. 55, No. 126, Friday, June 29, 1990, p. 26986-26998). Following extraction, the TCLP analytes listed in Table 1-7 are to be determined on the leachate by the SW-846 methods specified.

4 Zero headspace TCLP extraction required.

TABLE 1-11

ANALYTES, REPORTING LIMITS, AND REGULATORY LIMITS FOR HAZARDOUS WASTE CHARACTERISTICS

Parameter	Recommended Reporting Limits: Leachate (ug/l)[3]	Recommended Reporting Limits: Sediments/Solids (mg/kg)[3]	Regulatory Levels (ug/L in Leachate)
Ignitibility	NA[1]	NA	Not Ignitible, per method
Corrosivity	NA	NA	pH > 2 and < 12.5
Reactivity	NA	NA	Not Reactive, per method
Reactive Cyanide	NA	NA	
	NA	0.1	
Reactive Sulfide	NA	0.5	
TCLP[2]			
Volatile Organics			
Benzene	25	NA	500
Carbon Tetrachloride	25	NA	500
Chlorobenzene	25	NA	100,000
Chloroform	25	NA	6,000
1,4-Dichlorobenzene	25	NA	7,500
1,2-Dichloroethane	25	NA	500
1,1-Dichloroethylene	25	NA	700
Methyl ethyl ketone	50	NA	200,000
Tetrachloroethylene	25	NA	700
Trichloroethylene	25	NA	500
Vinyl Chloride	50	NA	200
Semivolatile Organics			
o-Cresol	50	NA	200,000
m-Cresol	50	NA	200,000
p-Cresol	50	NA	200,000
Cresol	50	NA	200,000
Hexachlorobenzene	50	NA	130
Hexachlorobutadiene	50	NA	500
Hexachloroethane	50	NA	3,000
Nitrobenzene	50	NA	2,000
Pentachlorophenol	250	NA	100,000
Pyridine	100	NA	5,000
2,4,5-Trichlorophenol	250	NA	400,000
2,4,6-Trichlorophenol	50	NA	2,000
Organochlorine Pesticides and PCBs			
Chlordane	5.0	NA	30
Endrin	1.0	NA	20
Heptachlor (and its expoxide)	0.5	NA	8
Lindane	0.5	NA	400
Methoxychlor	5.0	NA	10,000
Toxaphene	50	NA	500

TABLE 1-11
(Concluded)

Parameter	Recommended Reporting Limits Leachate (ug/l)[3]	Recommended Reporting Limits Sediments/Solids (mg/kg)[3]	Regulatory Levels (ug/L in Leachate)
Chlorinated Herbicides			
2,4-D	50	NA	10,000
2,4,5-TP (Silvex)	10	NA	1,000
Metals			
Arsenic	1,000	NA	5,000
Barium	100	NA	100,000
Cadmium	50	NA	1,000
Chromium	100	NA	5,000
Lead	500	NA	5,000
Mercury	2.0	NA	200
Selenium	50	NA	1,000
Silver	100	NA	5,000

[1] NA = Not applicable

[2] TCLP samples are extracted by Toxicity Characteristic Leaching Procedure and the leachate analyzed by methods listed in Table 1-10.

[3] Reporting limits for reactivity are on a wet weight basis and all reporting limits are highly matrix dependent. Reporting limits listed herein are provided for guidance and may not always be achievable on site samples.

TABLE 1-12

ANALYTES FOR PCB[1] TESTING
CARBON SAMPLES

Aroclor 1016
Aroclor 1221
Aroclor 1232
Aroclor 1242
Aroclor 1248
Aroclor 1254
Aroclor 1260

1 PCB = polychlorinated biphenyls, analyzed by method specified in Table 1-3 for Organochlorine Pesticides and PCBs.

FIGURE 1-1
FIELD SAMPLING FORM

Date ____________________ Time__________________ Sampler __________________

Sample Location ____

Sample Designation ____

Sample Description:

Matrix ____

Composite ____________________ Grab__________________

Sample Containers:

Size: ____

Type: ____

Preservation: _______________________________________

QC Samples Collected _______________________________________

Field Parameters (if measured)

pH ____

Conductivity ____

PFLT Results ____

Comments ____

____

____

Analyses to be performed:

____

____

____

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TYPICAL CHAIN OF CUSTODY RECORD

PROJECT NAME: ____________________

SAMPLER'S SIGNATURE: ____________________

JOB CODE: ____________

IDENTIFICATION OF
BLIND FIELD DUPLICATE SITE: ________

DATE	TIME	SAMPLE IDENTIFICATION	GRAB	COMP	SAMPLE TYPE	CONTAINER CLASSIFICATION: UNPRESERVED	HNO_3	H_2SO_4	HCL	NAOH	VIAL (PRES.)	VIAL (UNPRES.)	TOTAL	PARAMETERS/REMARKS

TOTAL NUMBER OF CONTAINERS ____

NOTE: Please indicate required analysis, and whom we may contact with questions, if you have not yet done so through your customer service representative.

RELINQUISHED BY	DATE	TIME	RECEIVED BY
1. RELINQUISHED BY:	DATE	TIME	RECEIVED BY:
2. RELINQUISHED BY:	DATE	TIME	RECEIVED BY:
3. RELINQUISHED BY:	DATE	TIME	RECEIVED BY:

2.0
REMEDIATION WATER TREATMENT SAMPLING AND ANALYSIS

This section summarizes the sampling and analysis required for the remediation water treatment system. Sampling and analysis will be performed at start up (2-3 weeks) and during operation of the treatment system. The purpose of sampling at startup will be to confirm the design basis and evaluate equipment performance. The sampling during operation will provide spot checks of the equipment performance, confirm that POTW compliance is reasonably assured and monitor the carbon adsorption system to prevent significant PCB and organic breakthrough.

To monitor the startup period properly, quick-turnaround analyses and reporting of laboratory results must be arranged with the laboratory. The fastest turnaround (maximum of 3-5 days between sample collection and reporting of preliminary results) is needed for samples from the carbon beds (GCWT-9 through GCWT-11), to evaluate breakthrough of PCBs or other organics into both the lead and polishing carbon beds. Turnaround on other analytical results should be as quick as can be arranged with the laboratory in order to evaluate system performance and make adjustments during start up.

To evaluate system performance during startup, remediation water samples will be collected as specified in Table 2-1 and tested for the full lists of analytes specified for volatile organics, semivolatile organics, pesticides/PCBs, and total metals in Tables 1-5 through 1-8, by the methods specified in Table 1-3. Methods for total phenols, TSS, total cyanide, and total alkalinity are specified in Table 1-3. Recommended reporting limits for selected indicator analytical parameters are specified in Table 1-4.

Once the system is operating normally, the remediation water samples will be collected as specified in Table 2-2 and tested for the proposed list of indicator analytical parameters specified in Table 1-4 that will be refined after review of startup data. These indicator parameters and their recommended reporting limits have been selected on the basis of prior detection in water samples at the site and the existence of effluent limits for discharge to the City of Niagara Falls POTW. Methods for these analyses are specified in Table 1-3.

Carbon adsorption system startup performance will be monitored by samples collected as specified in Table 2-3. These samples also will be tested for the proposed list of indicator analytical parameters specified in Table 1-4, by methods specified in Table 1-3.

2.1 WATER SAMPLING PROCEDURE

The following procedure will be used to sample process waters at locations described in Sections 2.2 through 2.10.

Equipment used during sampling:

- pH meter (with automatic temperature compensation)
- Specific conductivity meter
- Thermometer
- Turbidimeter
- Sample bottles
- Sample labels
- Polyethylene or glass jar for pH measurement of samples
- Plastic squeeze bottle filled with deionized or distilled water
- Cooler with ice
- Field notebook
- Waterproof pen

Two types of samples will be collected; grab and 24 hour composite. Grab samples will be a collection of a volume of water at one point in time. Twenty-four hour composite samples will consist of grab samples collected every six hours and composited at the end of twenty-four hours. Samples will be collected from in-line sample ports. The locations of these valves are specified on the referenced drawings. Observations made during sample collection will be recorded in the field notebook and field data sheet as specified in this plan.

Electronic equipment used during sampling includes a pH meter with temperature scale, turbidimeter and a conductivity meter. Before collecting samples, the sampler shall verify that these instruments are operating properly. The pH and conductivity meters require calibration every day prior to use and must be recalibrated if they have been turned off. Calibration times and readings will be recorded in the field notebook. Calibration shall be performed per the manufacturer's instructions.

To obtain a sample, the following procedure will be used:

- Obtain sample bottles with preservative from the analytical laboratory. Several extra sample containers should be obtained in case of breakage or other problem.

- Ensure that the treatment system has been in operation for at least 15 minutes prior to sampling.

- Open the appropriate sampling port and let run for 1 to 2 minutes. Collect the purge water in a designated labeled container and return to tanks at front end of Treatment System.

- Fill the decontaminated sample bottle directly from the port. Cap the bottle and close the sampling port.

- Record sample collection and the readings on the flow meters in the field notebook.

- Record field measurements of pH, conductivity turbidity and temperature.

- If the sample is not being transported to the laboratory immediately, place the sample on ice in a cooler.

Sample containers, preservation and holding times are defined in Table 1-1. QC samples will be taken at the frequencies specified in Table 1-2. Table 1-3 describes the analytical methods to be used on water samples.

2.2 PRIMARY CLARIFIER INFLUENT

Samples will be taken at the primary clarifier influent to characterize the remediation water being fed to the clarifier. Samples will be collected during startup and normal operation as defined in Tables 2-1 and 2-2. The samples will be taken from a sample port on the line between the creek bed sump pumps (P-101A-G) and the primary clarifier (TK-101A) as shown on Drawing No. 12722-103. The samples will be taken according to the procedure described in Section 2.1. Sample identification at this point will be designated as Sample No. GCWT1-#.

2.3 PRIMARY CLARIFIER EFFLUENT

Samples will be taken at the discharge of the primary clarifier (TK-101A) to monitor the operation of the clarifier. Samples will be collected during start-up and normal operation as defined in Tables 2-1 and 2-2. The samples will be taken from a sample port on the line between the primary clarifier and the storage tanks (TK-107BC) as shown on Drawing No. 12722-103. Sample identification from this point will be designated as Sample No. GCWT2-#. The procedure described in Section 2.1 will be used to collect the samples. These samples will only be analyzed for turbidity and TSS as defined on Tables 2-1 and 2-2.

2.4 LAMELLA CLARIFIER INFLUENT

Samples will be taken at the influent to each of the lamella clarifiers (Cl-101A and Cl-101B). The samples will be collected during start up and normal operation as defined in Tables 2-1 and 2-2. The samples will be taken from sample ports on the lines between the storage tanks (TK-101B/C) and each clarifier (CL101A/101B) as shown on Drawing No. 12722-103. Sample identification from these points will be designated as Sample Nos. GCWT3-# and GCWT5-# respectively. The procedure described in Section 2.1 will be used to collect the samples. These samples will only be analyzed for turbidity.

2.5 LAMELLA CLARIFIER EFFLUENT

Samples will be taken at the discharge of each lamella clarifier (CL-101A/101B) to monitor the operation of these clarifiers. Samples will be collected during startup and normal operation as defined in Tables 2-1 and 2-2. The samples will be collected from a sample port between the clarifiers and the Clarified Water Storage Tank (TK-102) as shown on Drawing No. 12722-103. Sample identification from these points will be designated as Sample Nos. GCWT4-# and GCWT6-# respectively. The procedure described in Section 2.1 will be used to collect the samples. These samples will only be analyzed for TSS and turbidity.

2.6 SAND FILTER EFFLUENT

Samples will be collected at the discharge of the sand filters to monitor the operation of the filters and to characterize the water that will be sent for further treatment by the air stripping/GAC system. Samples will be taken during startup and normal operation as defined in Tables 2-1 and 2-2. The samples will be taken from a sample port on the lines between the sand filters (F-101A-C) and the Filter Effluent Storage Tank (TK-105) as shown on Drawing No. 12722-104. Sample identification from this point will be designated as Sample No. GCWT7-#. The procedure described in Section 2.1 will be used to collect a sample. Tables 2-1 and 2-2 define the types of samples to be collected and the parameters to be analyzed during both start up and normal operation.

2.7 AIR STRIPPER EFFLUENTS

Samples will be collected at the water discharge of each air stripper to monitor performance of the air strippers and identify the amount of organics remaining that will require removal by carbon adsorption. Characterizing the influent to the carbon beds will allow better estimates of how much carbon will be used and frequency of carbon change outs. Samples will be taken during startup and normal operation as defined in Tables 2-1 and 2-2. The samples will be taken from a sample port in the line between the air stripper towers (T-201 A/B) and carbon guard beds as shown on Drawing No. 12722-104. Samples collected here will be designated as Sample No. GCWT8-#. The procedure described in Section 2.1 will be used to collect samples. Tables 2-1 and 2-2 define the types of samples being collected and parameters to be analyzed. Only total volatiles and semivolatiles will be analyzed.

2.8 CARBON GUARD BED EFFLUENT

Samples will be collected from the discharge side of the carbon guard bed vessel. These samples will be taken and analyzed for PCBs in order to monitor for break through of PCBs. When PCBs are detected in these samples, carbon change out will be required. Samples will be taken during start up and normal operation as defined in Tables 2-1 and 2-2. The samples will be taken from a sample port on the line between the carbon guard bed and the second carbon vessel as shown in Drawing No. 12722-105. Samples collected at this point will be designated as Sample No. GCWT9-#. The procedure for sampling described in Section 2.1 will be used. Tables 2-1 and 2-2 define the types of samples being collected. The samples will be analyzed for PCBs, total volatiles and semi-volatiles. During the start up period each carbon vessel will be properly primed or prepared per supplier's instructions. This usually involves soaking the carbon. After proper preparation the carbon vessel discharge will be sampled according to Table 2-3 to check for channeling.

2.9 LEAD CARBON VESSEL EFFLUENT

Samples will be collected from the discharge of the lead carbon vessel. These samples will be taken to monitor organic breakthrough. Detection of organics in concentrations that could cause exceedance of a suggested list of threshold concentrations (Table 2-4) in these samples will require replacement of the carbon. The samples will be analyzed for total organics including volatiles, semivolatiles and pesticides/PCBs as specified in Table 1-4. Samples will be collected during start up and normal operation as defined in Tables 2-1 and 2-2. The samples will be taken from a sample port between the second and third carbon vessels as shown on Drawing No. 12722-105. Samples will be designated as Sample No. GCWT10-#. The procedure described in Section 2.1 for sampling will be used to collect the samples. Tables 2-1 and 2-2 define the types of samples being collected and the analytical parameters. During the start up period each carbon vessel will be properly primed or prepared per supplier's instructions. This usually involves soaking the carbon. After proper preparation the carbon vessel discharge will be sampled according to Table 2-3 to check for channeling.

2.10 POLISHING CARBON VESSEL EFFLUENT/DISCHARGE TO OUTFALL 023

Samples will be collected from the discharge of the polishing carbon vessel prior to discharging to the plant outfall 023 which goes to the Niagara Falls POTW. The purpose of these samples will be to monitor for the following:

- performance of the remediation water treatment system
- compliance with site discharge limits

Samples will be taken during start up and normal operation as defined in Tables 2-1 and 2-2. Samples will be collected from a sample port on line after the polishing carbon vessel as shown on Drawing No. 12722-105. Samples will be designated as Sample No. GCWT11-#. The procedure for sampling described in Section 2.1 will be used. Tables 2-1 and 2-2 define the types of samples taken and the analytical parameters. During the start up period each carbon vessel will be properly primed or prepared per suppliers instructions. This usually involves soaking the carbon. After proper preparation the carbon vessel discharge will be sampled according to Table 2-3 to check for channeling.

2.11 SPENT CARBON REGENERATION OR DISPOSAL

Once organics are detected at concentrations that could cause exceedances of a suggested list of threshold concentrations (Table 2-4) in the carbon vessel discharge streams, the vessel will be taken off line. The carbon will be deemed spent and will be taken off site for either regeneration or disposal. The lead carbon vessel and polishing carbon vessel may be sent for regeneration if no PCBs have been detected in the samples taken at the discharge point (GCWT10 and GCWT11). Grab samples or supplier carbon canisters will be sent for hazardous waste characteristic analyses (ignitibility, reactivity and TCLP) by the methods specified in Table 1.5. TCLP analytes are specified in Table 1-11.

The carbon guardbed will probably contain PCBs and require off-site disposal. Grab samples will be taken and sent for PCB and hazardous waste characteristic analyses (ignitibility, reactivity and TCLP) by methods specified in Table 1-10 for hazardous waste characteristics and in Table 1-3 for PCBs. TCLP analytes are specified in Table 1-11 and PCBs to be analyzed are specified in Table 1-12.

TABLE 2-1

SAMPLING PROTOCOL FOR STARTUP OF REMEDIATION WATER TREATMENT SYSTEM

Sample Location No.	Sample Location/Description	Frequency	Indicator Analytical Parameters[3]	Type of Sample
GCWT1-#	Primary Clarifier Influent	1 per week	Volatile Organics	Grab
			Semivolatile Organics	24 hr composite[1]
			Pesticides/PCBs	24 hr composite[1]
			Total Phenols	Grab
			Total Metals	24 hr composite[1]
			Total Cyanide	Grab
			Total Alkalinity	Grab
			pH[2]	Grab
			TSS	24 hr composite[1]
		3 per week	Turbidity[2]	Grab
GCWT2-#	Primary Clarifier Effluent	1 per week	TSS	24 hr composite[1]
		Daily	Turbidity[2]	Grab
GCWT3-#	Lamella Clarifier (CL-101A) Influent	Daily	Turbidity	Grab
GCWT4-#	Lamella Clarifier (CL-101A) Effluent	Daily	Turbidity	Grab
		3 per week	TSS	24 hr composite[1]
GCWT5-#	Lamella Clarifier (CL-101B) Influent	Daily	Turbidity	Grab

TABLE 2-1
(Continued)

Sample Location No.	Sample Location/Description	Frequency	Indicator Analytical Parameters[3]	Type of Sample
GCWT6-#	Lamella Clarifier (CL-101B) Effluent	Daily	Turbidity	Grab
		3 per week	TSS	24 hr composite[1]
GCWT7-#	Sand filter Effluent	3 per week (M,W,F)	Volatile Organics	Grab
			Semivolatile Organics	24 hr composite[1]
			Pesticides/PCBs	24 hr composite[1]
			Total Phenols	24 hr composite[1]
			Total Metals	24 hr composite[1]
			TSS	24 hr composite[1]
			Total Alkalinity	Grab
			pH[2]	Grab
			Turbidity[2]	Grab
GCWT8-#	Air Stripper Effluent	3 per week (M,W,F)	Volatile Organics	Grab
			Semivolatile Organics	24 hr composite[1]
GCWT9-#	Carbon Guard Bed Effluent	3 per week (M,W,F)	Volatile Organics	Grab
			PCBs	24 hr composite[1]
			Semivolatile Organics	24 hr composite[1]
GCWT10-#	Lead Carbon Vessel Effluent	3 per week (M,W,F)	Volatile Organics	Grab
			Semivolatile Organics	24 hr composite[1]
			Pesticides/PCBs	24 hr composite[1]

TABLE 2-1
(Concluded)

Sample Location No.	Sample Location/Description	Frequency	Indicator Analytical Parameters[3]	Type of Sample
GCWT11-#	Polishing Carbon Vessel Effluent Discharge to Outfall 023	3 per week (M,W,F)	Volatile Organics	Grab
			Semivolatile Organics	24 hr composite[1]
			Pesticides/PCBs	24 hr composite[1]
			Total Metals	24 hr composite[1]
			Total Phenols	Grab
			Total Alkalinity	Grab
			pH[2]	Grab

1 Grab samples for 24-hour composite shall be collected approximately every 8 hours and composited at the end of 24 hours. A single grab sample may be used in leiu of a composite sample upon the approval or direction of the owner.
2 Field analysis
3 Volatile organics, semivolatile organics, pesticides/PCBs, and total metals to be analyzed for the respective lists of compounds specified in Tables 1-5 through 1-8, by the methods specified in Table 1-3. Methods for total phenols, TSS, total cyanide, and total alkalinity are specified in Table 1-3.
4 Frequency and type of sampling may vary from that detailed above as approved by Du Pont.

TABLE 2-2

SAMPLING PROTOCOL FOR NORMAL OPERATION OF REMEDIATION WATER TREATMENT SYSTEM

Sample Location No.	Sample Location/Description	Frequency	Indicator Analytical Parameters[3]	Type of Sample
GCWT1-#	Primary Clarifier Influent	1 every 2 weeks	Volatile Organics	Grab
			Semivolatile Organics	24 hr composite[1]
			Pesticides/PCBs	24 hr composite[1]
			Total Phenols	Grab
			Total Metals	24 hr composite[1]
			Total Cyanide	Grab
			TSS	24 hr composite[1]
			Total Alkalinity	Grab
			pH[2]	Grab
		2 per week	Turbidity[2]	Grab
GCWT2-#	Primary Clarifier Effluent	1 every 2 weeks	TSS	Grab
		2 per week	Turbidity[2]	Grab
GCWT3-#	Lamella Clarifier (CL-101A) Influent	Daily	Turbidity	Grab
GCWT4-#	Lamella Clarifier (CL-101A) Effluent	Daily	Turbidity	Grab
GCWT5-#	Lamella Clarifier (CL-101B) Influent	Daily	Turbidity	Grab

TABLE 2-2
(Continued)

Sample Location No.	Sample Location/Description	Frequency	Indicator Analytical Parameters[3]	Type of Sample
GCWT6-#	Lamella Clarifier (CL-101B) Effluent	Daily	Turbidity	Grab
GCWT7-#	Sand Filter Effluent	1 every 2 weeks	Volatile Organics	Grab
			Semivolatile Organics	24 hr composite[1]
			Pesticides/PCBs	24 hr composite[1]
			Total Metals	24 hr composite[1]
			TSS	24 hr composite[1]
			Total Alkalinity	24 hr composite[1]
		daily	pH[2]	Grab
		daily	Turbidity[2]	Grab
GCWT8-#	Air Stripper Effluent	3 per week (M,W,F)	Volatile Organics	Grab
			Semivolatile Organics	24 hr composite[1]
GCWT9-#	Carbon Guard Bed Effluent	3 per week (M,W,F)	PCBs	24 hr composite[1]
GCWT10-#	Lead Carbon Vessel Effluent	3 per week (M,W,F)	Volatile Organics	Grab
			Semivolatile Organics	24 hr composite[1]
			Pesticides/PCBs	24 hr composite[1]

TABLE 2-2
(Continued)

Sample Location No.	Sample Location/Description	Frequency	Indicator Analytical Parameters[3]	Type of Sample
GCWT11-#	Polishing Carbon Vessel Effluent Discharge to Outfall 023	1 per week	Volatile Organics	Grab
		1 every 2 weeks	Semivolatile Organics	24 hr composite[1]
			Pesticides/PCBs	24 hr composite[1]
			Total Metals	24 hr composite[1]
			Total Cyanide	Grab
			Total Phenols	Grab

1 Grab samples for 24-hour composite shall be collected every 8 hours and composited at the end of 24 hours.
2 Field analysis
3 Indicator analytical parameters are listed in Table 1-4.
4 Frequency and type of analysis may vary from above based on experience gained during operations. Any changes shall require approval by Du Pont.

TABLE 2-3

CARBON ADSORPTION SYSTEM STARTUP PERFORMANCE MONITORING

Sample Location No.	Sample Location/Description	Frequency	Indicator Analytical Parameters[1]
GCWT9-#	Carbon Guard Bed Effluent	after 3 bed volumes	Volatile Organics
GCWT10-#	Lead Carbon Vessel Effluent	after 3 bed volumes	Volatile Organics
GCWT11-#	Polishing Carbon Vessel Effluent Discharge to Outfall 023	after 3 bed volumes	Volatile Organics

1 All samples will be grab type
Indicator analytical Parameters are listed in Table 1-4.

TABLE 2-4

SUGGESTED LIST OF THRESHOLD CONCENTRATIONS

Contaminant	Suggested Threshold Concentrations (PPD)
1,1 dichloroethene	100
1,1,1 trichloroethane	50
1,1,2,2-tetrachloroethane	100
1,2,3 trichlorobenzene (REVISED)	250
1,2,4 trichlorobenzene (REVISED)	250
1,2-dichlorobenzene	2
1,3-dichlorobenzene	2
1,4-dichlorobenzene	2
2-chlorophenol (REVISED)	15
acenaphthene	3
acetone	1
alpha-BHC	1
anthracene	1
benzene	10
beta-BHC	1
dis(2-ethylhexyl)phthalate	50
carbon tetrachloride	50
chlorobenzene	5
chloroform	500
cis-1,2-dichloroethene	100
delta-BHC	1
fluoranthene	1
gamma-BHC (REVISED)	25
hexachlorobenzene	1

TABLE 2-4
(Continued)

Contaminant	Suggested Threshold Concentrations (PPD)
hexachlorobutadiene	1
hexachloroethane	
methanol	
methylene chloride	50
napthalene	5
PCB 1254	NON DETECT
PCB-1248	NON DETECT
phenantherene	1
pyrene	3
tetrachloroethene	75
tetrahydrothiophene	
total phenol	500
trans-1, 2 Dichloroethene	100
trichloroethene	500
vinyl chloride	5
Cadmium	NON DETECT
Chromium (REVISED)	150
Copper (REVISED)	2000
Lead (REVISED)	1500
Mercury (REVISED)	90
Nickle (REVISED)	650
Zinc (REVISED)	4000

LETTER OF TRANSMITTAL

WOODWARD - CLYDE CONSULTANTS

✓52150

DATE	June 19, 1992
PROJECT NO.	22915 - 109
ATTENTION :	Mr. Mike Hinton
RE:	Du Pont and Olin
	Gill Creek Remediation

TO NYS Dept. of Environmental Conservation
270 Michigan Avenue
Buffalo, NY 14203-2000

WE ARE SENDING YOU ☐ Attached ☐ Under seperate cover via ________ The following items :

☐ Shop Drawings ☐ Prints ☒ Plans ☐ Samples ☒ Specifications

☐ Copy of letter ☐ Change order ☐ ________

COPIES	DATE	NO.	DESCRIPTION
2	5/92		PHASE ONE CELLULAR COFFERDAM AND DIVERSION
			STRUCTURE NO. 1 SPECIFICATIONS
2	4/92		PHASE ONE CELLULAR COFFERDAM AND DIVERSION
			STRUCTURE NO. 1 PLANS

THESE ARE TRANSMITTED as checked below ;

☐ For approval ☐ Approved as submitted ☐ Resubmit ________ Copies for approval

☐ For your use ☐ Approved as noted ☐ Submit ________ Copies for distribution

☐ As requested ☐ Returned for corrections ☐ Return ________ Corrected prints

☐ For review and comment ☐ ________

FOR BIDS DUE ________ 19 ___ PRINTS RETURNED TO AFTER LOAN TO US

REMARKS These plans and specifications are transmitted per request by Leslie Warner of Du Pont.

COPY TO : L. Warner
J. Brown
M. Vermersch

SIGNED Paula Daukas

Paula Daukas

Stanford Place 3 Suite 1000
4582 South Ulster Street Parkway
Denver, Colorado 80237
(303) 694-2770
Telex 501285 (WOODWARD DVR)

DU PONT

CHEMICALS

P.O. Box 787
Buffalo Ave & 26th Street
Niagara Falls, NY 14302-0787
(716) 278-5100

bcc: RJGiraud - Engg, L3379
TAKittleman - Engg, L3370
DEEllis - Chem, Bellevue
RJGentilucci/File 52150
SEDreyer

kw: Air, requirements

June 26, 1992

Mr. Michael J. Hinton, P.E.
NYS Dept. of Environmental Conservation
Division of Hazardous Waste Remediation
270 Michigan Avenue
Buffalo, NY 14203-2999

Dear Mr. Hinton:

DU PONT/OLIN GILL CREEK REMEDIATION PROJECT

Two copies of the requested information regarding the predicted air emissions during the four-month operation of the water treatment systems for the remediation project are enclosed. The water quality estimate for the influent stream is identical to the conservative estimate provided in Table 5-3 of the "Gill Creek Remediation Plans and Specifications" (Woodward-Clyde Consultants, April 1992) with one exception: benzene. The explanation for the reduction in the estimate for the predicted levels of benzene is contained in the letter sent to the NYSDEC dated May 29, 1992. The reduction is based on a review of data collected from the groundwater treatment facility at the Du Pont Niagara Plant and data from samples collected from test pits at the project excavation site, the source of the majority of the water to be treated.

The following are enclosed:

- Air Guide 1 Analysis. A description of the SCREEN air stripper model, SCREEN model input/output sheets, and printouts of the SCREEN model. Spreadsheets were developed to combine the modeling results and are included.

- Air permit applications (Forms 76-19-3) have been completed and provided for each of the air strippers, not as a request for permitting but for the purpose of providing all the required information in an organized format. We understand approval will be provided as an "in lieu" of permit.

- Plot Plan No. EE-40-5337

We are conducting this project under the terms of Order on Consent No. B9-0206-90-1, and it has been determined that the SEQR review is not required. However, the Federal Consistency Assessment Form was supplied concurrent with our application to the U.S. Army Corps of Engineers. The New York Department of State has reviewed and concurs that the project as proposed will be conducted in a manner consistent with the Coastal Management Program. A copy of the letter providing this opinion is enclosed.

We ask that DEC provide a rapid review of this material. Construction of the water treatment system has been scheduled to begin in the next two weeks. If you have any questions, please call me at (716) 278-5452.

Sincerely,

Leslie A. Warner

Leslie A. Warner
Senior Engineer, Engineering
and Environmental Affairs

LAW:klf
Enc.
19495

cc: NYSDEC - Division of Hazardous Waste Remediation (Buffalo)
NYSDEC - Division of Environmental Enforcement (Buffalo)*
NYSDEC - Division of Air (Buffalo)
NYSDEC - Division of Hazardous Waste Remediation (Albany)*
NYSDEC - Division of Air (Albany)
NYSDOH - Bureau of Environmental Exposure Investigation (Albany)*
Jim Brown - Olin
Max Vermersch - Woodward-Clyde Consultants
Steve Constable - Du Pont

* Two copies per order on consent

STATE OF NEW YORK
DEPARTMENT OF STATE
ALBANY, N.Y. 12231-0001

GAIL S. SHAFFER
SECRETARY OF STATE

June 11, 1992

Ms. Leslie A. Warner
Senior Engineer
Engineering & Environmental Affairs
DuPont Chemicals
P.O. Box 787
Buffalo Avenue and 26th Street
Niagara Falls, NY 14302-0787

Re: F-92-208
U.S. Army Corps of Engineers/Buffalo
District Permit Application #92-986-42
DuPont and Olin Corp. - Gill Creek
Remediation
City of Niagara Falls

Dear Ms. Warner:

The Department of State has completed its evaluation of your Federal Consistency Assessment Form and certification that the above proposed permit activity complies with New York State's approved Coastal Management Program, and will be conducted in a manner consistent with this program.

Pursuant to 15 CFR Section 930.63, and based upon the project information submitted, the Department of State concurs with your consistency certification. This concurrence is without prejudice to, and does not obviate the need to obtain all other applicable licenses, permits, and approvals required under existing State statutes.

The U.S. Army Corps of Engineers is being notified of this decision by copy of this letter.

Sincerely,

William F. Barton for
George R. Stafford
Director
Division of Coastal Resources
and Waterfront Revitalization

GRS/MC/mab
c: COE/Buffalo District - Gary McDannell
DEC/Region 9 - Steve Doleski

AIR GUIDE 1 ANALYSIS

The Draft 1991 Edition of New York State Air Guide 1 states on page 7, Section IV.A., Ambient Air Quality Impact Analysis, "The impacts calculated by the Appendix B screening procedure are generally conservative. Therefore, when a calculated impact is predicted to exceed an AGC or SGC, it may be appropriate to request site-specific modeling from the source owner."

Indeed it is more conservative and in fact not appropriate to use when we are only interested in a temporary (i.e., four months) operation. This situation is addressed further in the latest version of Air Guide 29 (August 2, 1991), page 3, Screening Dispersion Models. This document says, "If the proposed remedial action is anticipated to be less than two years in duration, the screening model should focus on the worst case one hour impacts." Continuing on page 4, the section entitled Short Term Impacts states "the recommended dispersion model for short term, i.e., worst case one hour, impacts is SCREEN."

In light of Air Guide 1 and Air Guide 29 guidance as stated above, we used the "SCREEN" model for our analysis. The shortcut calculation listed in Air Guide 1 does not account for such basic things as momentum plume rise or distance between sources or fences. However, for comparison purposes, we did the calculation for Ca from page B-8 and Cp from page B-9 for benzene (benzene is the compound most likely to exceed the guidelines).

$$Cp\ (\mu g/m^3) = \frac{4218Q}{h_e E2.16}$$

$$\text{where } Q = 0.127 \text{ (lb/hr peak)}$$

$$h_e = 40 \text{ ft}$$

The Cp = 0.185 $\mu\hat{E}gr/m^3$ versus the AGC of 0.12 $\mu\hat{E}gr/m^3$. In reality this cleanup should only last around four months. Therefore, the Ca = 0.06 $\mu\hat{E}gr/m^3$.

Since we are willing to do the more realistic modeling that would be requested if Cp exceeds the AGC, we have taken that step directly.

DISPERSION MODELING

There are four potential sources on the plant, all associated with groundwater remediation, that can emit the same compounds: a steam stripper and neutralization tank that are already in operation and the two air strippers being considered for installation. Only one of the air strippers would be operated at any given time. Therefore, there are two combinations to consider (i.e., existing sources with Air Stripper 1 and existing sources with Air Stripper 2). The proposed air strippers are about 400 meters from the existing sources.

Printouts of the "SCREEN" modeling are attached. Emissions for the two existing sources were taken as their permit levels. Emissions for the proposed air strippers were estimated by Woodward-Clyde from the design water quality estimates, revised as described by our May 29 memo to DEC, et al. (The Woodward-Clyde air stripper model outputs are attached.)

The emission rates generated by the SCREEN printouts were based on a hypothetical 1 gram/sec. A spreadsheet (attached) was set up to combine the hypothetical SCREEN modeling result with the Woodward-Clyde estimated emission rates. To accomplish this, for each individual compound at every distance of interest, the SCREEN results were multiplied by the emission rates provided by Woodward-Clyde. The combined results depict the ground level concentration of each compound at every given distance, both upwind and downwind of the aligned sources. The distance between the two stacks was compensated for. That is, for any given distance from the downwind stacks, 400 meters were added to the upwind stack distance.

The maximum ground level concentrations are then easy to locate on the spreadsheets. These maximum ground level concentrations are summarized in Tables 1 and 2. Keep in mind that depending on which grouping of sources were considered (i.e., C1 or C2), the maximum ground level concentrations can occur at different distances.

SUMMARY

The pertinent information is included in Tables 1 and 2. These tables summarize the concentration prediction for winds that could line up the stacks. These tables show applicable SGCs, toxicity ranking, and peak emission rates for the air strippers and highest ground level concentration for each compound of concern.

The emission rates for all "high toxicity" compounds are less than 1 lb/hr. Therefore, the DEC does not require a BACT analysis.

Tables 1 and 2 show that the combined ground level concentration for all compounds are below the SGC and odor threshold concentration. Since the proposed remediation will be for much less than two years, these are the appropriate comparisons.

CONCENTRATIONS IN AIR CONSIDERING INPUTS
FROM THE EXISTING GROUNDWATER RECOVERY SYSTEM
AND THE PROPOSED GILL CREEK PROJECT SOURCES
EAST OF GILL CREEK PROJECT

Chemical Compound	Toxicity Table	SGC (ug/m3)	Odor Threshold (ug/m3)	Maximum Groundlevel Concentration from Combined Sources C1 (ug/m3)	C2 (ug/m3)	Peak Emission Rate From Either Stripper (pph)
Vinyl Chloride	hi	1300	26000	21.2592	17.7833	7.07e-01
1,1 Dichloroethene	mod	190000	5500000	1.03588	0.80247	3.73e-02
Dichloromethane	mod	41000	4000	19.693	16.5707	6.55e-01
Chloroform	mod	980	20000	8.8941	8.78492	2.14e-01
1,1,1 Trichloroethane	lo	450000	70000	2.04972	1.60494	7.38e-02
Carbon Tetrachloride	hi	1300	10000	0.94772	0.73269	3.41e-02
Trichloroethylene	mod	33000	2000	157.617	125.298	5.64e+00
Tetrachloroethylene	mod	81000	480000	50.1929	39.8701	1.80e+00
1,1,2,2 Tetrachloroethane	mod	1600	20000	28.7903	28.6887	1.04e+00
Chlorobenzene	mod	11000	600	13.6015	10.9826	4.83e-01
Hexachloroethane	N/A *	2310	150	0.7714	0.59313	2.78e-02
1,4 Dichlorobenzene	mod	30000	90000	2.60072	2.0934	9.37e-02
1,2 Dichlorobenzene	mod	30000	120	3.65864	3.00054	1.32e-01
Hexachlorobutadiene	mod	50	N/A	2.47289	1.95384	8.91e-02
Benzene	hi	30	516	3.58499	5.6647	1.27e-01
1,2 Dichloroethylene	mod	190000	30000	40.5278	33.5711	1.37e+00
Hexachlorobenzene	hi *	6	N/A	0.1102	0.06978	3.97e-03
1,3 Dichlorobenzene	mod	30000	1100	1.16812	0.94203	4.21e-02
1,2,4 Trichlorobenzene	hi *	3700	10400	5.59816	4.26522	2.02e-01
2 Methyl furan	hi	34	N/A	6.92032	6.92032	0.00e+00

SGC - Short-Term Guideline Concentrations, ug/m3

Q1 - Steam Stripper Emission Rate, g/s
Q2 - Equalization Tank Emission Rate, g/s
Q3 - 84" Air Stripper Emission Rate, g/s
Q4 - 54" Air Stripper Emission Rate, g/s

C/Q - Concentration calculated using SCREEN with emission rate equal to 1 g/s, ug/m3
C1 - Combined 1-hr Impact from Q1, Q2, & Q3, ug/m3
C2 - Combined 1-hr Impact from Q1, Q2, & Q4, ug/m3

Steam Stripper - Existing Groundwater Stripper (Stack ht. - 110'; dia. - 2"; vel. - 0.8 fps)

Equal. Tank - Groundwater Holding Tank (Stack ht. - 24'; dia. - 4"; vel. - 0.1 fps)

Air Strip. 1 - 84" Dia. Air Stripper (Stack ht. - 40'; dia. - 30"; vel. - 6.9 fps)

Air Strip. 2 - 54" Dia. Air Stripper (Stack ht. - 40'; dia. - 30"; vel. - 3.4 fps)

Notes: 1. Only one of the air strippers will be operat at any give time
2. N/A = not available
3. * = interim SGC derived by TLV/4.2

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DUPONT NIAGARA GILL CREEK PROJECT

TABLE 2

CONCENTRATIONS IN AIR CONSIDERING INPUTS
FROM THE EXISTING GROUNDWATER RECOVERY SYSTEM
AND THE PROPOSED GILL CREEK PROJECT SOURCES
WEST OF STEAM STRIPPER

Chemical Compound	Toxicity Table	SGC (ug/m3)	Odor Threshold (ug/m3)	Maximum Groundlevel Concentration From Combined Sources C1 (ug/m3)	C2 (ug/m3)	Peak Emission Rate From Either Stripper (pph)
Vinyl Chloride	hi	1300	26000	22.5839	16.3451	0.70728
1,1 Dichloroethene	mod	190000	5500000	1.03588	0.73209	0.03731
Dichloromethane	mod	41000	4000	20.779	15.1617	0.65489
Chloroform	mod	980	20000	11.4026	9.48465	0.21353
1,1,1 Trichloroethane	lo	450000	70000	2.04972	1.46418	0.07382
Carbon Tetrachloride	hi	1300	10000	0.94772	0.66843	0.03413
Trichloroethylene	mod	33000	2000	159.191	115.572	5.64074
Tetrachloroethylene	mod	81000	480000	51.2782	37.3475	1.79716
1,1,2,2 Tetrachloroethane	mod	1600	20000	28.812	26.192	1.0367
Chlorobenzene	mod	11000	600	14.4173	10.757	0.48263
Hexachloroethane	N/A *	2310	150	0.7714	0.54111	0.02778
1,4 Dichlorobenzene	mod	30000	90000	2.60072	1.9098	0.09367
1,2 Dichlorobenzene	mod	30000	120	3.65864	2.73738	0.13177
Hexachlorobutadiene	mod	50	N/A	2.47289	1.78248	0.08906
Benzene	hi	30	516	3.64053	5.18756	0.12701
1,2 Dichloroethylene	mod	190000	30000	42.5434	30.5542	1.3701
Hexachlorobenzene	hi *	6	N/A	0.1102	0.06366	0.00397
1,3 Dichlorobenzene	mod	30000	1100	1.16812	0.85941	0.04207
1,2,4 Trichlorobenzene	hi	3700	10400	5.59816	4.26522	0.20163
2 Methyl furan	hi	34	N/A	6.92032	6.92032	0

SGC - Short-Term Guideline Concentrations, ug/m3

Q1 - Steam Stripper Emission Rate, g/s
Q2 - Equalization Tank Emission Rate, g/s
Q3 - 84" Air Stripper Emission Rate, g/s
Q4 - 54" Air Stripper Emission Rate, g/s

C/Q - Concentration calculated using SCREEN
with emission rate equal to 1 g/s, ug/m3
C1 - Combined 1-hr Impact from Q1, Q2, & Q3, ug/m3
C2 - Combined 1-hr Impact from Q1, Q2, & Q4, ug/m3

Steam Stripper - Existing Groundwater Stripper
(Stack ht. - 110'; dia. - 2", vel. - 0.8 fps

Equal Tank - Groundwater Holding Tank
(Stack ht. - 24'; dia. - 1'; vel - 0.1 fps

Air Strip. 1 - 84" Dia. Air Stripper
(Stack ht. - 40'; dia - [illegible]", vel. - 6.9 fps

Air Strip. 2 - 54" Dia. Air Stripper
(Stack ht. - 40', dia - [illegible]"; vel - 3.4 fps

Notes: 1. Only one of the air strippers will be operat
at any give time
2. N/A = not available
3. * = Interim SGC derived by TLV/4.2

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DUPONT NIAGARA GILL CREEK PROJECT SPREADSHEET

CONCENTRATIONS IN AIR CONSIDERING INPUTS
FROM THE EXISTING GROUNDWATER RECOVERY SYSTEM
AND THE PROPOSED GILL CREEK PROJECT SOURCES
WEST OF STEAM STRIPPER

Chemical Compound	Toxicity Table	SGC (ug/m3)	Odor Threshold (ug/m3)	Peak Emission Rates: Steam Stripper Q1 (g/s)	Equal. Tank Q2 (g/s)	Air Strip. 1 Q3 (g/s)	Air Strip. 2 Q4 (g/s)
Vinyl Chloride	hi	1300	26000	1.92e-02	2.52e-04	8.91e-02	4.45e-02
1,1 Dichloroethene	mod	190000	5500000	0.00e+00	0.00e+00	4.70e-03	2.30e-03
Dichloromethane	mod	41000	4000	1.88e-02	9.32e-05	8.25e-02	4.15e-02
Chloroform	mod	980	20000	3.31e-02	6.30e-04	2.69e-02	1.35e-02
1,1,1 Trichloroethane	lo	450000	70000	0.00e+00	0.00e+00	9.30e-03	4.60e-03
Carbon Tetrachloride	hi	1300	10000	0.00e+00	0.00e+00	4.30e-03	2.10e-03
Trichloroethylene	mod	33000	2000	7.94e-03	7.56e-04	7.11e-01	3.55e-01
Tetrachloroethylene	mod	81000	480000	5.04e-04	5.04e-04	2.26e-01	1.13e-01
1,1,2,2 Tetrachloroethane	mod	1600	20000	1.26e-05	1.01e-05	1.31e-01	8.22e-02
Chlorobenzene	mod	11000	600	1.26e-04	3.78e-04	6.08e-02	3.06e-02
Hexachloroethane	N/A *	2310	150	0.00e+00	0.00e+00	3.50e-03	1.70e-03
1,4 Dichlorobenzene	mod	30000	90000	0.00e+00	0.00e+00	1.18e-02	6.00e-03
1,2 Dichlorobenzene	mod	30000	120	0.00e+00	0.00e+00	1.66e-02	8.60e-03
Hexachlorobutadiene	mod	50	N/A	0.00e+00	0.00e+00	1.12e-02	5.60e-03
Benzene	hi	30	516	6.30e-04	1.89e-05	1.60e-02	1.60e-02
1,2 Dichloroethylene	mod	190000	30000	2.95e-02	3.78e-04	1.73e-01	8.63e-02
Hexachlorobenzene	hi *	6	N/A	0.00e+00	0.00e+00	5.00e-04	2.00e-04
1,3 Dichlorobenzene	mod	30000	1100	0.00e+00	0.00e+00	5.30e-03	2.70e-03
1,2,4 Trichlorobenzene	hi	3700	10400	0.00e+00	0.00e+00	2.54e-02	1.34e-02
2 Methyl furan	hi	34	N/A	5.27e-02	7.56e-04	0.00e+00	0.00e+00

SGC - Short-Term Guideline Concentrations, ug/m3

Q1 - Steam Stripper Emission Rate, g/s
Q2 - Equalization Tank Emission Rate, g/s
Q3 - 84" Air Stripper Emission Rate, g/s
Q4 - 54" Air Stripper Emission Rate, g/s

C/Q - Concentration calculated using SCREEN with emission rate equal to 1 g/s, ug/m3
C1 - Combined 1-hr Impact from Q1, Q2, & Q3, ug/m3
C2 - Combined 1-hr Impact from Q1, Q2, & Q4, ug/m3

Steam Stripper - Existing Groundwater Stripper (Stack ht. - 110'; dia. - 2"; vel. - 0.8 fps)

Equal. Tank - Groundwater Holding Tank (Stack ht. - 24'; dia. - 4"; vel. - 0.1 fps)

Air Strip. 1 - 84" Dia. Air Stripper (Stack ht. - 40'; dia. - 30"; vel. - 6.9 fps)

Air Strip. 2 - 54" Dia. Air Stripper (Stack ht. - 40'; dia. - 30"; vel. - 3.4 fps)

Notes: 1. Only one of the air strippers will be operational at any give time
2. N/A = not available
3. * = Interim SGC derived by TLV / 42

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DUPONT NIAGARA GILL CREEK PROJECT

CONCENTRATIONS IN AIR CONSIDERING INPUTS
FROM THE EXISTING GROUNDWATER RECOVERY SYSTEM
AND THE PROPOSED GILL CREEK PROJECT SOURCES
WEST OF STEAM STRIPPER

Concentration West of Gill Creek at 100 Meters

Chemical Compound	Toxicity Table	SGC (ug/m3)	Odor Threshold (ug/m3)	Conc. w/ emissions at 1 g/s C/Q1 (ug/m3)	C/Q2 (ug/m3)	C/Q3 (ug/m3)	C/Q4 (ug/m3)	Comb. 1-hr Impact C1 (ug/m3)	C2 (ug/m3)
Vinyl Chloride	hi	1300	26000	70.40	2667.00	220.40	318.30	21.661	16.188
1,1 Dichloroethene	mod	190000	5500000	70.40	2667.00	220.40	318.30	1.036	0.732
Dichloromethane	mod	41000	4000	70.40	2667.00	220.40	318.30	19.755	14.782
Chloroform	mod	980	20000	70.40	2667.00	220.40	318.30	9.939	8.308
1,1,1 Trichloroethane	lo	450000	70000	70.40	2667.00	220.40	318.30	2.050	1.464
Carbon Tetrachloride	hi	1300	10000	70.40	2667.00	220.40	318.30	0.948	0.668
Trichloroethylene	mod	33000	2000	70.40	2667.00	220.40	318.30	159.191	115.572
Tetrachloroethylene	mod	81000	480000	70.40	2667.00	220.40	318.30	51.278	37.348
1,1,2,2 Tetrachloroethane	mod	1400	20000	70.40	2667.00	220.40	318.30	28.812	26.192
Chlorobenzene	mod	11000	600	70.40	2667.00	220.40	318.30	14.417	10.757
Hexachloroethane	N/A *	2310	150	70.40	2667.00	220.40	318.30	0.771	0.541
1,4 Dichlorobenzene	mod	30000	90000	70.40	2667.00	220.40	318.30	2.601	1.910
1,2 Dichlorobenzene	mod	30000	120	70.40	2667.00	220.40	318.30	3.659	2.737
Hexachlorobutadiene	mod	50	N/A	70.40	2667.00	220.40	318.30	2.473	1.782
Benzene	hi	30	515	70.40	2667.00	220.40	318.30	3.621	5.188
1,2 Dichloroethylene	mod	190000	30000	70.40	2667.00	220.40	318.30	41.126	30.554
Hexachlorobenzene	hi *	6	N/A	70.40	2667.00	220.40	318.30	0.110	0.064
1,3 Dichlorobenzene	mod	30000	1100	70.40	2667.00	220.40	318.30	1.169	0.859
1,2,4 Trichlorobenzene	hi	3700	10400	118.00	928.20	220.40	318.30	5.598	4.265
2 Methyl furan	hi	34	N/A	118.00	928.20	220.40	318.30	6.920	[illegible]

SGC - Short-Term Guideline Concentrations, ug/m3

Q1 - Steam Stripper Emission Rate, g/s
Q2 - Equalization Tank Emission Rate, g/s
Q3 - 84" Air Stripper Emission Rate, g/s
Q4 - 54" Air Stripper Emission Rate, g/s

C/Q - Concentration calculated using SCREEN
with emission rate equal to 1 g/s, ug/m3
C1 - Combined 1-hr Impact from Q1, Q2, & Q3, ug/m3
C2 - Combined 1-hr Impact from Q1, Q2, & Q4, ug/m3

Notes: 1. Only one of the air strippers will be operat
at any give time
2. N/A = not available
3. * = Interim SGC derived by TLV/4.2

file: gillcrk-west.w20

DUPC NIAGARA GILL CREEK PROJECT

CONCENTRATIONS IN AIR CONSIDERING INPUTS
FROM THE EXISTING GROUNDWATER RECOVERY SYSTEM
AND THE PROPOSED GILL CREEK PROJECT SOURCES
WEST OF STEAM STRIPPER

Concentration West of Gill Creek at 200 Meters

Chemical Compound	Toxicity Table	SGC (ug/m3)	Odor Threshold (ug/m3)	Conc. w/ emissions at 1 g/s C/Q1 (ug/m3)	C/Q2 (ug/m3)	C/Q3 (ug/m3)	C/Q4 (ug/m3)	Comb. 1-hr Impact C1 (ug/m3)	C2 (ug/m3)
Vinyl Chloride	hi	1300	26000	129.60	1888.00	220.20	296.70	22.584	16.167
1,1 Dichloroethene	mod	190000	5500000	129.60	1888.00	220.20	296.70	1.035	0.682
Dichloromethane	mod	41000	4000	129.60	1888.00	220.20	296.70	20.779	14.926
Chloroform	mod	980	20000	129.60	1888.00	220.20	296.70	11.403	9.485
1,1,1 Trichloroethane	lo	450000	70000	129.60	1888.00	220.20	296.70	2.048	1.365
Carbon Tetrachloride	hi	1300	10000	129.60	1888.00	220.20	296.70	0.947	0.623
Trichloroethylene	mod	33000	2000	129.60	1888.00	220.20	296.70	158.930	107.785
Tetrachloroethylene	mod	81000	480000	129.60	1888.00	220.20	296.70	50.870	34.544
1,1,2,2 Tetrachloroethane	mod	1600	20000	129.60	1888.00	220.20	296.70	28.779	24.409
Chlorobenzene	mod	11000	600	129.60	1888.00	220.20	296.70	14.118	9.809
Hexachloroethane	N/A *	2310	150	129.60	1888.00	220.20	296.70	0.771	0.504
1,4 Dichlorobenzene	mod	30000	90000	129.60	1888.00	220.20	296.70	2.598	1.780
1,2 Dichlorobenzene	mod	30000	120	129.60	1888.00	220.20	296.70	3.655	2.552
Hexachlorobutadiene	mod	50	N/A	129.60	1888.00	220.20	296.70	2.471	1.662
Benzene	hi	30	516	129.60	1888.00	220.20	296.70	3.641	4.865
1,2 Dichloroethylene	mod	190000	30000	129.60	1888.00	220.20	296.70	42.543	30.142
Hexachlorobenzene	hi *	6	N/A	129.60	1888.00	220.20	296.70	0.110	0.059
1,3 Dichlorobenzene	mod	30000	1100	129.60	1888.00	220.20	296.70	1.167	0.801
1,2,4 Trichlorobenzene	hi	3700	10100	107.40	774.30	220.20	296.70	5.593	3.976
2 Methyl furan	hi	34	N/A	107.40	774.30	220.20	296.70	6.245	6.245

SGC - Short-Term Guideline Concentrations, ug/m3

Q1 - Steam Stripper Emission Rate, g/s
Q2 - Equalization Tank Emission Rate, g/s
Q3 - 84" Air Stripper Emission Rate, g/s
Q4 - 54" Air Stripper Emission Rate, g/s

C/Q - Concentration calculated using SCREEN
with emission rate equal to 1 g/s, ug/m3
C1 - Combined 1-hr Impact from Q1, Q2, & Q3, ug/m3
C2 - Combined 1-hr Impact from Q1, Q2, & Q4, ug/m3

Notes: 1. Only one of the air strippers will be operat
at any give time
2. N/A = not available
3. * = Interim SGC derived by TLV/4 2

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DUPONT NIAGARA GILL CREEK PROJECT

CONCENTRATIONS IN AIR CONSIDERING INPUTS
FROM THE EXISTING GROUNDWATER RECOVERY SYSTEM
AND THE PROPOSED GILL CREEK PROJECT SOURCES
WEST OF STEAM STRIPPER

Concentration West of Gill Creek at 300 Meters

Chemical Compound	Toxicity Table	SGC (ug/m3)	Odor Threshold (ug/m3)	Conc. w/ emissions at 1 g/s C/Q1 (ug/m3)	C/Q2 (ug/m3)	C/Q3 (ug/m3)	C/Q4 (ug/m3)	Comb. 1-hr Impact C1 (ug/m3)	C2 (ug/m3)
Vinyl Chloride	hi	1300	26000	134.10	1421.00	209.30	301.40	21.581	16.345
1,1 Dichloroethene	mod	190000	5500000	134.10	1421.00	209.30	301.40	0.984	0.693
Dichloromethane	mod	41000	4000	134.10	1421.00	209.30	301.40	19.921	15.162
Chloroform	mod	980	20000	134.10	1421.00	209.30	301.40	10.964	9.403
1,1,1 Trichloroethane	lo	450000	70000	134.10	1421.00	209.30	301.40	1.946	1.386
Carbon Tetrachloride	hi	1300	10000	134.10	1421.00	209.30	301.40	0.900	0.633
Trichloroethylene	mod	33000	2000	134.10	1421.00	209.30	301.40	150.868	109.136
Tetrachloroethylene	mod	81000	480000	134.10	1421.00	209.30	301.40	48.169	34.842
1,1,2,2 Tetrachloroethane	mod	1600	20000	134.10	1421.00	209.30	301.40	27.351	24.791
Chlorobenzene	mod	11000	600	134.10	1421.00	209.30	301.40	13.279	9.777
Hexachloroethane	N/A *	2310	150	134.10	1421.00	209.30	301.40	0.733	0.512
1,4 Dichlorobenzene	mod	30000	90000	134.10	1421.00	209.30	301.40	2.470	1.808
1,2 Dichlorobenzene	mod	30000	120	134.10	1421.00	209.30	301.40	3.474	2.592
Hexachlorobutadiene	mod	50	N/A	134.10	1421.00	209.30	301.40	2.348	1.688
Benzene	hi	30	510	134.10	1421.00	209.30	301.40	3.460	4.234
1,2 Dichloroethylene	mod	190000	30000	134.10	1421.00	209.30	301.40	40.618	30.504
Hexachlorobenzene	hi *	6	N/A	134.10	1421.00	209.30	301.40	0.105	0.060
1,3 Dichlorobenzene	mod	30000	1100	134.10	1421.00	209.30	301.40	1.109	0.814
1,2,4 Trichlorobenzene	hi	3700	10400	96.60	667.90	209.30	301.40	5.316	4.039
2 Methyl furan	hi	34	N/A	96.60	667.90	209.30	301.40	5.596	5.596

SGC - Short-Term Guideline Concentrations, ug/m3

Q1 - Steam Stripper Emission Rate, g/s
Q2 - Equalization Tank Emission Rate, g/s
Q3 - 84" Air Stripper Emission Rate, g/s
Q4 - 54" Air Stripper Emission Rate, g/s

C/Q - Concentration calculated using SCREEN with emission rate equal to 1 g/s, ug/m3
C1 - Combined 1-hr Impact from Q1, Q2, & Q3, ug/m3
C2 - Combined 1-hr Impact from Q1, Q2, & Q4, ug/m3

Notes: 1. Only one of the air strippers will be operat at any give time
2. N/A = not available
3. * = Interim SGC derived by TLV/4.2

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DUPON. NIAGARA GILL CREEK PROJECT

CONCENTRATIONS IN AIR CONSIDERING INPUTS
FROM THE EXISTING GROUNDWATER RECOVERY SYSTEM
AND THE PROPOSED GILL CREEK PROJECT SOURCES
WEST OF STEAM STRIPPER

Concentration East of Gill Creek at 400 Meters

Chemical Compound	Toxicity Table	SGC (ug/m3)	Odor Threshold (ug/m3)	Conc. w/ emissions at 1 g/s C/Q1 (ug/m3)	C/Q2 (ug/m3)	C/Q3 (ug/m3)	C/Q4 (ug/m3)	Comb. 1-hr Impact C1 (ug/m3)	C2 (ug/m3)
Vinyl Chloride	hi	1300	26000	126.30	1139.00	208.20	299.20	21.263	16.026
1,1 Dichloroethene	mod	190000	5500000	126.30	1139.00	208.20	299.20	0.979	0.688
Dichloromethane	mod	41000	4000	126.30	1139.00	208.20	299.20	19.657	14.897
Chloroform	mod	980	20000	126.30	1139.00	208.20	299.20	10.499	8.937
1,1,1 Trichloroethane	lo	450000	70000	126.30	1139.00	208.20	299.20	1.936	1.376
Carbon Tetrachloride	hi	1300	10000	126.30	1139.00	208.20	299.20	0.895	0.628
Trichloroethylene	mod	33000	2000	126.30	1139.00	208.20	299.20	149.811	108.080
Tetrachloroethylene	mod	81000	480000	126.30	1139.00	208.20	299.20	47.774	34.447
1,1,2,2 Tetrachloroethane	mod	1600	20000	126.30	1139.00	208.20	299.20	27.204	24.607
Chlorobenzene	mod	11000	600	126.30	1139.00	208.20	299.20	13.105	9.602
Hexachloroethane	N/A *	2310	150	126.30	1139.00	208.20	299.20	0.729	0.509
1,4 Dichlorobenzene	mod	30000	90000	126.30	1139.00	208.20	299.20	2.457	1.795
1,2 Dichlorobenzene	mod	30000	120	126.30	1139.00	208.20	299.20	3.456	2.573
Hexachlorobutadiene	mod	50	N/A	126.30	1139.00	208.20	299.20	2.336	1.676
Benzene	hi	30	516	126.30	1139.00	208.20	299.20	3.432	4.888
1,2 Dichloroethylene	mod	190000	30000	126.30	1139.00	208.20	299.20	40.092	29.977
Hexachlorobenzene	hi *	6	N/A	126.30	1139.00	208.20	299.20	0.104	0.060
1,3 Dichlorobenzene	mod	30000	1100	126.30	1139.00	208.20	299.20	1.103	0.808
1,2,4 Trichlorobenzene	hi	3700	10400	85.82	577.80	208.20	299.20	5.288	4.009
2 Methyl furan	hi	34	N/A	85.82	577.80	208.20	299.20	4.960	4.960

SGC - Short-Term Guideline Concentrations, ug/m3

Q1 - Steam Stripper Emission Rate, g/s
Q2 - Equalization Tank Emission Rate, g/s
Q3 - 84" Air Stripper Emission Rate, g/s
Q4 - 54" Air Stripper Emission Rate, g/s

C/Q - Concentration calculated using SCREEN
with emission rate equal to 1 g/s, ug/m3
C1 - Combined 1-hr Impact from Q1, Q2, & Q3, ug/m3
C2 - Combined 1-hr Impact from Q1, Q2, & Q4, ug/m3

Notes: 1 Only one of the air strippers will be operat
at any give time
2. N/A = not available
3. * = Interim SGC derived by TLV/4.2

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DUPONT NIAGARA GILL CREEK PROJECT

CONCENTRATIONS IN AIR CONSIDERING INPUTS
FROM THE EXISTING GROUNDWATER RECOVERY SYSTEM
AND THE PROPOSED GILL CREEK PROJECT SOURCES
WEST OF STEAM STRIPPER

Concentration West of Gill Creek at 500 Meters

Chemical Compound	Toxicity Table	SGC (ug/m3)	Odor Threshold (ug/m3)	Conc. w/ emissions at 1 g/s C/Q1 (ug/m3)	C/Q2 (ug/m3)	C/Q3 (ug/m3)	C/Q4 (ug/m3)	Comb. 1-hr Impact C1 (ug/m3)	C2 (ug/m3)
Vinyl Chloride	hi	1300	26000	118.00	928.20	209.80	289.20	21.193	15.369
1,1 Dichloroethene	mod	190000	5500000	118.00	928.20	209.80	289.20	0.986	0.665
Dichloromethane	mod	41000	4000	118.00	928.20	209.80	289.20	19.613	14.307
Chloroform	mod	980	20000	118.00	928.20	209.80	289.20	10.134	8.395
1,1,1 Trichloroethane	lo	450000	70000	118.00	928.20	209.80	289.20	1.951	1.330
Carbon Tetrachloride	hi	1300	10000	118.00	928.20	209.80	289.20	0.902	0.6[illegible]7
Trichloroethylene	mod	33000	2000	118.00	928.20	209.80	289.20	150.723	104.305
Tetrachloroethylene	mod	81000	480000	118.00	928.20	209.80	289.20	48.026	33.207
1,1,2,2 Tetrachloroethane	mod	1600	20000	118.00	928.20	209.80	289.20	27.411	23.783
Chlorobenzene	mod	11000	600	118.00	928.20	209.80	289.20	13.122	9.215
Hexachloroethane	N/A *	2310	150	118.00	928.20	209.80	289.20	0.734	0.492
1,4 Dichlorobenzene	mod	30000	90000	118.00	928.20	209.80	289.20	2.476	1.735
1,2 Dichlorobenzene	mod	30000	120	118.00	928.20	209.80	289.20	3.483	2.487
Hexachlorobutadiene	mod	50	N/A	118.00	928.20	209.80	289.20	2.354	1.620
Benzene	hi	30	516	118.00	928.20	209.80	289.20	3.449	4.719
1,2 Dichloroethylene	mod	190000	30000	118.00	928.20	209.80	289.20	40.043	28.790
Hexachlorobenzene	hi *	6	N/A	118.00	928.20	209.80	289.20	0.105	0.058
1,3 Dichlorobenzene	mod	30000	1100	118.00	928.20	209.80	289.20	1.112	0.781
1,2,4 Trichlorobenzene	hi	3700	10400	77.81	506.20	209.80	289.20	5.329	3.875
2 Methyl furan	hi	34	N/A	77.81	506.20	209.80	289.20	4.483	4.483

SGC - Short-Term Guideline Concentrations, ug/m3

Q1 - Steam Stripper Emission Rate, g/s
Q2 - Equalization Tank Emission Rate, g/s
Q3 - 84" Air Stripper Emission Rate, g/s
Q4 - 54" Air Stripper Emission Rate, g/s

C/Q - Concentration calculated using SCREEN with emission rate equal to 1 g/s, ug/m3
C1 - Combined 1-hr Impact from Q1, Q2, & Q3, ug/m3
C2 - Combined 1-hr Impact from Q1, Q2, & Q4, ug/m3

Notes: 1. Only one of the air strippers will be operat at any give time
2. N/A = not available
3. * = Interim SGC derived by TLV/4.2

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DUPONT NIAGARA GILL CREEK PROJECT

CONCENTRATIONS IN AIR CONSIDERING INPUTS
FROM THE EXISTING GROUNDWATER RECOVERY SYSTEM
AND THE PROPOSED GILL CREEK PROJECT SOURCES
WEST OF STEAM STRIPPER

Concentration West of Gill Creek at 600 Meters

Chemical Compound	Toxicity Table	SGC (ug/m3)	Odor Threshold (ug/m3)	Conc. w/ emissions at 1 g/s C/Q1 (ug/m3)	C/Q2 (ug/m3)	C/Q3 (ug/m3)	C/Q4 (ug/m3)	Comb. 1-hr Impact C1 (ug/m3)	C2 (ug/m3)
Vinyl Chloride	hi	1300	26000	107.40	774.30	206.80	275.40	20.683	14.513
1,1 Dichloroethene	mod	190000	5500000	107.40	774.30	206.80	275.40	0.972	0.633
Dichloromethane	mod	41000	4000	107.40	774.30	206.80	275.40	19.152	13.520
Chloroform	mod	980	20000	107.40	774.30	206.80	275.40	9.606	7.761
1,1,1 Trichloroethane	lo	450000	70000	107.40	774.30	206.80	275.40	1.923	1.267
Carbon Tetrachloride	hi	1300	10000	107.40	774.30	206.80	275.40	0 889	0 578
Trichloroethylene	mod	33000	2000	107.40	774.30	206.80	275.40	148.390	99.205
Tetrachloroethylene	mod	81000	480000	107.40	774.30	206.80	275.40	47.264	31.565
1,1,2,2 Tetrachloroethane	mod	1600	20000	107.40	774.30	206.80	275.40	27.017	22.647
Chlorobenzene	mod	11000	600	107.40	774.30	206.80	275.40	12.880	8 733
Hexachloroethane	N/A	* 2310	150	107.40	774.30	206.80	275.40	0.724	0.468
1,4 Dichlorobenzene	mod	30000	90000	107.40	774.30	206.80	275.40	2.440	1.652
1,2 Dichlorobenzene	mod	30000	120	107.40	774.30	206.80	275.40	3.433	2 368
Hexachlorobutadiene	mod	50	N/A	107.40	774.30	206.80	275.40	2.320	1 542
Benzene	hi	30	516	107.40	774.30	206.80	275.40	3.391	4 499
1,2 Dichloroethylene	mod	190000	30000	107.40	774.30	206.80	275.40	39.155	27.229
Hexachlorobenzene	hi	* 6	N/A	107.40	774.30	206.80	275.40	0.103	0 055
1,3 Dichlorobenzene	mod	30000	1100	107.40	774.30	206.80	275.40	1.096	0.744
1,2,4 Trichlorobenzene	hi	3700	10400	70.60	448.10	206.80	275.40	5.253	3 690
2 Methyl furan	hi	34	N/A	70.60	448.10	206.80	275.40	4.059	4.059

SGC - Short-Term Guideline Concentrations, ug/m3

Q1 - Steam Stripper Emission Rate, g/s
Q2 - Equalization Tank Emission Rate, g/s
Q3 - 84" Air Stripper Emission Rate, g/s
Q4 - 54" Air Stripper Emission Rate, g/s

C/Q - Concentration calculated using SCREEN with emission rate equal to 1 g/s, ug/m3
C1 - Combined 1-hr Impact from Q1, Q2, & Q3, ug/m3
C2 - Combined 1-hr Impact from Q1, Q2, & Q4, ug/m3

Notes: 1. Only one of the air strippers will be operat at any give time
2. N/A = not available
3. * = Interim SGC derived by TLV/4.2

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DUPONT NIAGARA GILL CREEK PROJECT

CONCENTRATIONS IN AIR CONSIDERING INPUTS
FROM THE EXISTING GROUNDWATER RECOVERY SYSTEM
AND THE PROPOSED GILL CREEK PROJECT SOURCES
WEST OF STEAM STRIPPER

Concentration West of Gill Creek at 700 Meters

Chemical Compound	Toxicity Table	SGC (ug/m3)	Odor Threshold (ug/m3)	Conc. w/ emissions at 1 g/s C/Q1 (ug/m3)	C/Q2 (ug/m3)	C/Q3 (ug/m3)	C/Q4 (ug/m3)	Comb. 1-hr Impact C1 (ug/m3)	C2 (ug/m3)
Vinyl Chloride	hi	1300	26000	96.60	667.90	200.20	259.50	19.861	13.571
1,1 Dichloroethene	mod	190000	5500000	96.60	667.90	200.20	259.50	0.941	0.597
Dichloromethane	mod	41000	4000	96.60	667.90	200.20	259.50	18.395	12.648
Chloroform	mod	980	20000	96.60	667.90	200.20	259.50	9.004	7.121
1,1,1 Trichloroethane	lo	450000	70000	96.60	667.90	200.20	259.50	1.862	1.194
Carbon Tetrachloride	hi	1300	10000	96.60	667.90	200.20	259.50	0.861	0.545
Trichloroethylene	mod	33000	2000	96.60	667.90	200.20	259.50	143.534	93.394
Tetrachloroethylene	mod	81000	480000	96.60	667.90	200.20	259.50	45.711	29.709
1,1,2,2 Tetrachloroethane	mod	1600	20000	96.60	667.90	200.20	259.50	26.154	21.339
Chlorobenzene	mod	11000	600	96.60	667.90	200.20	259.50	12.437	8.205
Hexachloroethane	N/A	* 2310	150	96.60	667.90	200.20	259.50	0.701	0.441
1,4 Dichlorobenzene	mod	30000	90000	96.60	667.90	200.20	259.50	2.362	1.557
1,2 Dichlorobenzene	mod	30000	120	96.60	667.90	200.20	259.50	3.323	2.232
Hexachlorobutadiene	mod	50	N/A	96.60	667.90	200.20	259.50	2.246	1.453
Benzene	hi	30	516	96.60	667.90	200.20	259.50	3.277	4.225
1,2 Dichloroethylene	mod	190000	30000	96.60	667.90	200.20	259.50	37.657	25.497
Hexachlorobenzene	hi	* 6	N/A	96.60	667.90	200.20	259.50	0.100	0.052
1,3 Dichlorobenzene	mod	30000	1100	96.60	667.90	200.20	259.50	1.061	0.701
1,2,4 Trichlorobenzene	hi	3700	10400	64.70	400.20	200.20	259.50	5.085	3.477
2 Methyl furan	hi	34	N/A	64.70	400.20	200.20	259.50	3.712	3.712

SGC - Short-Term Guideline Concentrations, ug/m3

Q1 - Steam Stripper Emission Rate, g/s
Q2 - Equalization Tank Emission Rate, g/s
Q3 - 84" Air Stripper Emission Rate, g/s
Q4 - 54" Air Stripper Emission Rate, g/s

C/Q - Concentration calculated using SCREEN with emission rate equal to 1 g/s, ug/m3
C1 - Combined 1-hr Impact from Q1, Q2, & Q3, ug/m3
C2 - Combined 1-hr Impact from Q1, Q2, & Q4, ug/m3

Notes: 1. Only one of the air strippers will be operat at any give time
2. N/A = not available
3. * = Interim SGC derived by TLV/4.2

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DUPON. NIAGARA GILL CREEK PROJECT

CONCENTRATIONS IN AIR CONSIDERING INPUTS
FROM THE EXISTING GROUNDWATER RECOVERY SYSTEM
AND THE PROPOSED GILL CREEK PROJECT SOURCES
WEST OF STEAM STRIPPER

Concentration West of Gill Creek at 800 Meters

Chemical Compound	Toxicity Table	SGC (ug/m3)	Odor Threshold (ug/m3)	Conc. w/ emissions at 1 g/s C/Q1 (ug/m3)	C/Q2 (ug/m3)	C/Q3 (ug/m3)	C/Q4 (ug/m3)	Comb. 1-hr Impact C1 (ug/m3)	C2 (ug/m3)
Vinyl Chloride	hi	1300	26000	85.82	577.80	192.40	243.70	18.936	12.638
1,1 Dichloroethene	mod	190000	5500000	85.82	577.80	192.40	243.70	0.904	0.561
Dichloromethane	mod	41000	4000	85.82	577.80	192.40	243.70	17.540	11.781
Chloroform	mod	980	20000	85.82	577.80	192.40	243.70	8.380	6.495
1,1,1 Trichloroethane	lo	450000	70000	85.82	577.80	192.40	243.70	1.789	1.121
Carbon Tetrachloride	hi	1300	10000	85.82	577.80	192.40	243.70	0.827	0.512
Trichloroethylene	mod	33000	2000	85.82	577.80	192.40	243.70	137.838	87.632
Tetrachloroethylene	mod	81000	480000	85.82	577.80	192.40	243.70	43.894	27.873
1,1,2,2 Tetrachloroethane	mod	1600	20000	85.82	577.80	192.40	243.70	25.134	20.039
Chlorobenzene	mod	11000	600	85.82	577.80	192.40	243.70	11.927	7.686
Hexachloroethane	N/A	* 2310	150	85.82	577.80	192.40	243.70	0.673	0.414
1,4 Dichlorobenzene	mod	30000	90000	85.82	577.80	192.40	243.70	2.270	1.462
1,2 Dichlorobenzene	mod	30000	120	85.82	577.80	192.40	243.70	3.194	2.096
Hexachlorobutadiene	mod	50	N/A	85.82	577.80	192.40	243.70	2.159	1.365
Benzene	hi	30	516	85.82	577.80	192.40	243.70	3.143	3.964
1,2 Dichloroethylene	mod	190000	30000	85.82	577.80	192.40	243.70	35.958	23.781
Hexachlorobenzene	hi	* 6	N/A	85.82	577.80	192.40	243.70	0.096	0.049
1,3 Dichlorobenzene	mod	30000	1100	85.82	577.80	192.40	243.70	1.020	0.658
1,2,4 Trichlorobenzene	hi	3700	10400	60.95	360.10	192.40	243.70	4.887	3.266
2 Methyl furan	hi	31	N/A	60.95	360.10	192.40	243.70	3.484	3.484

SGC - Short-Term Guideline Concentrations, ug/m3

Q1 - Steam Stripper Emission Rate, g/s
Q2 - Equalization Tank Emission Rate, g/s
Q3 - 84" Air Stripper Emission Rate, g/s
Q4 - 54" Air Stripper Emission Rate, g/s

C/Q - Concentration calculated using SCREEN
with emission rate equal to 1 g/s, ug/m3
C1 - Combined 1-hr Impact from Q1, Q2, & Q3, ug/m3
C2 - Combined 1-hr Impact from Q1, Q2, & Q4, ug/m3

Notes: 1. Only one of the air strippers will be operat
at any give time
2. N/A = not available
3. * = Interim SGC derived by TLV/4.2

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DUPONT NIAGARA GILL CREEK PROJECT

CONCENTRATIONS IN AIR CONSIDERING INPUTS
FROM THE EXISTING GROUNDWATER RECOVERY SYSTEM
AND THE PROPOSED GILL CREEK PROJECT SOURCES
WEST OF STEAM STRIPPER

Concentration West of Gill Creek at 900 Meters

Chemical Compound	Toxicity Table	SGC (ug/m3)	Odor Threshold (ug/m3)	Conc. w/ emissions at 1 g/s C/Q1 (ug/m3)	C/Q2 (ug/m3)	C/Q3 (ug/m3)	C/Q4 (ug/m3)	Comb. 1-hr Impact C1 (ug/m3)	C2 (ug/m3)
Vinyl Chloride	hi	1300	26000	77.81	506.20	184.00	228.60	18.016	11.794
1,1 Dichloroethene	mod	190000	5500000	77.81	506.20	184.00	228.60	0.865	0.526
Dichloromethane	mod	41000	4000	77.81	506.20	184.00	228.60	16.690	10.997
Chloroform	mod	980	20000	77.81	506.20	184.00	228.60	7.844	5.981
1,1,1 Trichloroethane	lo	450000	70000	77.81	506.20	184.00	228.60	1.711	1.052
Carbon Tetrachloride	hi	1300	10000	77.81	506.20	184.00	228.60	0.791	0.480
Trichloroethylene	mod	33000	2000	77.81	506.20	184.00	228.60	131.751	82.153
Tetrachloroethylene	mod	81000	480000	77.81	506.20	184.00	228.60	41.952	26.126
1,1,2,2 Tetrachloroethane	mod	1600	20000	77.81	506.20	184.00	228.60	24.036	18.797
Chlorobenzene	mod	11000	600	77.81	506.20	184.00	228.60	11.388	7.196
Hexachloroethane	N/A	* 2310	150	77.81	506.20	184.00	228.60	0.644	0.389
1,4 Dichlorobenzene	mod	30000	90000	77.81	506.20	184.00	228.60	2.171	1.372
1,2 Dichlorobenzene	mod	30000	120	77.81	506.20	184.00	228.60	3.554	1.966
Hexachlorobutadiene	mod	50	N/A	77.81	506.20	184.00	228.60	2.064	1.280
Benzene	hi	30	516	77.81	506.20	184.00	228.60	3.003	3.716
1,2 Dichloroethylene	mod	190000	30000	77.81	506.20	184.00	228.60	34.245	22.215
Hexachlorobenzene	hi	* 6	N/A	77.81	506.20	184.00	228.60	0.092	0.046
1,3 Dichlorobenzene	mod	30000	1100	77.81	506.20	184.00	228.60	0.975	0.617
1,2,4 Trichlorobenzene	hi	3700	10400	57.45	326.30	184.00	228.60	4.674	3.063
2 Methyl furan	hi	34	N/A	57.45	326.30	184.00	228.60	3.274	3.271

SGC - Short-Term Guideline Concentrations, ug/m3

Q1 - Steam Stripper Emission Rate, g/s
Q2 - Equalization Tank Emission Rate, g/s
Q3 - 84" Air Stripper Emission Rate, g/s
Q4 - 54" Air Stripper Emission Rate, g/s

C/Q - Concentration calculated using SCREEN with emission rate equal to 1 g/s, ug/m3
C1 - Combined 1-hr Impact from Q1, Q2, & Q3, ug/m3
C2 - Combined 1-hr Impact from Q1, Q2, & Q4, ug/m3

Notes: 1. Only one of the air strippers will be operat at any give time
2. N/A = not available
3. * = Interim SGC derived by TLV/4.2

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DUP... NIAGARA GILL CREEK PROJECT

CONCENTRATIONS IN AIR CONSIDERING INPUTS
FROM THE EXISTING GROUNDWATER RECOVERY SYSTEM
AND THE PROPOSED GILL CREEK PROJECT SOURCES
WEST OF STEAM STRIPPER

Concentration West of Gill Creek at 1000 Meters

Chemical Compound	Toxicity Table	SGC (ug/m3)	Odor Threshold (ug/m3)	Conc. w/ emissions at 1 g/s C/Q1 (ug/m3)	C/Q2 (ug/m3)	C/Q3 (ug/m3)	C/Q4 (ug/m3)	Comb. 1-hr Impact C1 (ug/m3)	C2 (ug/m3)
Vinyl Chloride	hi	1300	26000	70.60	448.10	175.50	214.30	17.105	11.005
1,1 Dichloroethene	mod	190000	5500000	70.60	448.10	175.50	214.30	0.825	0.493
Dichloromethane	mod	41000	4000	70.60	448.10	175.50	214.30	15.848	10.263
Chloroform	mod	980	20000	70.60	448.10	175.50	214.30	7.340	5.512
1,1,1 Trichloroethane	lo	450000	70000	70.60	448.10	175.50	214.30	1.632	0.986
Carbon Tetrachloride	hi	1300	10000	70.60	448.10	175.50	214.30	0.755	0.450
Trichloroethylene	mod	33000	2000	70.60	448.10	175.50	214.30	125.610	76.976
Tetrachloroethylene	mod	81000	480000	70.60	448.10	175.50	214.30	39.995	24.477
1,1,2,2 Tetrachloroethane	mod	1600	20000	70.60	448.10	175.50	214.30	22.326	17.621
Chlorobenzene	mod	11000	600	70.60	448.10	175.50	214.30	10.849	6.736
Hexachloroethane	N/A	* 2310	150	70.60	448.10	175.50	214.30	0.614	0.364
1,4 Dichlorobenzene	mod	30000	90000	70.60	448.10	175.50	214.30	2.071	1.286
1,2 Dichlorobenzene	mod	30000	120	70.60	448.10	175.50	214.30	2.913	1.843
Hexachlorobutadiene	mod	50	N/A	70.60	448.10	175.50	214.30	1.969	1.200
Benzene	hi	30	516	70.60	448.10	175.50	214.30	2.861	3.182
1,2 Dichloroethylene	mod	190000	30000	70.60	448.10	175.50	214.30	32.543	20.746
Hexachlorobenzene	hi	* 6	N/A	70.60	448.10	175.50	214.30	0.088	0.043
1,3 Dichlorobenzene	mod	30000	1100	70.60	448.10	175.50	214.30	0.930	0.579
1,2,4 Trichlorobenzene	hi	3700	10400	54.19	297.40	175.50	214.30	4.458	2.872
2 Methyl furan	hi	34	N/A	54.19	297.40	175.50	214.30	3.081	3.081

SGC - Short-Term Guideline Concentrations, ug/m3

Q1 - Steam Stripper Emission Rate, g/s
Q2 - Equalization Tank Emission Rate, g/s
Q3 - 84" Air Stripper Emission Rate, g/s
Q4 - 54" Air Stripper Emission Rate, g/s

C/Q - Concentration calculated using SCREEN
with emission rate equal to 1 g/s, ug/m3
C1 - Combined 1-hr Impact from Q1, Q2, & Q3, ug/m3
C2 - Combined 1-hr Impact from Q1, Q2, & Q4, ug/m3

Notes: 1. Only one of the air strippers will be operat
at any give time
2. N/A = not available
3. * = Interim SGC derived by TLV/4.2

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DUPONT NIAGARA GILL CREEK PROJECT

CONCENTRATIONS IN AIR CONSIDERING INPUTS
FROM THE EXISTING GROUNDWATER RECOVERY SYSTEM
AND THE PROPOSED GILL CREEK PROJECT SOURCES
WEST OF STEAM STRIPPER

Concentration West of Gill Creek at 1100 Meters

Chemical Compound	Toxicity Table	SGC (ug/m3)	Odor Threshold (ug/m3)	Conc. w/ emissions at 1 g/s C/Q1 (ug/m3)	C/Q2 (ug/m3)	C/Q3 (ug/m3)	C/Q4 (ug/m3)	Comb. 1-hr Impact C1 (ug/m3)	C2 (ug/m3)
Vinyl Chloride	hi	1300	26000	64.70	400.20	167.20	201.10	16.241	10.292
1,1 Dichloroethene	mod	190000	5500000	64.70	400.20	167.20	201.10	0.786	0.463
Dichloromethane	mod	41000	4000	64.70	400.20	167.20	201.10	15.048	9.599
Chloroform	mod	980	20000	64.70	400.20	167.20	201.10	6.891	5.109
1,1,1 Trichloroethane	lo	450000	70000	64.70	400.20	167.20	201.10	1.555	0.925
Carbon Tetrachloride	hi	1300	10000	64.70	400.20	167.20	201.10	0.719	0.422
Trichloroethylene	mod	33000	2000	64.70	400.20	167.20	201.10	119.629	72.207
Tetrachloroethylene	mod	81000	480000	64.70	400.20	167.20	201.10	38.088	22.959
1,1,2,2 Tetrachloroethane	mod	1600	20000	64.70	400.20	167.20	201.10	21.841	16.535
Chlorobenzene	mod	11000	600	64.70	400.20	167.20	201.10	10.325	6.313
Hexachloroethane	N/A	* 2310	150	64.70	400.20	167.20	201.10	0.585	0.342
1,4 Dichlorobenzene	mod	30000	90000	64.70	400.20	167.20	201.10	1.973	1.207
1,2 Dichlorobenzene	mod	30000	120	64.70	400.20	167.20	201.10	2.776	1.729
Hexachlorobutadiene	mod	50	N/A	64.70	400.20	167.20	201.10	1.876	1.126
Benzene	hi	30	516	64.70	400.20	167.20	201.10	2.724	3.266
1,2 Dichloroethylene	mod	190000	30000	64.70	400.20	167.20	201.10	30.919	19.415
Hexachlorobenzene	hi	* 6	N/A	64.70	400.20	167.20	201.10	0.084	0.040
1,3 Dichlorobenzene	mod	30000	1100	64.70	400.20	167.20	201.10	0.886	0.543
1,2,4 Trichlorobenzene	hi	3700	10400	51.18	272.50	167.20	201.10	4.247	2.695
2 Methyl furan	hi	34	N/A	51.18	272.50	167.20	201.10	2.903	2.903

SGC - Short-Term Guideline Concentrations, ug/m3

Q1 - Steam Stripper Emission Rate, g/s
Q2 - Equalization Tank Emission Rate, g/s
Q3 - 84" Air Stripper Emission Rate, g/s
Q4 - 54" Air Stripper Emission Rate, g/s

C/Q - Concentration calculated using SCREEN with emission rate equal to 1 g/s, ug/m3
C1 - Combined 1-hr Impact from Q1, Q2, & Q3, ug/m3
C2 - Combined 1-hr Impact from Q1, Q2, & Q4, ug/m3

Notes 1. Only one of the air strippers will be operat at any give time
2. N/A = not available
3. * - Interim SGC derived by TLV/1.2

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DUPONT NIAGARA GILL CREEK PROJECT SPREADSHEET

CONCENTRATIONS IN AIR CONSIDERING INPUTS
FROM THE EXISTING GROUNDWATER RECOVERY SYSTEM
AND THE PROPOSED GILL CREEK PROJECT SOURCES
EAST OF GILL CREEK PROJECT

Chemical Compound	Toxicity Table		SGC (ug/m3)	Odor Threshold (ug/m3)	Peak Emission Rates: Steam Stripper Q1 (g/s)	Equal. Tank Q2 (g/s)	Air Strip. 1 Q3 (g/s)	Air Strip. 2 Q4 (g/s)
Vinyl Chloride	hi		1300	26000	1.92e-02	2.52e-04	8.91e-02	4.45e-02
1,1 Dichloroethene	mod		190000	5500000	0.00e+00	0.00e+00	4.70e-03	2.30e-03
Dichloromethane	mod		41000	4000	1.88e-02	9.32e-05	8.25e-02	4.15e-02
Chloroform	mod		980	20000	3.31e-02	6.30e-04	2.69e-02	1.35e-02
1,1,1 Trichloroethane	lo		450000	70000	0.00e+00	0.00e+00	9.30e-03	4.60e-03
Carbon Tetrachloride	hi		1300	10000	0.00e+00	0.00e+00	4.30e-03	2.10e-03
Trichloroethylene	mod		33000	2000	7.94e-03	7.56e-04	7.11e-01	3.55e-01
Tetrachloroethylene	mod		81000	480000	5.04e-04	5.04e-04	2.26e-01	1.13e-01
1,1,2,2 Tetrachloroethane	mod		1600	20000	1.26e-05	1.01e-05	1.31e-01	8.22e-02
Chlorobenzene	mod		11000	600	1.26e-04	3.78e-04	6.08e-02	3.06e-02
Hexachloroethane	N/A	*	2710	150	0.00e+00	0.00e+00	3.50e-03	1.70e-03
1,4 Dichlorobenzene	mod		30000	90000	0.00e+00	0.00e+00	1.18e-02	6.00e-03
1,2 Dichlorobenzene	mod		30000	120	0.00e+00	0.00e+00	1.66e-02	8.60e-03
Hexachlorobutadiene	mod		50	N/A	0.00e+00	0.00e+00	1.12e-02	5.60e-03
Benzene	hi		30	516	6.30e-04	1.89e-05	1.60e-02	1.60e-02
1,2 Dichloroethylene	mod		190000	30000	2.95e-02	3.78e-04	1.73e-01	8.63e-02
Hexachlorobenzene	hi	*	6	N/A	0.00e+00	0.00e+00	5.00e-04	2.00e-04
1,3 Dichlorobenzene	mod		30000	1100	0.00e+00	0.00e+00	5.30e-03	2.70e-03
1,2,4 Trichlorobenzene	hi		3700	10400	0.00e+00	0.00e+00	2.54e-02	1.34e-02
2 Methyl furan	hi		34	N/A	5.27e-02	7.56e-01	0.00e+00	0.00e+00

SGC - Short-Term Guideline Concentrations, ug/m3

Q1 - Steam Stripper Emission Rate, g/s
Q2 - Equalization Tank Emission Rate, g/s
Q3 - 84" Air Stripper Emission Rate, g/s
Q4 - 54" Air Stripper Emission Rate, g/s

C/Q - Concentration calculated using SCREEN
with emission rate equal to 1 g/s, ug/m3
C1 - Combined 1-hr Impact from Q1, Q2, & Q3, ug/m3
C2 - Combined 1-hr Impact from Q1, Q2, & Q4, ug/m3

Steam Stripper - Existing Groundwater Stripper
(Stack ht. - 110'; dia - 2"; vel. - 0.8 fps)

Equal. Tank - Groundwater Holding Tank
(Stack ht. - 24'; dia. - 4"; vel - 0.1 fps)

Air Strip. 1 - 84" Dia. Air Stripper
(Stack ht. - 40'; dia. - 30"; vel - [illegible] fps)

Air Strip. 2 - 54" Dia. Air Stripper
(Stack ht. - 40'; dia - 30"; vel. - 3.4 fps)

Notes: 1. Only one of the air strippers will be operational
at any give time
2. N/A = not available
3. * = interim SGC derived by TLV/4.2

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DUPONT NIAGARA GILL CREEK PROJECT

CONCENTRATIONS IN AIR CONSIDERING INPUTS
FROM THE EXISTING GROUNDWATER RECOVERY SYSTEM
AND THE PROPOSED GILL CREEK PROJECT SOURCES
EAST OF GILL CREEK PROJECT

Concentration East of Gill Creek at 100 Meters

Chemical Compound	Toxicity Table	SGC (ug/m3)	Odor Threshold (ug/m3)	Conc. w/ emissions at 1 g/s C/Q1 (ug/m3)	C/Q2 (ug/m3)	C/Q3 (ug/m3)	C/Q4 (ug/m3)	Comb. 1-hr Impact C1 (ug/m3)	C2 (ug/m3)
Vinyl Chloride	hi	1300	26000	118.00	928.20	163.70	318.10	17.085	16.655
1,1 Dichloroethene	mod	190000	5500000	118.00	928.20	163.70	318.10	0.769	0.732
Dichloromethane	mod	41000	4000	118.00	928.20	163.70	318.10	15.810	15.506
Chloroform	mod	980	20000	118.00	928.20	163.70	318.10	8.894	8.785
1,1,1 Trichloroethane	lo	450000	70000	118.00	928.20	163.70	318.10	1.522	1.463
Carbon Tetrachloride	hi	1300	10000	118.00	928.20	163.70	318.10	0.704	0.668
Trichloroethylene	mod	33000	2000	118.00	928.20	163.70	318.10	117.964	114.564
Tetrachloroethylene	mod	81000	480000	118.00	928.20	163.70	318.10	37.589	36.473
1,1,2,2 Tetrachloroethane	mod	1600	20000	118.00	928.20	163.70	318.10	21.390	26.159
Chlorobenzene	mod	11000	600	118.00	928.20	163.70	318.10	10.319	10.100
Hexachloroethane	N/A *	2310	150	118.00	928.20	163.70	318.10	0.573	0.541
1,4 Dichlorobenzene	mod	30000	90000	118.00	928.20	163.70	318.10	1.932	1.909
1,2 Dichlorobenzene	mod	30000	120	118.00	928.20	163.70	318.10	2.717	2.736
Hexachlorobutadiene	mod	50	N/A	118.00	928.20	163.70	318.10	1.837	1.781
Benzene	hi	30	516	118.00	928.20	163.70	318.10	2.711	5.181
1,2 Dichloroethylene	mod	190000	30000	118.00	928.20	163.70	318.10	32.086	31.284
Hexachlorobenzene	hi *	6	N/A	118.00	928.20	163.70	318.10	0.082	0.064
1,3 Dichlorobenzene	mod	30000	1100	118.00	928.20	163.70	318.10	0.868	0.859
1,2,4 Trichlorobenzene	hi	3700	10400	118.00	928.20	220.40	318.30	5.598	4.265
2 Methyl furan	hi	34	N/A	118.00	928.20	220.40	318.30	6.920	6.920

SGC - Short-Term Guideline Concentrations, ug/m3

Q1 - Steam Stripper Emission Rate, g/s
Q2 - Equalization Tank Emission Rate, g/s
Q3 - 84" Air Stripper Emission Rate, g/s
Q4 - 54" Air Stripper Emission Rate, g/s

C/Q - Concentration calculated using SCREEN
with emission rate equal to 1 g/s, ug/m3
C1 - Combined 1-hr Impact from Q1, Q2, & Q3, ug/m3
C2 - Combined 1-hr Impact from Q1, Q2, & Q4, ug/m3

Notes: 1 Only one of the air strippers will be operat
at any give time
2 N/A = not available
3 * = interim SGC derived by TLV/42

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DUPONT NIAGARA GILL CREEK PROJECT

CONCENTRATIONS IN AIR CONSIDERING INPUTS
FROM THE EXISTING GROUNDWATER RECOVERY SYSTEM
AND THE PROPOSED GILL CREEK PROJECT SOURCES
EAST OF GILL CREEK PROJECT

Concentration East of Gill Creek at 200 Meters

Chemical Compound	Toxicity Table	SGC (ug/m3)	Odor Threshold (ug/m3)	Conc. w/ emissions at 1 g/s C/Q1 (ug/m3)	C/Q2 (ug/m3)	C/Q3 (ug/m3)	C/Q4 (ug/m3)	Comb. 1-hr Impact C1 (ug/m3)	C2 (ug/m3)
Vinyl Chloride	hi	1300	26000	107.40	774.30	172.50	348.90	17.627	17.783
1,1 Dichloroethene	mod	190000	5500000	107.40	774.30	172.50	348.90	0.811	0.802
Dichloromethane	mod	41000	4000	107.40	774.30	172.50	348.90	16.323	16.571
Chloroform	mod	980	20000	107.40	774.30	172.50	348.90	8.683	8.753
1,1,1 Trichloroethane	lo	450000	70000	107.40	774.30	172.50	348.90	1.604	1.605
Carbon Tetrachloride	hi	1300	10000	107.40	774.30	172.50	348.90	0.742	0.733
Trichloroethylene	mod	33000	2000	107.40	774.30	172.50	348.90	124.017	125.298
Tetrachloroethylene	mod	81000	480000	107.40	774.30	172.50	348.90	39.498	39.870
1,1,2,2 Tetrachloroethane	mod	1600	20000	107.40	774.30	172.50	348.90	22.538	28.689
Chlorobenzene	mod	11000	600	107.40	774.30	172.50	348.90	10.794	10.983
Hexachloroethane	N/A *	2310	150	107.40	774.30	172.50	348.90	0.604	0.593
1,4 Dichlorobenzene	mod	30000	90000	107.40	774.30	172.50	348.90	2.036	2.093
1,2 Dichlorobenzene	mod	30000	120	107.40	774.30	172.50	348.90	2.364	3.001
Hexachlorobutadiene	mod	50	N/A	107.40	774.30	172.50	348.90	1.935	1.954
Benzene	hi	30	516	107.40	774.30	172.50	348.90	2.842	5.665
1,2 Dichloroethylene	mod	190000	30000	107.40	774.30	172.50	348.90	33.234	33.571
Hexachlorobenzene	hi *	6	N/A	107.40	774.30	172.50	348.90	0.086	0.070
1,3 Dichlorobenzene	mod	30000	1100	107.40	774.30	172.50	348.90	0.914	0.942
1,2,4 Trichlorobenzene	hi	3700	10400	107.40	774.30	220.20	296.70	5.593	3.976
2 Methyl furan	hi	34	N/A	107.40	774.30	220.20	296.70	6.245	6.245

SGC - Short-Term Guideline Concentrations, ug/m3

Q1 - Steam Stripper Emission Rate, g/s
Q2 - Equalization Tank Emission Rate, g/s
Q3 - 84" Air Stripper Emission Rate, g/s
Q4 - 54" Air Stripper Emission Rate, g/s

C/Q - Concentration calculated using SCREEN
with emission rate equal to 1 g/s, ug/m3
C1 - Combined 1-hr Impact from Q1, Q2, & Q3, ug/m3
C2 - Combined 1-hr Impact from Q1, Q2, & Q4, ug/m3

Notes: 1. Only one of the air strippers will be operat
at any give time
2. N/A = not available
3. * = interim SGC derived by TLV 4 2

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DUPONT NIAGARA GILL CREEK PROJECT

CONCENTRATIONS IN AIR CONSIDERING INPUTS
FROM THE EXISTING GROUNDWATER RECOVERY SYSTEM
AND THE PROPOSED GILL CREEK PROJECT SOURCES
EAST OF GILL CREEK PROJECT

Concentration East of Gill Creek at 300 Meters

Chemical Compound	Toxicity Table	SGC (ug/m3)	Odor Threshold (ug/m3)	Conc. w/ emissions at 1 g/s C/Q1 (ug/m3)	C/Q2 (ug/m3)	C/Q3 (ug/m3)	C/Q4 (ug/m3)	Comb. 1-hr Impact C1 (ug/m3)	C2 (ug/m3)
Vinyl Chloride	hi	1300	26000	96.60	667.90	178.50	303.40	17.927	15.524
1,1 Dichloroethene	mod	190000	5500000	96.60	667.90	178.50	303.40	0.839	0.698
Dichloromethane	mod	41000	4000	96.60	667.90	178.50	303.40	16.605	14.469
Chloroform	mod	980	20000	96.60	667.90	178.50	303.40	8.420	7.714
1,1,1 Trichloroethane	lo	450000	70000	96.60	667.90	178.50	303.40	1.660	1.396
Carbon Tetrachloride	hi	1300	10000	96.60	667.90	178.50	303.40	0.768	0.637
Trichloroethylene	mod	33000	2000	96.60	667.90	178.50	303.40	128.114	108.979
Tetrachloroethylene	mod	81000	480000	96.60	667.90	178.50	303.40	40.798	34.670
1,1,2,2 Tetrachloroethane	mod	1600	20000	96.60	667.90	178.50	303.40	23.220	24.947
Chlorobenzene	mod	11000	600	96.60	667.90	178.50	303.40	11.117	9.549
Hexachloroethane	N/A *	2310	150	96.60	667.90	178.50	303.40	0.625	0.516
1,4 Dichlorobenzene	mod	30000	90000	96.60	667.90	178.50	303.40	2.106	1.820
1,2 Dichlorobenzene	mod	30000	120	96.60	667.90	178.50	303.40	2.963	2.609
Hexachlorobutadiene	mod	50	N/A	96.60	667.90	178.50	303.40	2.003	1.699
Benzene	hi	30	516	96.60	667.90	178.50	303.40	2.929	4.928
1,2 Dichloroethylene	mod	190000	30000	96.60	667.90	178.50	303.40	33.911	29.286
Hexachlorobenzene	hi *	6	N/A	96.60	667.90	178.50	303.40	0.089	0.061
1,3 Dichlorobenzene	mod	30000	1100	96.60	667.90	178.50	303.40	0.946	0.819
1,2,4 Trichlorobenzene	hi	3700	10400	96.60	667.90	209.30	301.40	5.316	4.039
2 Methyl furan	hi	34	N/A	96.60	667.90	209.30	301.40	5.596	5.596

SGC - Short-Term Guideline Concentrations, ug/m3

Q1 - Steam Stripper Emission Rate, g/s
Q2 - Equalization Tank Emission Rate, g/s
Q3 - 84" Air Stripper Emission Rate, g/s
Q4 - 54" Air Stripper Emission Rate, g/s

C/Q - Concentration calculated using SCREEN
with emission rate equal to 1 g/s, ug/m3
C1 - Combined 1-hr Impact from Q1, Q2, & Q3, ug/m3
C2 - Combined 1-hr Impact from Q1, Q2 & Q4, ug/m3

Notes: 1. Only one of the air strippers will be operat
at any give time
2. N/A = not available
3. * = interim SGC derived by TLV / 2

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DUP.   NIAGARA GILL CREEK PROJECT

CONCENTRATIONS IN AIR CONSIDERING INPUTS
FROM THE EXISTING GROUNDWATER RECOVERY SYSTEM
AND THE PROPOSED GILL CREEK PROJECT SOURCES
EAST OF GILL CREEK PROJECT

Concentration East of Gill Creek at 400 Meters

Chemical Compound	Toxicity Table	SGC (ug/m3)	Odor Threshold (ug/m3)	Conc. w/ emissions at 1 g/s C/Q1 (ug/m3)	C/Q2 (ug/m3)	C/Q3 (ug/m3)	C/Q4 (ug/m3)	Comb. 1-hr Impact C1 (ug/m3)	C2 (ug/m3)
Vinyl Chloride	hi	1300	26000	85.82	577.80	198.70	314.80	19.498	15.802
1,1 Dichloroethene	mod	190000	5500000	85.82	577.80	198.70	314.80	0.934	0.724
Dichloromethane	mod	41000	4000	85.82	577.80	198.70	314.80	18.060	14.731
Chloroform	mod	980	20000	85.82	577.80	198.70	314.80	8.550	7.454
1,1,1 Trichloroethane	lo	450000	70000	85.82	577.80	198.70	314.80	1.848	1.448
Carbon Tetrachloride	hi	1300	10000	85.82	577.80	198.70	314.80	0.854	0.661
Trichloroethylene	mod	33000	2000	85.82	577.80	198.70	314.80	142.314	112.872
Tetrachloroethylene	mod	81000	480000	85.82	577.80	198.70	314.80	45.320	35.907
1,1,2,2 Tetrachloroethane	mod	1600	20000	85.82	577.80	198.70	314.80	25.957	25.883
Chlorobenzene	mod	11000	600	85.82	577.80	198.70	314.80	12.310	9.862
Hexachloroethane	N/A *	2310	150	85.82	577.80	198.70	314.80	0.695	0.535
1,4 Dichlorobenzene	mod	30000	90000	85.82	577.80	198.70	314.80	2.345	1.889
1,2 Dichlorobenzene	mod	30000	120	85.82	577.80	198.70	314.80	3.298	2.707
Hexachlorobutadiene	mod	50	N/A	85.82	577.80	198.70	314.80	2.229	1.763
Benzene	hi	30	516	85.82	577.80	198.70	314.80	3.244	5.102
1,2 Dichloroethylene	mod	190000	30000	85.82	577.80	198.70	314.80	37.046	29.917
Hexachlorobenzene	hi *	6	N/A	85.82	577.80	198.70	314.80	0.099	0.063
1,3 Dichlorobenzene	mod	30000	1100	85.82	577.80	198.70	314.80	1.053	0.850
1,2,4 Trichlorobenzene	hi	3700	10400	85.82	577.80	208.20	299.20	5.288	4.009
2 Methyl furan	hi	34	N/A	85.82	577.80	208.20	299.20	4.960	4.960

SGC - Short-Term Guideline Concentrations, ug/m3

Q1 - Steam Stripper Emission Rate, g/s
Q2 - Equalization Tank Emission Rate, g/s
Q3 - 84" Air Stripper Emission Rate, g/s
Q4 - 54" Air Stripper Emission Rate, g/s

C/Q - Concentration calculated using SCREEN with emission rate equal to 1 g/s, ug/m3
C1 - Combined 1-hr Impact from Q1, Q2, & Q3, ug/m3
C2 - Combined 1-hr Impact from Q1, Q2, & Q4, ug/m3

Notes: 1. Only one of the air strippers will be operat at any give time
2. N/A = not available
3. * = interim SGC derived by TLV/4.2

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DUPONT NIAGARA GILL CREEK PROJECT

CONCENTRATIONS IN AIR CONSIDERING INPUTS
FROM THE EXISTING GROUNDWATER RECOVERY SYSTEM
AND THE PROPOSED GILL CREEK PROJECT SOURCES
EAST OF GILL CREEK PROJECT

Concentration East of Gill Creek at 500 Meters

Chemical Compound	Toxicity Table	SGC (ug/m3)	Odor Threshold (ug/m3)	Conc. w/ emissions at 1 g/s C/Q1 (ug/m3)	C/Q2 (ug/m3)	C/Q3 (ug/m3)	C/Q4 (ug/m3)	Comb. 1-hr Impact C1 (ug/m3)	C2 (ug/m3)
Vinyl Chloride	hi	1300	26000	77.81	506.20	220.40	318.30	21.259	15.786
1,1 Dichloroethene	mod	190000	5500000	77.81	506.20	220.40	318.30	1.036	0.732
Dichloromethane	mod	41000	4000	77.81	506.20	220.40	318.30	19.693	14.719
Chloroform	mod	980	20000	77.81	506.20	220.40	318.30	8.823	7.191
1,1,1 Trichloroethane	lo	450000	70000	77.81	506.20	220.40	318.30	2.050	1.464
Carbon Tetrachloride	hi	1300	10000	77.81	506.20	220.40	318.30	0.948	0.668
Trichloroethylene	mod	33000	2000	77.81	506.20	220.40	318.30	157.617	113.997
Tetrachloroethylene	mod	81000	480000	77.81	506.20	220.40	318.30	50.193	36.262
1,1,2,2 Tetrachloroethane	mod	1600	20000	77.81	506.20	220.40	318.30	28.790	26.170
Chlorobenzene	mod	11000	600	77.81	506.20	220.40	318.30	13.601	9.941
Hexachloroethane	N/A	* 2310	150	77.81	506.20	220.40	318.30	0.771	0.541
1,4 Dichlorobenzene	mod	30000	90000	77.81	506.20	220.40	318.30	2.601	1.910
1,2 Dichlorobenzene	mod	30000	120	77.81	506.20	220.40	318.30	3.659	2.737
Hexachlorobutadiene	mod	50	N/A	77.81	506.20	220.40	318.30	2.473	1.782
Benzene	hi	30	516	77.81	506.20	220.40	318.30	3.585	5.151
1,2 Dichloroethylene	mod	190000	30000	77.81	506.20	220.40	318.30	40.528	29.956
Hexachlorobenzene	hi	* 6	N/A	77.81	506.20	220.40	318.30	0.110	0.064
1,3 Dichlorobenzene	mod	30000	1100	77.81	506.20	220.40	318.30	1.168	0.859
1,2,4 Trichlorobenzene	hi	3700	10400	77.81	506.20	209.80	289.20	5.329	3.875
2 Methyl furan	hi	34	N/A	77.81	506.20	209.80	289.20	4.483	4.483

SGC - Short-Term Guideline Concentrations, ug/m3

Q1 - Steam Stripper Emission Rate, g/s
Q2 - Equalization Tank Emission Rate, g/s
Q3 - 84" Air Stripper Emission Rate, g/s
Q4 - 54" Air Stripper Emission Rate, g/s

C/Q - Concentration calculated using SCREEN with emission rate equal to 1 g/s, ug/m3
C1 - Combined 1-hr Impact from Q1, Q2, & Q3, ug/m3
C2 - Combined 1-hr Impact from Q1, Q2, & Q4, ug/m3

Notes: 1. Only one of the air strippers will be operat at any give time
2. N/A = not available
3. * = interim SGC derived by TLV/4.2

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DUPO. NIAGARA GILL CREEK PROJECT

CONCENTRATIONS IN AIR CONSIDERING INPUTS
FROM THE EXISTING GROUNDWATER RECOVERY SYSTEM
AND THE PROPOSED GILL CREEK PROJECT SOURCES
EAST OF GILL CREEK PROJECT

Concentration East of Gill Creek at 600 Meters

Chemical Compound	Toxicity Table	SGC (ug/m3)	Odor Threshold (ug/m3)	Conc. w/ emissions at 1 g/s C/Q1 (ug/m3)	C/Q2 (ug/m3)	C/Q3 (ug/m3)	C/Q4 (ug/m3)	Comb. 1-hr Impact C1 (ug/m3)	C2 (ug/m3)
Vinyl Chloride	hi	1300	26000	70.60	448.10	220.20	296.70	21.088	14.672
1,1 Dichloroethene	mod	190000	5500000	70.60	448.10	220.20	296.70	1.035	0.682
Dichloromethane	mod	41000	4000	70.60	448.10	220.20	296.70	19.536	13.682
Chloroform	mod	980	20000	70.60	448.10	220.20	296.70	8.543	6.625
1,1,1 Trichloroethane	lo	450000	70000	70.60	448.10	220.20	296.70	2.048	1.365
Carbon Tetrachloride	hi	1300	10000	70.60	448.10	220.20	296.70	0.947	0.623
Trichloroethylene	mod	33000	2000	70.60	448.10	220.20	296.70	157.373	106.228
Tetrachloroethylene	mod	81000	480000	70.60	448.10	220.20	296.70	50.115	33.789
1,1,2,2 Tetrachloroethane	mod	1600	20000	70.60	448.10	220.20	296.70	28.764	24.394
Chlorobenzene	mod	11000	600	70.60	448.10	220.20	296.70	13.566	9.257
Hexachloroethane	N/A *	2310	150	70.60	448.10	220.20	296.70	0.771	0.504
1,4 Dichlorobenzene	mod	30000	90000	70.60	448.10	220.20	296.70	2.598	1.780
1,2 Dichlorobenzene	mod	30000	120	70.60	448.10	220.20	296.70	3.655	2.552
Hexachlorobutadiene	mod	50	N/A	70.60	448.10	220.20	296.70	2.471	1.662
Benzene	hi	30	516	70.60	448.10	220.20	296.70	3.576	4.800
1,2 Dichloroethylene	mod	190000	30000	70.60	448.10	220.20	296.70	40.259	27.857
Hexachlorobenzene	hi *	6	N/A	70.60	448.10	220.20	296.70	0.110	0.059
1,3 Dichlorobenzene	mod	30000	1100	70.60	448.10	220.20	296.70	1.167	0.801
1,2,4 Trichlorobenzene	hi	3700	10400	70.60	448.10	206.80	275.40	5.253	3.690
2 Methyl furan	hi	34	N/A	70.60	448.10	206.80	275.40	4.059	4.059

SGC - Short-Term Guideline Concentrations, ug/m3

Q1 - Steam Stripper Emission Rate, g/s
Q2 - Equalization Tank Emission Rate, g/s
Q3 - 84" Air Stripper Emission Rate, g/s
Q4 - 54" Air Stripper Emission Rate, g/s

C/Q - Concentration calculated using SCREEN
with emission rate equal to 1 g/s, ug/m3
C1 - Combined 1-hr Impact from Q1, Q2, & Q3, ug/m3
C2 - Combined 1-hr Impact from Q1, Q2, & Q4, ug/m3

Notes: 1. Only one of the air strippers will be operat
at any give time
2. N/A = not available
3. * = interim SGC derived by TLV / 2

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DUPONT NIAGARA GILL CREEK PROJECT

CONCENTRATIONS IN AIR CONSIDERING INPUTS
FROM THE EXISTING GROUNDWATER RECOVERY SYSTEM
AND THE PROPOSED GILL CREEK PROJECT SOURCES
EAST OF GILL CREEK PROJECT

Concentration East of Gill Creek at 700 Meters

Chemical Compound	Toxicity Table	SGC (ug/m3)	Odor Threshold (ug/m3)	Conc. w/ emissions at 1 g/s C/Q1 (ug/m3)	C/Q2 (ug/m3)	C/Q3 (ug/m3)	C/Q4 (ug/m3)	Comb. 1-hr Impact C1 (ug/m3)	C2 (ug/m3)
Vinyl Chloride	hi	1300	26000	64.70	400.20	209.30	301.40	19.992	14.755
1,1 Dichloroethene	mod	190000	5500000	64.70	400.20	209.30	301.40	0.984	0.693
Dichloromethane	mod	41000	4000	64.70	400.20	209.30	301.40	18.521	13.762
Chloroform	mod	980	20000	64.70	400.20	209.30	301.40	8.024	6.463
1,1,1 Trichloroethane	lo	450000	70000	64.70	400.20	209.30	301.40	1.946	1.386
Carbon Tetrachloride	hi	1300	10000	64.70	400.20	209.30	301.40	0.900	0.623
Trichloroethylene	mod	33000	2000	64.70	400.20	209.30	301.40	149.545	107.813
Tetrachloroethylene	mod	81000	480000	64.70	400.20	209.30	301.40	47.620	34.293
1,1,2,2 Tetrachloroethane	mod	1600	20000	64.70	400.20	209.30	301.40	27.339	24.780
Chlorobenzene	mod	11000	600	64.70	400.20	209.30	301.40	12.885	9.382
Hexachloroethane	N/A	* 2310	150	64.70	400.20	209.30	301.40	0.733	0.512
1,4 Dichlorobenzene	mod	30000	90000	64.70	400.20	209.30	301.40	2.470	1.808
1,2 Dichlorobenzene	mod	30000	120	64.70	400.20	209.30	301.40	3.474	2.592
Hexachlorobutadiene	mod	50	N/A	64.70	400.20	209.30	301.40	2.348	1.688
Benzene	hi	30	516	64.70	400.20	209.30	301.40	3.397	4.871
1,2 Dichloroethylene	mod	190000	30000	64.70	400.20	209.30	301.40	38.185	28.071
Hexachlorobenzene	hi	* 6	N/A	64.70	400.20	209.30	301.40	0.105	0.060
1,3 Dichlorobenzene	mod	30000	1100	64.70	400.20	209.30	301.40	1.109	0.814
1,2,4 Trichlorobenzene	hi	3700	10400	64.70	400.20	200.20	259.50	5.085	3.477
2 Methyl furan	hi	34	N/A	64.70	400.20	200.20	259.50	3.712	3.712

SGC - Short-Term Guideline Concentrations, ug/m3

Q1 - Steam Stripper Emission Rate, g/s
Q2 - Equalization Tank Emission Rate, g/s
Q3 - 84" Air Stripper Emission Rate, g/s
Q4 - 54" Air Stripper Emission Rate, g/s

C/Q - Concentration calculated using SCREEN
with emission rate equal to 1 g/s, ug/m3
C1 - Combined 1-hr Impact from Q1, Q2, & Q3, ug/m3
C2 - Combined 1-hr Impact from Q1, Q2, & Q4, ug/m3

Notes: 1. Only one of the air strippers will be operat
at any give time
2. N/A = not available
3. * = interim SGC derived by TLV/4.2

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DUPONT NIAGARA GILL CREEK PROJECT

CONCENTRATIONS IN AIR CONSIDERING INPUTS
FROM THE EXISTING GROUNDWATER RECOVERY SYSTEM
AND THE PROPOSED GILL CREEK PROJECT SOURCES
EAST OF GILL CREEK PROJECT

Concentration East of Gill Creek at 800 Meters

Chemical Compound	Toxicity Table	SGC (ug/m3)	Odor Threshold (ug/m3)	Conc. w/ emissions at 1 g/s C/Q1 (ug/m3)	C/Q2 (ug/m3)	C/Q3 (ug/m3)	C/Q4 (ug/m3)	Comb. 1-hr Impact C1 (ug/m3)	C2 (ug/m3)
Vinyl Chloride	hi	1300	26000	60.95	360.10	208.20	299.20	19.812	14.575
1,1 Dichloroethene	mod	190000	5500000	60.95	360.10	208.20	299.20	0.979	0.688
Dichloromethane	mod	41000	4000	60.95	360.10	208.20	299.20	18.356	13.596
Chloroform	mod	980	20000	60.95	360.10	208.20	299.20	7.845	6.284
1,1,1 Trichloroethane	lo	450000	70000	60.95	360.10	208.20	299.20	1.936	1.376
Carbon Tetrachloride	hi	1300	10000	60.95	360.10	208.20	299.20	0.895	0.628
Trichloroethylene	mod	33000	2000	60.95	360.10	208.20	299.20	148.703	106.972
Tetrachloroethylene	mod	81000	480000	60.95	360.10	208.20	299.20	47.349	34.022
1,1,2,2 Tetrachloroethane	mod	1600	20000	60.95	360.10	208.20	299.20	27.195	24.599
Chlorobenzene	mod	11000	600	60.95	360.10	208.20	299.20	12.802	9.299
Hexachloroethane	N/A *	2310	150	60.95	360.10	208.20	299.20	0.729	0.509
1,4 Dichlorobenzene	mod	30000	90000	60.95	360.10	208.20	299.20	2.457	1.795
1,2 Dichlorobenzene	mod	30000	120	60.95	360.10	208.20	299.20	3.456	2.573
Hexachlorobutadiene	mod	50	N/A	60.95	360.10	208.20	299.20	2.336	1.676
Benzene	hi	30	516	60.95	360.10	208.20	299.20	3.376	4.832
1,2 Dichloroethylene	mod	190000	30000	60.95	360.10	208.20	299.20	37.869	27.755
Hexachlorobenzene	hi *	6	N/A	60.95	360.10	208.20	299.20	0.104	0.060
1,3 Dichlorobenzene	mbd	30000	1100	60.95	360.10	208.20	299.20	1.103	0.808
1,2,4 Trichlorobenzene	hi	3700	10400	60.95	360.10	192.40	243.70	4.887	3.266
2 Methyl furan	hi	34	N/A	60.95	360.10	192.40	243.70	3.484	3.484

SGC - Short-Term Guideline Concentrations, ug/m3

Q1 - Steam Stripper Emission Rate, g/s
Q2 - Equalization Tank Emission Rate, g/s
Q3 - 84" Air Stripper Emission Rate, g/s
Q4 - 54" Air Stripper Emission Rate, g/s

C/Q - Concentration calculated using SCREEN
with emission rate equal to 1 g/s, ug/m3
C1 - Combined 1-hr Impact from Q1, Q2, & Q3, ug/m3
C2 - Combined 1-hr Impact from Q1, Q2, & Q4, ug/m3

Notes: 1. Only one of the air strippers will be operat
at any give time
2. N/A = not available
3. * = interim SGC derived by TLV 4.2

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DUPONT NIAGARA GILL CREEK PROJECT

CONCENTRATIONS IN AIR CONSIDERING INPUTS
FROM THE EXISTING GROUNDWATER RECOVERY SYSTEM
AND THE PROPOSED GILL CREEK PROJECT SOURCES
EAST OF GILL CREEK PROJECT

Concentration East of Gill Creek at 900 Meters

Chemical Compound	Toxicity Table	SGC (ug/m3)	Odor Threshold (ug/m3)	Conc. w/ emissions at 1 g/s C/Q1 (ug/m3)	C/Q2 (ug/m3)	C/Q3 (ug/m3)	C/Q4 (ug/m3)	Comb. 1-hr Impact C1 (ug/m3)	C2 (ug/m3)
Vinyl Chloride	hi	1300	26000	57.45	326.30	209.80	289.20	19.878	14.055
1,1 Dichloroethene	mod	190000	5500000	57.45	326.30	209.80	289.20	0.986	0.665
Dichloromethane	mod	41000	4000	57.45	326.30	209.80	289.20	18.419	13.112
Chloroform	mod	980	20000	57.45	326.30	209.80	289.20	7.751	6.011
1,1,1 Trichloroethane	lo	450000	70000	57.45	326.30	209.80	289.20	1.951	1.330
Carbon Tetrachloride	hi	1300	10000	57.45	326.30	209.80	289.20	0.902	0.607
Trichloroethylene	mod	33000	2000	57.45	326.30	209.80	289.20	149.787	103.369
Tetrachloroethylene	mod	81000	480000	57.45	326.30	209.80	289.20	47.692	32.873
1,1,2,2 Tetrachloroethane	mod	1600	20000	57.45	326.30	209.80	289.20	27.404	23.776
Chlorobenzene	mod	11000	600	57.45	326.30	209.80	289.20	12.886	8.980
Hexachloroethane	N/A *	2310	150	57.45	326.30	209.80	289.20	0.734	0.492
1,4 Dichlorobenzene	mod	30000	90000	57.45	326.30	209.80	289.20	2.476	1.735
1,2 Dichlorobenzene	mod	30000	120	57.45	326.30	209.80	289.20	3.483	2.487
Hexachlorobutadiene	mod	50	N/A	57.45	326.30	209.80	289.20	2.354	1.620
Benzene	hi	30	516	57.45	326.30	209.80	289.20	3.399	4.670
1,2 Dichloroethylene	mod	190000	30000	57.45	326.30	209.80	289.20	38.030	26.776
Hexachlorobenzene	hi *	6	N/A	57.45	326.30	209.80	289.20	0.105	0.058
1,3 Dichlorobenzene	mod	30000	1100	57.45	326.30	209.80	289.20	1.112	0.781
1,2,4 Trichlorobenzene	hi	3700	10400	57.45	326.30	184.00	228.60	4.674	3.063
2 Methyl furan	hi	34	N/A	57.45	326.30	184.00	228.60	3.274	3.274

SGC - Short-Term Guideline Concentrations, ug/m3

Q1 - Steam Stripper Emission Rate, g/s
Q2 - Equalization Tank Emission Rate, g/s
Q3 - 84" Air Stripper Emission Rate, g/s
Q4 - 54" Air Stripper Emission Rate, g/s

C/Q - Concentration calculated using SCREEN with emission rate equal to 1 g/s, ug/m3
C1 - Combined 1-hr Impact from Q1, Q2, & Q3, ug/m3
C2 - Combined 1-hr Impact from Q1, Q2, & Q4, ug/m3

Notes: 1. Only one of the air strippers will be operat at any give time
2. N/A = not available
3. * = interim SGC derived by TLV/4.2

file gillcrk-east.wk1

DUPONT NIAGARA GILL CREEK PROJECT

CONCENTRATIONS IN AIR CONSIDERING INPUTS
FROM THE EXISTING GROUNDWATER RECOVERY SYSTEM
AND THE PROPOSED GILL CREEK PROJECT SOURCES
EAST OF GILL CREEK PROJECT

Concentration East of Gill Creek at 1000 Meters

Chemical Compound	Toxicity Table	SGC (ug/m3)	Odor Threshold (ug/m3)	Conc. w/ emissions at 1 g/s C/Q1 (ug/m3)	C/Q2 (ug/m3)	C/Q3 (ug/m3)	C/Q4 (ug/m3)	Comb. 1-hr Impact C1 (ug/m3)	C2 (ug/m3)
Vinyl Chloride	hi	1300	26000	54.19	297.40	206.80	275.40	19.541	13.371
1,1 Dichloroethene	mod	190000	5500000	54.19	297.40	206.80	275.40	0.972	0.633
Dichloromethane	mod	41000	4000	54.19	297.40	206.80	275.40	18.108	12.476
Chloroform	mod	980	20000	54.19	297.40	206.80	275.40	7.544	5.699
1,1,1 Trichloroethane	lo	450000	70000	54.19	297.40	206.80	275.40	1.923	1.267
Carbon Tetrachloride	hi	1300	10000	54.19	297.40	206.80	275.40	0.889	0.578
Trichloroethylene	mod	33000	2000	54.19	297.40	206.80	275.40	147.607	98.422
Tetrachloroethylene	mod	81000	480000	54.19	297.40	206.80	275.40	46.997	31.297
1,1,2,2 Tetrachloroethane	mod	1600	20000	54.19	297.40	206.80	275.40	27.012	22.642
Chlorobenzene	mod	11000	600	54.19	297.40	206.80	275.40	12.693	8.546
Hexachloroethane	N/A *	2310	150	54.19	297.40	206.80	275.40	0.724	0.468
1,4 Dichlorobenzene	mod	30000	90000	54.19	297.40	206.80	275.40	2.440	1.652
1,2 Dichlorobenzene	mod	30000	120	54.19	297.40	206.80	275.40	3.433	2.368
Hexachlorobutadiene	mod	50	N/A	54.19	297.40	206.80	275.40	2.320	1.542
Benzene	hi	30	516	54.19	297.40	206.80	275.40	3.349	4.446
1,2 Dichloroethylene	mod	190000	30000	54.19	297.40	206.80	275.40	37.405	25.478
Hexachlorobenzene	hi *	6	N/A	54.19	297.40	206.80	275.40	0.103	0.055
1,3 Dichlorobenzene	mod	30000	1100	54.19	297.40	206.80	275.40	1.096	0.744
1,2,4 Trichlorobenzene	hi	3700	10400	54.19	297.40	175.50	214.30	4.458	2.872
2 Methyl furan	hi	34	N/A	54.19	297.40	175.50	214.30	3.081	3.081

SGC - Short-Term Guideline Concentrations, ug/m3

Q1 - Steam Stripper Emission Rate, g/s
Q2 - Equalization Tank Emission Rate, g/s
Q3 - 84" Air Stripper Emission Rate, g/s
Q4 - 54" Air Stripper Emission Rate, g/s

C/Q - Concentration calculated using SCREEN
with emission rate equal to 1 g/s, ug/m3
C1 - Combined 1-hr Impact from Q1, Q2, & Q3, ug/m3
C2 - Combined 1-hr Impact from Q1, Q2, & Q4, ug/m3

Notes: 1. Only one of the air strippers will be operat
at any give time
2. N/A = not available
3. * = interim SGC derived by TLV 4.2

file: gillcrk-east v20

DUPONT NIAGARA GILL CREEK PROJECT

CONCENTRATIONS IN AIR CONSIDERING INPUTS
FROM THE EXISTING GROUNDWATER RECOVERY SYSTEM
AND THE PROPOSED GILL CREEK PROJECT SOURCES
EAST OF GILL CREEK PROJECT

Concentration East of Gill Creek at 1100 Meters

Chemical Compound	Toxicity Table	SGC (ug/m3)	Odor Threshold (ug/m3)	Conc. w/ emissions at 1 g/s C/Q1 (ug/m3)	C/Q2 (ug/m3)	C/Q3 (ug/m3)	C/Q4 (ug/m3)	Comb. 1-hr Impact C1 (ug/m3)	C2 (ug/m3)
Vinyl Chloride	hi	1300	26000	51.18	272.50	200.20	259.50	18.889	12.599
1,1 Dichloroethene	mod	190000	5500000	51.18	272.50	200.20	259.50	0.941	0.597
Dichloromethane	mod	41000	4000	51.18	272.50	200.20	259.50	17.504	11.757
Chloroform	mod	980	20000	51.18	272.50	200.20	259.50	7.251	5.369
1,1,1 Trichloroethane	lo	450000	70000	51.18	272.50	200.20	259.50	1.862	1.194
Carbon Tetrachloride	hi	1300	10000	51.18	272.50	200.20	259.50	0.861	0.545
Trichloroethylene	mod	33000	2000	51.18	272.50	200.20	259.50	142.874	92.735
Tetrachloroethylene	mod	81000	480000	51.18	272.50	200.20	259.50	45.488	29.487
1,1,2,2 Tetrachloroethane	mod	1600	20000	51.18	272.50	200.20	259.50	26.150	21.334
Chlorobenzene	mod	11000	600	51.18	272.50	200.20	259.50	12.282	8.050
Hexachloroethane	N/A	* 2310	150	51.18	272.50	200.20	259.50	0.701	0.441
1,4 Dichlorobenzene	mod	30000	90000	51.18	272.50	200.20	259.50	2.362	1.557
1,2 Dichlorobenzene	mod	30000	120	51.18	272.50	200.20	259.50	3.323	2.232
Hexachlorobutadiene	mod	50	N/A	51.18	272.50	200.20	259.50	2.246	1.453
Benzene	hi	30	516	51.18	272.50	200.20	259.50	3.241	4.189
1,2 Dichloroethylene	mod	190000	30000	51.18	272.50	200.20	259.50	36.167	24.008
Hexachlorobenzene	hi	* 6	N/A	51.18	272.50	200.20	259.50	0.100	0.052
1,3 Dichlorobenzene	mod	30000	1100	51.18	272.50	200.20	259.50	1.061	0.701
1,2,4 Trichlorobenzene	hi	3700	10400	51.18	272.50	167.20	201.10	4.247	2.695
2 Methyl furan	hi	34	N/A	51.18	272.50	167.20	201.10	2.903	2.903

SGC - Short-Term Guideline Concentrations, ug/m3

Q1 - Steam Stripper Emission Rate, g/s
Q2 - Equalization Tank Emission Rate, g/s
Q3 - 84" Air Stripper Emission Rate, g/s
Q4 - 54" Air Stripper Emission Rate, g/s

C Q - Concentration calculated using SCREEN
with emission rate equal to 1 g/s, ug/m3
C1 - Combined 1-hr Impact from Q1, Q2, & Q3, ug/m3
C2 - Combined 1-hr Impact from Q1, Q2, & Q4, ug/m3

Notes: 1. Only one of the air strippers will be operat
at any give time
2. N/A = not available
3. * = interim SGC derived by TLV 4.2

file: gillcrk-east w20

NEW YORK STATE
DEPARTMENT OF ENVIRONMENTAL CONSERVATION

PROCESS EXHAUST OR VENTILATION SYSTEM

APPLICATION FOR PERMIT TO CONSTRUCT OR CERTIFICATE TO OPERATE

WHITE ORIGINAL / GREEN DIVISION OF AIR / WHITE REGIONAL OFFICE / WHITE FIELD REP / YELLOW APPLICANT

LOCATION | FACILITY | EMISSION POINT

A ADD / C CHANGE / E DELETE — READ INSTRUCTIONS CONTAINED IN FORM 76-11-12 BEFORE ANSWERING ANY QUESTION

1 NAME OF OWNER / FIRM: E. I. du Pont de Nemours and Company
NUMBER AND STREET ADDRESS: 1007 Market Street
3 CITY / TOWN / VILLAGE: Wilmington | 4 STATE: DE | 5 ZIP: 19898
6 OWNER CLASSIFICATION: A COMMERCIAL, B INDUSTRIAL [X], C UTILITY, D FEDERAL, E STATE, F MUNICIPAL, G EXECUTIVE INST., H HOSPITAL, I RESIDENTIAL, J OTHER
NAME & TITLE OF OWNER'S REPRESENTATIVE: Richard Gentilucci, Manager Environmental Affairs | 8 TELEPHONE: (716) 278-5162

9 NAME OF AUTHORIZED AGENT: | 10 TELEPHONE:
11 NUMBER AND STREET ADDRESS:
12 CITY / TOWN / VILLAGE: | 13 STATE: | 14 ZIP:
15 NAME OF P.E. OR ARCHITECT PREPARING APPLICATION: W. L. Quon | 16 N.Y.S. P.E. OR ARCHITECT LICENSE NO: 063343 | 17 TELEPHONE: (716) 278-5504
18 SIGNATURE OF OWNER'S REPRESENTATIVE OR AGENT WHEN APPLYING FOR A PERMIT TO CONSTRUCT:

19 FACILITY NAME (IF DIFFERENT FROM OWNER / FIRM):
20 FACILITY LOCATION (NUMBER AND STREET ADDRESS): Buffalo Avenue and 26th Street
21 CITY / TOWN / VILLAGE: Niagara Falls | 22 ZIP: 14302
23 BUILDING NAME OR NUMBER: Gill Creek Remediation | 24 FLOOR NAME OR NUMBER: Ground
25 START UP DATE: 8 / 92 (MO / YR) | 26 DRAWING NUMBERS OF PLANS SUBMITTED: EE-40-5337
27 PERMIT TO CONSTRUCT: A [X] NEW SOURCE, B [ ] MODIFICATION
28 CERTIFICATE TO OPERATE: A [ ] NEW SOURCE, B [ ] MODIFICATION, C [ ] EXISTING SOURCE

29 EMISSION POINT ID	30 GROUND ELEVATION (FT)	31 HEIGHT ABOVE STRUCTURE (FT)	32 STACK HEIGHT (FT)	33 INSIDE DIMENSIONS (IN)	34 EXIT TEMP (°F)	35 EXIT VELOCITY (FT/SEC)	36 EXIT FLOW RATE (ACFM)	37 SOURCE CODE	38 HRS/DAY	39 DAYS/YR	40 % OPERATION BY SEASON Winter	Spring	Summer	Fall
GILL1	568	3	40	30	68	6.9	414		24	120	10		30	60

DESCRIBE PROCESS OR UNIT:
This is a temporary air emission source. It is an 84-inch diameter air stripper (packed tower). The project is the remediation of the Gill Creek sediments. The two air strippers will run alternately, depending on the water flow rate.

EMISSION CONTROL EQUIPMENT ID	CONTROL TYPE	MANUFACTURER'S NAME AND MODEL NUMBER	DISPOSAL METHOD	DATE INSTALLED MONTH / YEAR	USEFUL LIFE
42	43 99	44	45	46 /	47
48	49	50	51	52 /	53

CALCULATIONS

See attached

CONTAMINANT NAME	CAS NUMBER	INPUT OR PRODUCTION	UNIT	ENV RATING	EMISSIONS ACTUAL	UNIT	HOW DET	PERMISSIBLE	% CONTROL EFFIC'CY	HOURLY EMISSIONS (LBS/HR) ERP	HOURLY ACTUAL	ANNUAL EMISSIONS (LBS/YR) ACTUAL	10ⁿ	PERMISSIBLE
Vinyl chloride	75-01-4				0.707	1	6		0	0.707	0.707	2.038	3	
1,1-Dichloroethene	75-35-4				0.037	1	6		0	0.037	0.037	1.064	2	
Dichloromethane	75-09-2				0.655	1	6		0	0.655	0.655	1.887	3	
Chloroform	67-66-3				0.214	1	6		0	0.214	0.214	6.159	2	
1,1,1-Trichloroethane	71-55-6				0.074	1	6		0	0.074	0.074	2.126	2	
CONTINUED . . .	- -													

SOLID FUEL TYPE	TONS/YR	% S	LIQUID FUEL TYPE	THOUSANDS OF GALLONS/YR	% S	GAS TYPE	THOUSANDS OF CF/YR	BTU/CF	APPLICABLE RULE	APPLICABLE RULE
144	145	146	147	148	149	150	151	152	153	154

Upon completion of construction sign the statement below and forward to the appropriate field representative.
THE PROCESS EXHAUST OR VENTILATION SYSTEM HAS BEEN CONSTRUCTED AND WILL BE OPERATED IN ACCORDANCE WITH STATED SPECIFICATIONS AND IN CONFORMANCE WITH ALL PROVISIONS OF EXISTING REGULATIONS.
155 SIGNATURE OF AUTHORIZED REPRESENTATIVE OR AGENT | DATE

156 LOCATION CODE | 157 FACILITY ID NO | 158 U.T.M. (E) | 159 U.T.M. (N) | 160 SIC NUMBER | 161 DATE APPL. RECEIVED / / | 162 DATE APPL. REVIEWED / / | 163 REVIEWED BY

PERMIT TO CONSTRUCT

164 DATE ISSUED / / | 165 EXPIRATION DATE / / | 166 SIGNATURE OF APPROVAL | 167 FEE

168
1 DEVIATION FROM APPROVED APPLICATION SHALL VOID THIS PERMIT
2 THIS IS NOT A CERTIFICATE TO OPERATE
3 TESTS AND/OR ADDITIONAL EMISSION CONTROL EQUIPMENT MAY BE REQUIRED PRIOR TO THE ISSUANCE OF A CERTIFICATE TO OPERATE

CERTIFICATE TO OPERATE

169 DATE ISSUED / / | 170 EXPIRATION DATE / / | 171 SIGNATURE OF APPROVAL | 172 FEE

173
1 [ ] INSPECTED BY ____ DATE ____
2 [ ] INSPECTION DISCLOSED DIFFERENCES AS BUILT VS PERMIT, CHANGES INDICATED ON FORM
3 [ ] ISSUE CERTIFICATE TO OPERATE FOR SOURCE AS BUILT
4 [ ] APPLICATION FOR C.O. DENIED ____ DATE ____ INITIALED

AGENCY USE ONLY

174 SPECIAL CONDITIONS
1
2
3
4
5
6

NEW YORK STATE
DEPARTMENT OF ENVIRONMENTAL CONSERVATION

WHITE – ORIGINAL
GREEN – DIVISION OF AIR
WHITE – REGIONAL OFFICE
WHITE – FIELD REP
YELLOW – APPLICANT

LOCATION | FACILITY | EMISSION POINT

A ADD
C CHANGE
D DELETE

READ INSTRUCTIONS CONTAINED IN FORM 76-1-12 BEFORE ANSWERING ANY QUESTION

PROCESS EXHAUST OR VENTILATION SYSTEM

APPLICATION FOR PERMIT TO CONSTRUCT OR CERTIFICATE TO OPERATE

SECTION A

1 NAME OF OWNER / FIRM
2 NUMBER AND STREET ADDRESS
3 CITY TOWN VILLAGE | 4 STATE | 5 ZIP
6 OWNER CLASSIFICATION: A COMMERCIAL, B INDUSTRIAL, C UTILITY, D FEDERAL, E STATE, F MUNICIPAL, G EDUCATIONAL / INSTITUTIONAL, H HOSPITAL, I RESIDENTIAL, J OTHER
7 NAME & TITLE OF OWNERS REPRESENTATIVE | 8 TELEPHONE
9 NAME OF AUTHORIZED AGENT | 10 TELEPHONE
11 NUMBER AND STREET ADDRESS
12 CITY TOWN VILLAGE | 13 STATE | 14 ZIP
15 NAME OF P.E. OR ARCHITECT PREPARING APPLICATION | 16 N.Y.S. P.E. OR ARCHITECT LICENSE NO | 17 TELEPHONE
18 SIGNATURE OF OWNERS REPRESENTATIVE OR AGENT WHEN APPLYING FOR A PERMIT TO CONSTRUCT
19 FACILITY NAME (IF DIFFERENT FROM OWNER / FIRM)
20 FACILITY LOCATION (NUMBER AND STREET ADDRESS)
21 CITY TOWN VILLAGE | 22 ZIP
23 BUILDING NAME OR NUMBER | 24 FLOOR NAME OR NUMBER
25 START UP DATE MO / YR | 26 DRAWING NUMBERS OF PLANS SUBMITTED
27 PERMIT TO CONSTRUCT: A NEW SOURCE, B MODIFICATION
28 CERTIFICATE TO OPERATE: A NEW SOURCE, B MODIFICATION, C EXISTING SOURCE

SECTION B

29 EMISSION POINT ID	30 GROUND ELEVATION (FT)	31 HEIGHT ABOVE STRUCT (FT)	32 STACK HEIGHT (FT)	33 INSIDE DIMENSIONS (IN)	34 EXIT TEMP (°F)	35 EXIT VELOCITY (FT/SEC)	36 EXIT FLOW RATE (ACFM)	37 SOURCE CODE	38 HRS / DAY	39 DAYS / YR	40 % OPERATION BY SEASON Winter Spring Summer Fall
G I L L 1											

SECTION C

DESCRIBE PROCESS OR UNIT: 1 / 2 / 3 / 4 / 5 / 6 / 7 / 8

SECTION D

EMISSION CONTROL EQUIPMENT ID	CONTROL TYPE		MANUFACTURER'S NAME AND MODEL NUMBER	DISPOSAL METHOD	DATE INSTALLED MONTH / YEAR	USEFUL LIFE
42	43	44		45	46 /	47
48	49	50		51	52 /	53

SECTION E

CALCULATIONS

SECTION F

CONTAMINANT NAME	CAS NUMBER	INPUT OR PRODUCTION	UNIT	ENV. RATING	EMISSIONS ACTUAL	UNIT	HOW DET.	PERMISSIBLE	% CONTROL EFFIC'CY	HOURLY EMISSIONS (LBS/HR) ERP	HOURLY EMISSIONS (LBS/HR) ACTUAL	ANNUAL EMISSIONS (LBS/YR) ACTUAL	10^x	PERMISSIBLE
Carbon tetrachloride	56-23-5				0.034	1	6		0	0.034	0.034	97.77	0	
Trichioroethylene	79-01-6				5.64	1	6		0	5.64	5.64	16.24	3	
Tetrachloroethylene	127-18-4				1.797	1	6		0	1.797	1.797	5.175	3	
1,1,2,2-Tetrachloroethane	79-34-5				1.037	1	6		0	1.037	1.037	2.985	3	
Chlorobenzene	108 90-7				0.483	1	6		0	0.483	0.483	1.391	3	
CONTINUED . . .														

SECTION G

SOLID FUEL TYPE	TONS / YR	LIQUID FUEL TYPE	THOUSANDS OF GALLONS/YR	% S	GAS TYPE	THOUSANDS OF CF/YR	BTU/CF	APPLICABLE RULE	APPLICABLE RULE
144	145	147	148	149	150	151	152	153	154

Upon completion of construction sign the statement below and forward to the appropriate field representative.
THE PROCESS EXHAUST OR VENTILATION SYSTEM HAS BEEN CONSTRUCTED AND WILL BE OPERATED IN ACCORDANCE WITH STATED SPECIFICATIONS AND IN CONFORMANCE WITH ALL PROVISIONS OF EXISTING REGULATIONS.
155 SIGNATURE OF AUTHORIZED REPRESENTATIVE OR AGENT | DATE

AGENCY USE ONLY

156 LOCATION CODE | 157 FACILITY ID NO | 158 U T M (E) | 159 U T M (N) | 160 SIC NUMBER | 161 DATE APPL. RECEIVED | 162 DATE APPL. REVIEWED | 163 REVIEWED BY

PERMIT TO CONSTRUCT
164 DATE ISSUED | 165 EXPIRATION DATE | 166 SIGNATURE OF APPROVAL | 167 FEE

168
1 DEVIATION FROM APPROVED APPLICATION SHALL VOID THIS PERMIT
2 THIS IS NOT A CERTIFICATE TO OPERATE
3 TESTS AND/OR ADDITIONAL EMISSION CONTROL EQUIPMENT MAY BE REQUIRED PRIOR TO THE ISSUANCE OF A CERTIFICATE TO OPERATE

CERTIFICATE TO OPERATE
169 DATE ISSUED | 170 EXPIRATION DATE | 171 SIGNATURE OF APPROVAL | 172 FEE

173
1 INSPECTED BY ______ DATE ______
2 INSPECTION DISCLOSED DIFFERENCES AS BUILT VS PERMIT CHANGES INDICATED ON FORM
3 ISSUE CERTIFICATE TO OPERATE FOR SOURCE AS BUILT
4 APPLICATION FOR C.O. DENIED ______ DATE ______ INITIALED

174 SPECIAL CONDITIONS
1 / 2 / 3 / 4 / 5 / 6 / 7 / 8

NEW YORK STATE
DEPARTMENT OF ENVIRONMENTAL CONSERVATION

COPIES: WHITE – ORIGINAL; GREEN – DIVISON OF AIR; WHITE – REGIONAL OFFICE; WHITE – FIELD REP; YELLOW – APPLICANT

LOCATION | FACILITY | EMISSION POINT

ADD / CHANGE / DELETE — READ INSTRUCTIONS CONTAINED IN FORM 76-11-12 BEFORE ANSWERING ANY QUESTION

PROCESS, EXHAUST OR VENTILATION SYSTEM

APPLICATION FOR PERMIT TO CONSTRUCT OR CERTIFICATE TO OPERATE

1. NAME OF OWNER / FIRM
2. NUMBER AND STREET ADDRESS
3. CITY, TOWN, VILLAGE | 4. STATE | 5. ZIP
6. OWNER CLASSIFICATION: A COMMERCIAL; B INDUSTRIAL; C UTILITY; D FEDERAL; E STATE; F MUNICIPAL; G INTERSTATE; H HOSPITAL; I RESIDENTIAL; J OTHER
7. NAME & TITLE OF OWNERS REPRESENTATIVE | 8. TELEPHONE
9. NAME OF AUTHORIZED AGENT | 10. TELEPHONE
11. NUMBER AND STREET ADDRESS
12. CITY, TOWN, VILLAGE | 13. STATE | 14. ZIP
15. NAME OF P.E. OR ARCHITECT PREPARING APPLICATION | 16. N.Y.S. P.E. OR ARCHITECT LICENSE NO. | 17. TELEPHONE
18. SIGNATURE OF OWNERS REPRESENTATIVE OR AGENT WHEN APPLYING FOR A PERMIT TO CONSTRUCT
19. FACILITY NAME (IF DIFFERENT FROM OWNER / FIRM)
20. FACILITY LOCATION (NUMBER AND STREET ADDRESS)
21. CITY, TOWN, VILLAGE | 22. ZIP
23. BUILDING NAME OR NUMBER | 24. FLOOR NAME OR NUMBER
25. START UP DATE MO / YR | 26. DRAWING NUMBERS OF PLANS SUBMITTED
27. PERMIT TO CONSTRUCT: A NEW SOURCE; B MODIFICATION
28. CERTIFICATE TO OPERATE: A NEW SOURCE; B MODIFICATION; C EXISTING SOURCE

29. EMISSION POINT ID	30. GROUND ELEVATION (FT)	31. HEIGHT ABOVE STRUCT	32. STACK HEIGHT (FT)	33. INSIDE DIMENSIONS (IN)	34. EXIT TEMP (°F)	35. EXIT VELOCITY (FT/SEC)	36. EXIT FLOW RATE (ACFM)	37. SOURCE CODE	38. HRS / DAY	39. DAYS / YR	40. % OPERATION BY SEASON: Winter / Spring / Summer / Fall
G.1 L . L 1											

41. DESCRIBE PROCESS OR UNIT: 1 / 2 / 3 / 4 / 5 / 6 / 7 / 8

EMISSION CONTROL EQUIPMENT ID	CONTROL TYPE	MANUFACTURER'S NAME AND MODEL NUMBER	DISPOSAL METHOD	DATE INSTALLED MONTH / YEAR	USEFUL LIFE
42	43	44	45	46 /	47
48	49	50	51	52 /	53

CALCULATIONS

CONTAMINANT NAME	CAS NUMBER	INPUT OR PRODUCTION	UNIT	ENV. RATING	EMISSIONS ACTUAL	EMISSIONS UNIT	HOW DET.	PERMISSIBLE	% CONTROL EFFIC'CY	HOURLY EMISSIONS (LBS/HR) ERP	HOURLY EMISSIONS (LBS/HR) ACTUAL	ANNUAL EMISSIONS (LBS/YR) ACTUAL	10ⁿ	PERMISSIBLE
Hexachloroethane	67-72-1				0.028	1	6		0	0.028	0.028	7.947	1	
1,4-Dichlorobenzene	106-46-7				0.094	1	6		0	0.094	0.094	2.707	2	
1,2-Dichlorobenzene	95-50-1				0.132	1	6		0	0.132	0.132	3.80	2	
Benzene	71-43-2				0.127	1	6		0	0.127	0.127	365	0	
Hexachlorobutadiene	87-68-3				0.089	1	6		0	0.089	0.089	2.56	2	
CONTINUED . . .	- -													

SOLID FUEL TYPE	TONS / YR	% S	LIQUID FUEL TYPE	THOUSANDS OF GALLONS/YR	% S	GAS TYPE	THOUSANDS OF CF/YR	BTU/CF	APPLICABLE RULE	APPLICABLE RULE
144	145	146	147	148	149	150	151	152	153	154

Upon completion of construction sign the statement below and forward to the appropriate field representative
THE PROCESS, EXHAUST OR VENTILATION SYSTEM HAS BEEN CONSTRUCTED AND WILL BE OPERATED IN ACCORDANCE WITH STATED SPECIFICATIONS AND IN CONFORMANCE WITH ALL PROVISIONS OF EXISTING REGULATIONS
155. SIGNATURE OF AUTHORIZED REPRESENTATIVE OR AGENT | DATE

AGENCY USE ONLY

156. LOCATION CODE | 157. FACILITY ID NO. | 158. U.T.M. (E) | 159. U.T.M. (N) | 160. SIC NUMBER | 161. DATE APPL. RECEIVED | 162. DATE APPL. REVIEWED | 163. REVIEWED BY

PERMIT TO CONSTRUCT
164. DATE ISSUED | 165. EXPIRATION DATE | 166. SIGNATURE OF APPROVAL | 167. FEE
168
1. DEVIATION FROM APPROVED APPLICATION SHALL VOID THIS PERMIT
2. THIS IS NOT A CERTIFICATE TO OPERATE
3. TESTS AND/OR ADDITIONAL EMISSION CONTROL EQUIPMENT MAY BE REQUIRED PRIOR TO THE ISSUANCE OF A CERTIFICATE TO OPERATE

CERTIFICATE TO OPERATE
169. DATE ISSUED | 170. EXPIRATION DATE | 171. SIGNATURE OF APPROVAL | 172. FEE
173
1. INSPECTED BY ____ DATE ____
2. INSPECTION DISCLOSED DIFFERENCES AS BUILT VS. PERMIT. CHANGES INDICATED ON FORM
3. ISSUE CERTIFICATE TO OPERATE FOR SOURCE AS BUILT
4. APPLICATION FOR C.O. DENIED ____ DATE ____ INITIALED

174. SPECIAL CONDITIONS: 1 / 2 / 3 / 4 / 5 / 6 / 7 / 8

NEW YORK STATE
DEPARTMENT OF ENVIRONMENTAL CONSERVATION

PROCESS, EXHAUST OR VENTILATION SYSTEM

APPLICATION FOR PERMIT TO CONSTRUCT OR CERTIFICATE TO OPERATE

LOCATION | FACILITY | EMISSION POINT

A ADD / C CHANGE / D DELETE — READ INSTRUCTIONS CONTAINED IN FORM 76-11-2 BEFORE ANSWERING ANY QUESTION

WHITE ORIGINAL — GREEN DIVISION OF AIR — WHITE REGIONAL OFFICE

SECTION A

1 NAME OF OWNER / FIRM
2 NUMBER AND STREET ADDRESS
3 CITY TOWN VILLAGE | 4 STATE | 5 ZIP
6 OWNER CLASSIFICATION: A COMMERCIAL, B INDUSTRIAL, C UTILITY, D FEDERAL, E STATE, F MUNICIPAL, G EDUC. INST., H HOSPITAL, I RESIDENTIAL, J OTHER
7 NAME & TITLE OF OWNERS REPRESENTATIVE | 8 TELEPHONE
9 NAME OF AUTHORIZED AGENT | 10 TELEPHONE
11 NUMBER AND STREET ADDRESS
12 CITY TOWN VILLAGE | 13 STATE | 14 ZIP
15 NAME OF P.E. OR ARCHITECT PREPARING APPLICATION | 16 N.Y.S. P.E. OR ARCHITECT LICENSE NO | 17 TELEPHONE
18 SIGNATURE OF OWNERS REPRESENTATIVE OR AGENT WHEN APPLYING FOR A PERMIT TO CONSTRUCT
19 FACILITY NAME (IF DIFFERENT FROM OWNER / FIRM)
20 FACILITY LOCATION (NUMBER AND STREET ADDRESS)
21 CITY TOWN VILLAGE | 22 ZIP
23 BUILDING NAME OR NUMBER | 24 FLOOR NAME OR NUMBER
25 START UP DATE MO / YR | 26 DRAWING NUMBERS OF PLANS SUBMITTED
27 PERMIT TO CONSTRUCT: A NEW SOURCE, B MODIFICATION
28 CERTIFICATE TO OPERATE: A NEW SOURCE, B MODIFICATION, C EXISTING SOURCE

SECTION B

29 EMISSION POINT ID	30 GROUND ELEVATION (FT)	31 HEIGHT ABOVE STRUCTURES (FT)	32 STACK HEIGHT (FT)	33 INSIDE DIMENSIONS (IN)	34 EXIT TEMP (°F)	35 EXIT VELOCITY (FT/SEC)	36 EXIT FLOW RATE (ACFM)	37 SOURCE CODE	38 HRS / DAY	39 DAYS / YR	40 % OPERATION BY SEASON Winter Spring Summer Fall
G I L L 1											

SECTION C

41 DESCRIBE PROCESS OR UNIT: 1 / 2 / 3 / 4 / 5 / 6 / 7 / 8

SECTION D

EMISSION CONTROL EQUIPMENT I.D.	CONTROL TYPE	MANUFACTURER'S NAME AND MODEL NUMBER	DISPOSAL METHOD	DATE INSTALLED MONTH / YEAR	USEFUL LIFE
42	43	44	45	46 /	47
48	49	50	51	52 /	53

SECTION E

CALCULATIONS

SECTION F

CONTAMINANT NAME	CAS NUMBER	INPUT OR PRODUCTION	UNIT	ENV. RATING	EMISSIONS ACTUAL	EMISSIONS UNIT	HOW DET.	PERMISSIBLE	% CONTROL EFFIC'CY	HOURLY EMISSIONS (LBS/HR) ERP	HOURLY EMISSIONS (LBS/HR) ACTUAL	ANNUAL EMISSIONS (LBS/YR) ACTUAL	10^n	PERMISSIBLE
54 1,2-Dichloroethene	55 540-59-0	56	57	58	59 1.370	60 1	61 6	62	63 0	64 1.370	65 1.370	66 3.94	67 3	68
69 Hexachlorobenzene	70 118-74-1	71	72	73	74 3.72	75 2	76 6	77	78 0	79 0.004	80 0.004	81 1.072	82 1	83
84 1,3-Dichlorobenzene	85 541-73-1	86	87	88	89 0.042	90 1	91 6	92	93 0	94 0.042	95 0.042	96 1.222	97 2	98
99 1,2,4-Trichlorobenzene	100 120-82-1	101	102	103	104 0.201	105 1	106 6	107	108 0	109 0.201	110 0.201	111 5.798	112 2	113
114	115 - -	116	117	118	119	120	121	122	123	124	125	126	127	128
129	130 - -	131	132	133	134	135	136	137	138	139	140	141	142	143

SECTION G

SOLID FUEL TYPE	TONS / YR	% S	LIQUID FUEL TYPE	THOUSANDS OF GALLONS/YR	% S	GAS TYPE	THOUSANDS OF CF/YR	BTU/CF	APPLICABLE RULE	APPLICABLE RULE
144	145	146	147	148	149	150	151	152	153	154

Upon completion of construction sign the statement below and forward to the appropriate field representative
THE PROCESS, EXHAUST OR VENTILATION SYSTEM HAS BEEN CONSTRUCTED AND WILL BE OPERATED IN ACCORDANCE WITH STATED SPECIFICATIONS AND IN CONFORMANCE WITH ALL PROVISIONS OF EXISTING REGULATIONS

155 SIGNATURE OF AUTHORIZED REPRESENTATIVE OR AGENT | DATE

AGENCY USE ONLY

156 LOCATION CODE | 157 FACILITY ID NO | 158 U.T.M. (E) | 159 U.T.M. (N) | 160 SIC NUMBER | 161 DATE APPL. RECEIVED | 162 DATE APPL. REVIEWED | 163 REVIEWED BY

PERMIT TO CONSTRUCT

164 DATE ISSUED / / | 165 EXPIRATION DATE / / | 166 SIGNATURE OF APPROVAL | 167 FEE

168
1. DEVIATION FROM APPROVED APPLICATION SHALL VOID THIS PERMIT
2. THIS IS NOT A CERTIFICATE TO OPERATE
3. TESTS AND/OR ADDITIONAL EMISSION CONTROL EQUIPMENT MAY BE REQUIRED PRIOR TO THE ISSUANCE OF A CERTIFICATE TO OPERATE

CERTIFICATE TO OPERATE

169 DATE ISSUED / / | 170 EXPIRATION DATE / / | 171 SIGNATURE OF APPROVAL | 172 FEE

173
1 ☐ INSPECTED BY ________ DATE ________
2 ☐ INSPECTION DISCLOSED DIFFERENCES AS BUILT VS. PERMIT. CHANGES INDICATED ON FORM
3 ☐ ISSUE CERTIFICATE TO OPERATE FOR SOURCE AS BUILT
4 ☐ APPLICATION FOR C.O. DENIED ________ DATE ________ INITIALED

174 SPECIAL CONDITIONS
1 / 2 / 3 / 4 / 5 / 6 / 7 / 8

NEW YORK STATE
DEPARTMENT OF ENVIRONMENTAL CONSERVATION

PROCESS, EXHAUST OR VENTILATION SYSTEM

APPLICATION FOR PERMIT TO CONSTRUCT OR CERTIFICATE TO OPERATE

WHITE - ORIGINAL
GREEN - DIVISION OF AIR
WHITE - REGIONAL OFFICE
WHITE - FIELD REP
YELLOW - APPLICANT

LOCATION | FACILITY | EMISSION POINT

A ADD / C CHANGE / D DELETE — READ INSTRUCTIONS CONTAINED IN FORM 76-11-12 BEFORE ANSWERING ANY QUESTION

1 NAME OF OWNER / FIRM: E. du Pont de Nemours and Company
2 NUMBER AND STREET ADDRESS: 1007 Market Street
3 CITY, TOWN, VILLAGE: Wilmington
4 STATE: DE
5 ZIP: 19898
6 OWNER CLASSIFICATION: A ☐ COMMERCIAL B ☒ INDUSTRIAL C ☐ UTILITY D ☐ FEDERAL E ☐ STATE F ☐ MUNICIPAL G ☐ EDUC. INST. H ☐ HOSPITAL I ☐ RESIDENTIAL J ☐ OTHER
7 NAME & TITLE OF OWNERS REPRESENTATIVE: Richard Gentilucci, Manager Environmental Affairs
8 TELEPHONE: (716) 278-5162
9 NAME OF AUTHORIZED AGENT:
10 TELEPHONE:
11 NUMBER AND STREET ADDRESS:
12 CITY, TOWN, VILLAGE:
13 STATE:
14 ZIP:
15 NAME OF P.E. OR ARCHITECT PREPARING APPLICATION: W. L. Quon
16 N.Y.S. P.E. OR ARCHITECT LICENSE NO: 063343
17 TELEPHONE: (716) 278-5504
18 SIGNATURE OF OWNERS REPRESENTATIVE OR AGENT WHEN APPLYING FOR A PERMIT TO CONSTRUCT:
19 FACILITY NAME (IF DIFFERENT FROM OWNER / FIRM):
20 FACILITY LOCATION (NUMBER AND STREET ADDRESS): Buffalo Avenue and 26th Street
21 CITY, TOWN, VILLAGE: Niagara Falls
22 ZIP: 14302
23 BUILDING NAME OR NUMBER: Gill Creek Remediation
24 FLOOR NAME OR NUMBER: Ground
25 START UP DATE: 8 / 92 (MO / YR)
26 DRAWING NUMBERS OF PLANS SUBMITTED: EE-40-5337
27 PERMIT TO CONSTRUCT: A ☒ NEW SOURCE B ☐ MODIFICATION
28 CERTIFICATE TO OPERATE: A ☐ NEW SOURCE C ☐ EXISTING SOURCE E ☐ MODIFICATION

29 EMISSION POINT ID	30 GROUND ELEVATION (FT)	31 HEIGHT ABOVE STRUCTURES (FT)	32 STACK HEIGHT (FT)	33 INSIDE DIMENSIONS (IN)	34 EXIT TEMP (°F)	35 EXIT VELOCITY (FT/SEC)	36 EXIT FLOW RATE (ACFM)	37 SOURCE CODE	38 HRS / DAY	39 DAYS / YR	40 % OPERATION BY SEASON Winter Spring Summer Fall
GILL.L.2	568	30	40	30	68	3.4	204		24	120	10	30 60

DESCRIBE PROCESS OR UNIT:
This is a temporary air emission source. It is a 54-inch diameter air stripper (packed tower). The project is the remediation of the Gill Creek sediments. The two air strippers will run alternately, depending on the water flow rate.

EMISSION CONTROL EQUIPMENT ID	CONTROL TYPE	MANUFACTURER'S NAME AND MODEL NUMBER	DISPOSAL METHOD	DATE INSTALLED MONTH / YEAR	USEFUL LIFE
42	43 99	44	45	46 /	47
48	49	50	51	52 /	53

CALCULATIONS

See attached

CONTAMINANT NAME	CAS NUMBER	INPUT OR PRODUCTION	UNIT	ENV. RATING	EMISSIONS ACTUAL	UNIT	HOW DET	PERMISSIBLE	% CONTROL EFFIC'CY	HOURLY EMISSIONS (LBS/HR) ERP	HOURLY ACTUAL	ANNUAL EMISSIONS (LBS/YR) ACTUAL	10'	PERMISSIBLE
Vinyl chloride	75-01-4				0.354	1	6		0	0.354	0.354	1.018	3	
1,1-Dichloroethene	75-35-4				0.018	1	6		0	0.018	0.018	53.18	0	
Dichloromethane	75-09-2				0.329	1	6		0	0.329	0.329	947	0	
Chloroform	67-66-3				0.107	1	6		0	0.107	0.107	308	0	
1,1,1-Trichloroethane	71-55-6				0.037	1	6		0	0.037	0.037	106	0	
CONTINUED . . .														

SOLID FUEL TYPE	TONS / YR	% S	LIQUID FUEL TYPE	THOUSANDS OF GALLONS/YR	% S	GAS TYPE	THOUSANDS OF CF/YR	BTU/CF	APPLICABLE RULE	APPLICABLE RULE
144	145	146	147	148	149	150	151	152	153	154

Upon completion of construction sign the statement listed below and forward to the appropriate field representative.
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155 SIGNATURE OF AUTHORIZED REPRESENTATIVE OR AGENT | DATE

AGENCY USE ONLY

156 LOCATION CODE | 157 FACILITY ID NO | 158 U.T.M. (E) | 159 U.T.M. (N) | 160 SIC NUMBER | 161 DATE APPL. RECEIVED | 162 DATE APPL. REVIEWED | 163 REVIEWED BY

PERMIT TO CONSTRUCT
164 DATE ISSUED | 165 EXPIRATION DATE | 166 SIGNATURE OF APPROVAL | 167 FEE
168
1 DEVIATION FROM APPROVED APPLICATION SHALL VOID THIS PERMIT
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CERTIFICATE TO OPERATE
169 DATE ISSUED | 170 EXPIRATION DATE | 171 SIGNATURE OF APPROVAL | 172 FEE
173
1 ☐ INSPECTED BY ________ DATE ________
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4 ☐ APPLICATION FOR C.O. DENIED ________ DATE ________ INITIALED

174 SPECIAL CONDITIONS
1 | 2
3 | 4
5 | 6
7 | 8

LOCATION | FACILITY | EMISSION POINT

NEW YORK STATE
DEPARTMENT OF ENVIRONMENTAL CONSERVATION

COPIES
WHITE ORIGINAL
GREEN DIVISION OF AIR
WHITE REGIONAL OFFICE
WHITE FIELD REP
YELLOW APPLICANT

A ADD
C CHANGE
D DELETE

READ INSTRUCTIONS CONTAINED IN FORM 76- BEFORE ANSWERING ANY QUESTION

PROCESS, EXHAUST OR VENTILATION SYSTEM

APPLICATION FOR PERMIT TO CONSTRUCT OR CERTIFICATE TO OPERATE

SECTION A

1 NAME OF OWNER / FIRM
2 NUMBER AND STREET ADDRESS
3 CITY / TOWN / VILLAGE | 4 STATE | 5 ZIP
6 OWNER CLASSIFICATION: a COMMERCIAL, b INDUSTRIAL, c UTILITY, d FEDERAL, e STATE, f MUNICIPAL, g EDUC. INST., h HOSPITAL, i RESIDENTIAL, j OTHER
7 NAME & TITLE OF OWNER'S REPRESENTATIVE | 8 TELEPHONE
9 NAME OF AUTHORIZED AGENT | 10 TELEPHONE
11 NUMBER AND STREET ADDRESS
12 CITY / TOWN / VILLAGE | 13 STATE | 14 ZIP
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18 SIGNATURE OF OWNER'S REPRESENTATIVE OR AGENT WHEN APPLYING FOR A PERMIT TO CONSTRUCT
19 FACILITY NAME (IF DIFFERENT FROM OWNER / FIRM)
20 FACILITY LOCATION (NUMBER AND STREET ADDRESS)
21 CITY / TOWN / VILLAGE | 22 ZIP
23 BUILDING NAME OR NUMBER | 24 FLOOR NAME OR NUMBER
25 START UP DATE MO / YR | 26 DRAWING NUMBERS OF PLANS SUBMITTED
27 PERMIT TO CONSTRUCT: a NEW SOURCE, b MODIFICATION
28 CERTIFICATE TO OPERATE: a NEW SOURCE, b MODIFICATION, c EXISTING SOURCE

SECTION B

29 EMISSION POINT ID	30 GROUND ELEVATION (FT)	31 HEIGHT ABOVE STRUCTURES (FT)	32 STACK HEIGHT (FT)	33 INSIDE DIMENSIONS (IN)	34 EXIT TEMP (F)	35 EXIT VELOCITY (FT/SEC)	36 EXIT FLOW RATE (ACFM)
G I L : L 2							

37 SOURCE CODE | 38 HRS / DAY | 39 DAYS / YR | 40 % OPERATION BY SEASON: Winter, Spring, Summer, Fall

SECTION C

41 DESCRIBE PROCESS OR UNIT: 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8

SECTION D

EMISSION CONTROL EQUIPMENT ID	CONTROL TYPE	MANUFACTURER'S NAME AND MODEL NUMBER	DISPOSAL METHOD	DATE INSTALLED MONTH / YEAR	USEFUL LIFE
42	43	44	45	46 /	47
48	49	50	51	52 /	53

SECTION E

CALCULATIONS

SECTION F

CONTAMINANT NAME	CAS NUMBER	INPUT OR PRODUCTION	UNIT	ENV RATING	EMISSIONS ACTUAL	EMISSIONS UNIT	HOW DET	PERMISSIBLE	% CONTROL EFFIC'CY	HOURLY EMISSIONS (LBS/HR) ERP	HOURLY EMISSIONS (LBS/HR) ACTUAL	ANNUAL EMISSIONS (LBS/YR) ACTUAL	10^x	PERMISSIBLE
Carbon tetrachloride	56-23-5				0.017	1	6		0	0.017	0.017	48.81	0	
Trichloroethylene	79-01-6				2.817	1	6		0	2.817	2.817	8.113	3	
Tetrachloroethylene	127-18-4				0.897	1	6		0	0.897	0.897	2.583	3	
1,1,2,2-Tetrachloroethane	79-34-5				0.652	1	6		0	0.652	0.652	1.879	3	
Chlorobenzene	108-90-7				0.243	1	6		0	0.243	0.243	689	0	
CONTINUED . . .														

SECTION G

SOLID FUEL TYPE	TONS / YR	% S	LIQUID FUEL TYPE	THOUSANDS OF GALLONS/YR	% S	GAS TYPE	THOUSANDS OF CF/YR	BTU/CF	APPLICABLE RULE	APPLICABLE RULE
144	145	146	147	148	149	150	151	152	153.	154

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155 SIGNATURE OF AUTHORIZED REPRESENTATIVE OR AGENT | DATE

AGENCY USE ONLY

156 LOCATION CODE | 157 FACILITY ID NO. | 158 U.T.M. (E) | 159 U.T.M. (N) | 160 SIC NUMBER | 161 DATE APPL. RECEIVED | 162 DATE APPL. REVIEWED | 163 REVIEWED BY

PERMIT TO CONSTRUCT

164 DATE ISSUED | 165 EXPIRATION DATE | 166 SIGNATURE OF APPROVAL | 167 FEE

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1. DEVIATION FROM APPROVED APPLICATION SHALL VOID THIS PERMIT
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CERTIFICATE TO OPERATE

169 DATE ISSUED | 170 EXPIRATION DATE | 171 SIGNATURE OF APPROVAL | 172 FEE

173
1. INSPECTED BY ________ DATE ________
2. INSPECTION DISCLOSED DIFFERENCES AS BUILT VS. PERMIT, CHANGES INDICATED ON FORM
3. ISSUE CERTIFICATE TO OPERATE FOR SOURCE AS BUILT
4. APPLICATION FOR C.O. DENIED ________ DATE ________ INITIALED

174 SPECIAL CONDITIONS: 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8

NEW YORK STATE
DEPARTMENT OF ENVIRONMENTAL CONSERVATION

LOCATION | FACILITY | EMISSION POINT

WHITE – DIVISION OF AIR (?)
GREEN – DIVISION OF AIR
WHITE – REGIONAL OFFICE

PROCESS, EXHAUST OR VENTILATION SYSTEM

APPLICATION FOR PERMIT TO CONSTRUCT OR CERTIFICATE TO OPERATE

CONTAINED IN FORM ... BEFORE ANSWERING ANY QUESTION

1 NAME OF OWNER / FIRM
NUMBER AND STREET ADDRESS
3 CITY, TOWN, VILLAGE | 4 STATE | 5 ZIP
6 OWNER CLASSIFICATION: A ☐ COMMERCIAL B ☐ INDUSTRIAL C ☐ UTILITY D ☐ FEDERAL E ☐ STATE F ☐ MUNICIPAL G ☐ EDUC. INST. H ☐ HOSPITAL I ☐ RESIDENTIAL J ☐ OTHER
7 NAME & TITLE OF OWNERS REPRESENTATIVE | 8 TELEPHONE

9 NAME OF AUTHORIZED AGENT | 10 TELEPHONE
11 NUMBER AND STREET ADDRESS
12 CITY, TOWN, VILLAGE | 13 STATE | 14 ZIP
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18 SIGNATURE OF OWNERS REPRESENTATIVE OR AGENT WHEN APPLYING FOR A PERMIT TO CONSTRUCT

19 FACILITY NAME (IF DIFFERENT FROM OWNER / FIRM)
20 FACILITY LOCATION (NUMBER AND STREET ADDRESS)
21 CITY, TOWN, VILLAGE | 22 ZIP
23 BUILDING NAME OR NUMBER | 24 FLOOR NAME OR NUMBER
25 START UP DATE: MO / YR | 26 DRAWING NUMBERS OF PLANS SUBMITTED
27 PERMIT TO CONSTRUCT: A ☐ NEW SOURCE B ☐ MODIFICATION
28 CERTIFICATE TO OPERATE: A ☐ NEW SOURCE B ☐ MODIFICATION C ☐ EXISTING SOURCE

29 EMISSION POINT ID	30 GROUND ELEVATION (FT)	31 HEIGHT ABOVE STRUCTURES (FT)	32 STACK HEIGHT (FT)	33 INSIDE DIMENSIONS (IN)	34 EXIT TEMP (°F)	35 EXIT VELOCITY (FT/SEC)	36 EXIT FLOW RATE (ACFM)	37 SOURCE CODE	38 HRS / DAY	39 DAYS / YR	40 % OPERATION BY SEASON: Winter Spring Summer Fall
G I L L 2											

41 DESCRIBE PROCESS OR UNIT: 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8

EMISSION CONTROL EQUIPMENT ID	CONTROL TYPE	MANUFACTURER'S NAME AND MODEL NUMBER	DISPOSAL METHOD	DATE INSTALLED MONTH / YEAR	USEFUL LIFE
42	43	44	45	46 /	47
48	49	50	51	52 /	53

CALCULATIONS

CONTAMINANT NAME	CAS NUMBER	INPUT OR PRODUCTION	UNIT	ENV RATING	EMISSIONS ACTUAL	EMISSIONS UNIT	EMISSIONS HOW DET	EMISSIONS PERMISSIBLE	% CONTROL EFFIC'CY	HOURLY EMISSIONS (LBS/HR) ERP	HOURLY EMISSIONS (LBS/HR) ACTUAL	ANNUAL EMISSIONS (LBS/YR) ACTUAL	10ˣ	ANNUAL EMISSIONS (LBS/YR) PERMISSIBLE
Hexachloroethane	67-72-1				0.014	1	6		0	0.014	0.014	39.66	0	
1,4-Dichlorobenzene	106-46-7				0.048	1	6		0	0.048	0.048	137	0	
1,2-Dichlorobenzene	95-50-1				0.068	1	6		0	0.068	0.068	195	0	
Hexachlorobutadiene	87-68-3				0.045	1	6		0	0.045	0.045	128	0	
benzene	71-43-2				0.681	1	6		0	0.681	0.681	1.963	3	
CONTINUED . . .														

SOLID FUEL TYPE	TONS / YR	% S	LIQUID FUEL TYPE	THOUSANDS OF GALLONS/YR	% S	GAS TYPE	THOUSANDS OF CF/YR	BTU/CF	APPLICABLE RULE	APPLICABLE RULE
144	145	146	147	148	149	150	151	152	153	154

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155 SIGNATURE OF AUTHORIZED REPRESENTATIVE OR AGENT | DATE

AGENCY USE ONLY

156 LOCATION CODE | 157 FACILITY ID NO | 158 U.T.M. (E) | 159 U.T.M. (N) | 160 SIC NUMBER | 161 DATE APPL. RECEIVED | 162 DATE APPL. REVIEWED | 163 REVIEWED BY

P E R M I T   T O   C O N S T R U C T

164 DATE ISSUED | 165 EXPIRATION DATE | 166 SIGNATURE OF APPROVAL | 167 FEE

168
1 DEVIATION FROM APPROVED APPLICATION SHALL VOID THIS PERMIT
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C E R T I F I C A T E   T O   O P E R A T E

169 DATE ISSUED | 170 EXPIRATION DATE | 171 SIGNATURE OF APPROVAL | 172 FEE

173
1 ☐ INSPECTED BY ______ DATE ______
2 ☐ INSPECTION DISCLOSED DIFFERENCES AS BUILT VS PERMIT. CHANGES INDICATED ON FORM
3 ☐ ISSUE CERTIFICATE TO OPERATE FOR SOURCE AS BUILT
4 ☐ APPLICATION FOR C.O. DENIED ______ DATE ______ INITIALED

174 SPECIAL CONDITIONS
1 | 2
3 | 4
5 | 6
7 | 8

NEW YORK STATE
DEPARTMENT OF ENVIRONMENTAL CONSERVATION

COPIES: WHITE – ORIGINAL; GREEN – DIVISION OF AIR; WHITE – REGIONAL OFFICE; WHITE – FIELD REP.; YELLOW – APPLICANT

LOCATION | FACILITY | EMISSION POINT

A ADD / C CHANGE / D DELETE — (READ INSTRUCTIONS CONTAINED IN FORM BEFORE ANSWERING ANY QUESTION)

PROCESS, EXHAUST OR VENTILATION SYSTEM

APPLICATION FOR PERMIT TO CONSTRUCT OR CERTIFICATE TO OPERATE

NAME OF OWNER / FIRM
NUMBER AND STREET ADDRESS
CITY, TOWN, VILLAGE | STATE | ZIP
OWNER CLASSIFICATION: COMMERCIAL · UTILITY · INDUSTRIAL · FEDERAL · STATE · MUNICIPAL · EDUC. INST. · HOSPITAL · RESIDENTIAL · OTHER

NAME OF AUTHORIZED AGENT | TELEPHONE
NUMBER AND STREET ADDRESS
CITY, TOWN, VILLAGE | STATE | ZIP
NAME OF P.E. OR ARCHITECT PREPARING APPLICATION | N.Y.S. P.E. OR ARCHITECT LICENSE NO. | TELEPHONE
SIGNATURE OF OWNER/REPRESENTATIVE OR AGENT WHEN APPLICATION

FACILITY NAME IF DIFFERENT FROM OWNER / FIRM
FACILITY LOCATION (NUMBER AND STREET ADDRESS)
CITY, TOWN, VILLAGE | ZIP
BUILDING NAME OR NUMBER | FLOOR NAME OR NUMBER
START UP DATE (MO / YR) | DRAWING NUMBERS OF PLANS SUBMITTED
PERMIT TO CONSTRUCT: NEW SOURCE · MODIFICATION
CERTIFICATE TO OPERATE: NEW SOURCE · EXISTING SOURCE · MODIFICATION

EMISSION POINT ID | GROUND ELEVATION (FT) | HEIGHT ABOVE STRUCTURE (FT) | STACK HEIGHT (FT) | INSIDE DIMENSIONS (IN) | EXIT TEMP (°F) | EXIT VELOCITY (FT/SEC) | EXIT FLOW RATE (ACFM)
G.I L.L 2

SOURCE CODE | HRS/DAY | DAYS/YR | % OPERATION BY SEASON: Winter, Spring, Summer, Fall

DESCRIBE PROCESS OR UNIT

EMISSION CONTROL EQUIPMENT | CONTROL TYPE | MANUFACTURER'S NAME AND MODEL NUMBER | DISPOSAL METHOD | DATE INSTALLED MONTH / YEAR | USEFUL LIFE

CALCULATIONS

CONTAMINANT NAME	CAS NUMBER	INPUT OR PRODUCTION	UNIT	ENV RATING	EMISSIONS ACTUAL	UNIT	HOW DET	PERMISSIBLE	% CONTROL EFFICIENCY	HOURLY EMISSIONS (LBS/HR) ERP	HOURLY EMISSIONS (LBS/HR) ACTUAL	ANNUAL EMISSIONS (LBS/YR) ACTUAL	10ⁿ	PERMISSIBLE
1,2-Dichloroethene	540-59-0				0.685	1	6		0	0.685	0.685	1.973	3	
Hexachlorobenzene	118-74-1				1.963	2	6		0	0.002	0.002	5.653	0	
1,3-Dichlorobenzene	541-73-1				0.022	1	6		0	0.022	0.022	61.95	0	
1,2,4-Trichlorobenzene	120-82-1				0.107	1	6		0	0.107	0.107	307	0	

SOLID FUEL: TYPE, TONS/YR, % S | LIQUID FUEL: TYPE, THOUSANDS OF GALLONS/YR, % S | GAS: TYPE, THOUSANDS OF CF/YR, BTU/CF | APPLICABLE RULE | APPLICABLE RULE

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SIGNATURE OF AUTHORIZED REPRESENTATIVE OR AGENT | DATE

AGENCY USE ONLY

LOCATION CODE | FACILITY ID NO. | U.T.M. (E) | U.T.M. (N) | SIC NUMBER | DATE APPL. RECEIVED | DATE APPL. REVIEWED | REVIEWED BY

PERMIT TO CONSTRUCT
DATE ISSUED | EXPIRATION DATE | SIGNATURE OF APPROVAL | FEE
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CERTIFICATE TO OPERATE
DATE ISSUED | EXPIRATION DATE | SIGNATURE OF APPROVAL | FEE
1. INSPECTED BY ______ DATE ______
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3. ISSUE CERTIFICATE TO OPERATE FOR SOURCE AS BUILT
4. APPLICATION FOR C.O. DENIED ______ DATE ______ INITIALED

SPECIAL CONDITIONS

EPA SCREEN - VERSION 1.1 (DATED 88300)

IBM-PC VERSION (1.04)
(C) COPYRIGHT 1989, TRINITY CONSULTANTS, INC.
SERIAL NUMBER 7683 SOLD TO EI DUPONT

Gill Creek Steam Stripper = Q_1

SIMPLE TERRAIN INPUTS:
SOURCE TYPE = POINT
EMISSION RATE (G/S) = 1.000
STACK HEIGHT (M) = 33.53
STK INSIDE DIAM (M) = .05
STK EXIT VELOCITY (M/S)= .24
STK GAS EXIT TEMP (K) = 277.00
AMBIENT AIR TEMP (K) = 293.00
RECEPTOR HEIGHT (M) = .00
IOPT (1=URB,2=RUR) = 2
BUILDING HEIGHT (M) = 24.88
MIN HORIZ BLDG DIM (M) = 5.49
MAX HORIZ BLDG DIM (M) = 9.14

TA > TS!!! BUOY. FLUX SET = 0.0

BUOY. FLUX = .00 M**4/S**3; MOM. FLUX = .00 M**4/S**2.

*** FULL METEOROLOGY ***

****
*** SCREEN AUTOMATED DISTANCES ***
****

*** TERRAIN HEIGHT OF 0. M ABOVE STACK BASE USED FOR FOLLOWING DISTANCES ***

DIST (M)	CONC (UG/M**3)	STAB	U10M (M/S)	USTK (M/S)	MIX HT (M)	PLUME HT (M)	SIGMA Y (M)	SIGMA Z (M)	DWASH
100.	70.37	6	1.0	1.9	5000.0	33.4	4.1	12.0	HS
200.	129.6	3	1.0	1.1	320.0	33.4	23.6	18.7	HS
300.	134.1	3	1.0	1.1	320.0	33.4	34.3	24.9	HS
400.	126.3	4	1.0	1.2	320.0	33.4	29.5	21.6	HS
500.	118.0	4	1.0	1.2	320.0	33.4	36.1	24.5	HS
600.	107.4	4	1.0	1.2	320.0	33.4	42.7	27.2	HS
700.	96.60	4	1.0	1.2	320.0	33.4	49.2	29.9	HS
800.	85.82	4	1.0	1.2	320.0	33.4	55.6	30.3	HS
900.	77.81	4	1.0	1.2	320.0	33.4	61.9	32.8	HS
1000.	70.60	4	1.0	1.2	320.0	33.4	68.1	34.8	HS
1100.	64.70	5	1.0	1.5	5000.0	33.4	55.6	27.1	HS
1200.	60.95	5	1.0	1.5	5000.0	33.4	60.2	28.3	HS
1300.	57.45	5	1.0	1.5	5000.0	33.4	64.7	29.4	HS
1400.	54.19	5	1.0	1.5	5000.0	33.4	69.2	30.5	HS
1500.	51.18	5	1.0	1.5	5000.0	33.4	73.7	31.6	HS
1600.	48.39	5	1.0	1.5	5000.0	33.4	78.1	32.7	HS
1700.	46.44	6	1.0	1.9	5000.0	33.4	54.9	23.7	HS
1800.	45.05	6	1.0	1.9	5000.0	33.4	57.9	24.2	HS
1900.	43.71	6	1.0	1.9	5000.0	33.4	60.8	24.7	HS
2000.	42.41	6	1.0	1.9	5000.0	33.4	63.7	25.2	HS
2100.	41.17	6	1.0	1.9	5000.0	33.4	66.6	25.8	HS
2200.	39.97	6	1.0	1.9	5000.0	33.4	69.4	26.3	HS
2300.	38.82	6	1.0	1.9	5000.0	33.4	72.3	26.8	HS
2400.	37.11	6	1.0	1.9	5000.0	33.4	75.1	26.5	HS

```
MAXIMUM 1-HR CONCENTRATION AT OR BEYOND   100. M:
   254.   137.9         3     1.0    1.1   320.0    33.4    29.5    22.1    HS

 DWASH=   MEANS NO CALC MADE (CONC = 0.0)
 DWASH=NO MEANS NO BUILDING DOWNWASH USED
 DWASH=HS MEANS HUBER-SNYDER DOWNWASH USED
 DWASH=SS MEANS SCHULMAN-SCIRE DOWNWASH USED
 DWASH=NA MEANS DOWNWASH NOT APPLICABLE, X<3*LB

 *** CAVITY CALCULATION - 1 ***          *** CAVITY CALCULATION - 2 ***
  CONC (UG/M**3)        =    2930.        CONC (UG/M**3)        =    4883.
  CRIT WS @10M (M/S) =       1.00        CRIT WS @10M (M/S) =       1.00
  CRIT WS @ HS (M/S) =       1.27        CRIT WS @ HS (M/S) =       1.27
  DILUTION WS (M/S)  =       1.00        DILUTION WS (M/S)  =       1.00
  CAVITY HT (M)      =      54.78        CAVITY HT (M)      =      49.58
  CAVITY LENGTH (M)  =      33.36        CAVITY LENGTH (M)  =      16.37
  ALONGWIND DIM (M)  =       5.49        ALONGWIND DIM (M)  =       9.14

     ***************************************
     *** SUMMARY OF SCREEN MODEL RESULTS ***
     ***************************************

 CALCULATION         MAX CONC     DIST TO    TERRAIN
  PROCEDURE         (UG/M**3)     MAX (M)     HT (M)
--------------     -----------    -------    -------
SIMPLE TERRAIN       137.9          254.         0.

BUILDING CAVITY-1    2930.           33.        --   (DIST = CAVITY LENGTH)
BUILDING CAVITY-2    4883.           16.        --   (DIST = CAVITY LENGTH)

***************************************************
** REMEMBER TO INCLUDE BACKGROUND CONCENTRATIONS **
***************************************************

RUN ENDED ON 92/06/17 AT 13:41:21
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EPA SCREEN - VERSION 1.1 (DATED 88300)

IBM-PC VERSION (1.04)
(C) COPYRIGHT 1989, TRINITY CONSULTANTS, INC.
SERIAL NUMBER 7683 SOLD TO EI DUPONT

Gill Creek Equalization Tank = Q_2

SIMPLE TERRAIN INPUTS:

SOURCE TYPE	=	POINT
EMISSION RATE (G/S)	=	1.000
STACK HEIGHT (M)	=	7.32
STK INSIDE DIAM (M)	=	.10
STK EXIT VELOCITY (M/S)	=	.04
STK GAS EXIT TEMP (K)	=	294.00
AMBIENT AIR TEMP (K)	=	293.00
RECEPTOR HEIGHT (M)	=	.00
IOPT (1=URB,2=RUR)	=	2
BUILDING HEIGHT (M)	=	6.71
MIN HORIZ BLDG DIM (M)	=	10.67
MAX HORIZ BLDG DIM (M)	=	10.67

Q_2

BUOY. FLUX = .00 M**4/S**3; MOM. FLUX = .00 M**4/S**2.

*** FULL METEOROLOGY ***

****
*** SCREEN AUTOMATED DISTANCES ***
****

*** TERRAIN HEIGHT OF 0. M ABOVE STACK BASE USED FOR FOLLOWING DISTANCES ***

DIST (M)	CONC (UG/M**3)	STAB	U10M (M/S)	USTK (M/S)	MIX HT (M)	PLUME HT (M)	SIGMA Y (M)	SIGMA Z (M)	DWASH
100.	2667.	6	1.0	1.0	5000.0	7.3	9.8	8.1	SS
200.	1888.	6	1.0	1.0	5000.0	7.3	13.2	9.4	SS
300.	1421.	6	1.0	1.0	5000.0	7.3	16.6	10.7	SS
400.	1139.	6	1.0	1.0	5000.0	7.3	19.9	11.5	SS
500.	928.2	6	1.0	1.0	5000.0	7.3	23.1	12.5	SS
600.	774.3	6	1.0	1.0	5000.0	7.3	26.3	13.5	SS
700.	667.9	6	1.0	1.0	5000.0	7.3	29.5	14.1	SS
800.	577.8	6	1.0	1.0	5000.0	7.3	32.6	15.0	SS
900.	506.2	6	1.0	1.0	5000.0	7.3	35.7	15.8	SS
1000.	448.1	6	1.0	1.0	5000.0	7.3	38.8	16.6	SS
1100.	400.2	6	1.0	1.0	5000.0	7.3	41.8	17.4	SS
1200.	360.1	6	1.0	1.0	5000.0	7.3	44.8	18.2	SS
1300.	326.3	6	1.0	1.0	5000.0	7.3	47.8	18.9	SS
1400.	297.4	6	1.0	1.0	5000.0	7.3	50.8	19.7	SS
1500.	272.5	6	1.0	1.0	5000.0	7.3	53.7	20.4	SS
1600.	250.9	6	1.0	1.0	5000.0	7.3	56.7	21.1	SS
1700.	237.9	6	1.0	1.0	5000.0	7.3	59.6	21.2	SS
1800.	220.8	6	1.0	1.0	5000.0	7.3	62.5	21.8	SS
1900.	206.2	6	1.0	1.0	5000.0	7.3	65.4	22.4	SS
2000.	193.1	6	1.0	1.0	5000.0	7.3	68.2	23.0	SS
2100.	181.4	6	1.0	1.0	5000.0	7.3	71.1	23.5	SS
2200.	170.8	6	1.0	1.0	5000.0	7.3	73.9	24.1	SS
2300.	161.3	6	1.0	1.0	5000.0	7.3	76.8	24.6	SS
2400.	152.6	6	1.0	1.0	5000.0	7.3	79.6	25.1	SS
2500.	144.7	6	1.0	1.0	5000.0	7.3	82.4	25.6	SS

MAXIMUM 1-HR CONCENTRATION ...

100.	2667.	6	1.0	1.0	5000.0	7.3	9.8	8.1	SS

```
DWASH=   MEANS NO CALC MADE (CONC = 0.0)
DWASH=NO MEANS NO BUILDING DOWNWASH USED
DWASH=HS MEANS HUBER-SNYDER DOWNWASH USED
DWASH=SS MEANS SCHULMAN-SCIRE DOWNWASH USED
DWASH=NA MEANS DOWNWASH NOT APPLICABLE, X<3*LB

*** CAVITY CALCULATION - 1 ***          *** CAVITY CALCULATION - 2 ***
 CONC (UG/M**3)       =    9319.         CONC (UG/M**3)       =    9319.
 CRIT WS @10M (M/S) =      1.00         CRIT WS @10M (M/S) =      1.00
 CRIT WS @ HS (M/S) =      1.00         CRIT WS @ HS (M/S) =      1.00
 DILUTION WS (M/S)  =      1.00         DILUTION WS (M/S)  =      1.00
 CAVITY HT (M)      =      8.06         CAVITY HT (M)      =      8.06
 CAVITY LENGTH (M)  =     10.60         CAVITY LENGTH (M)  =     10.60
 ALONGWIND DIM (M)  =     10.67         ALONGWIND DIM (M)  =     10.67

    ***************************************
    *** SUMMARY OF SCREEN MODEL RESULTS ***
    ***************************************

 CALCULATION         MAX CONC    DIST TO   TERRAIN
  PROCEDURE         (UG/M**3)    MAX (M)    HT (M)
--------------     -----------   -------   -------
SIMPLE TERRAIN       2667.         100.        0.

BUILDING CAVITY-1    9319.          11.       --   (DIST = CAVITY LENGTH)
BUILDING CAVITY-2    9319.          11.       --   (DIST = CAVITY LENGTH)

*******************************************************
** REMEMBER TO INCLUDE BACKGROUND CONCENTRATIONS **
*******************************************************

RUN ENDED ON 92/06/17 AT 13:37:19
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EPA SCREEN - VERSION 1.1 (DATED 88300)

IBM-PC VERSION (1.04)

SERIAL NUMBER 7683 SOLD TO EI DUPONT

Gill Creek Stripper

SIMPLE TERRAIN INPUTS:

SOURCE TYPE	=	POINT
EMISSION RATE (G/S)	=	1.000
STACK HEIGHT (M)	=	12.19 40'
STK INSIDE DIAM (M)	=	.76 30"
STK EXIT VELOCITY (M/S)	=	6.93
STK GAS EXIT TEMP (K)	=	289.00
AMBIENT AIR TEMP (K)	=	293.00
RECEPTOR HEIGHT (M)	=	.00
IOPT (1=URB,2=RUR)	=	2
BUILDING HEIGHT (M)	=	.00
MIN HORIZ BLDG DIM (M)	=	.00
MAX HORIZ BLDG DIM (M)	=	.00

D_s = 84"

TA > TS!!! BUOY. FLUX SET = 0.0

BUOY. FLUX = .00 M**4/S**3; MOM. FLUX = 7.07 M**4/S**2.

*** FULL METEOROLOGY ***

****
*** SCREEN AUTOMATED DISTANCES ***
****

*** TERRAIN HEIGHT OF 0. M ABOVE STACK BASE USED FOR FOLLOWING DISTANCES ***

DIST (M)	CONC (UG/M**3)	STAB	U10M (M/S)	USTK (M/S)	MIX HT (M)	PLUME HT (M)	SIGMA Y (M)	SIGMA Z (M)	DWASH
152.	163.7	1	1.0	1.0	320.0	27.8	39.4	22.2	NO
200.	172.5	3	2.0	2.0	640.0	20.0	23.7	14.2	NO
300.	178.5	3	1.0	1.0	320.0	27.7	34.6	20.8	NO
400.	198.7	5	1.0	1.1	5000.0	21.7	22.4	11.6	NO
500.	220.4	5	1.0	1.1	5000.0	21.7	27.3	13.5	NO
600.	220.2	5	1.0	1.1	5000.0	21.7	32.2	15.3	NO
700.	209.3	5	1.0	1.1	5000.0	21.7	37.0	17.0	NO
800.	208.2	6	1.0	1.1	5000.0	20.7	27.9	12.6	NO
900.	209.8	6	1.0	1.1	5000.0	20.7	31.0	13.5	NO
1000.	206.8	6	1.0	1.1	5000.0	20.7	34.1	14.5	NO
1100.	200.2	6	1.0	1.1	5000.0	20.7	37.2	15.3	NO
1200.	192.4	6	1.0	1.1	5000.0	20.7	40.2	16.1	NO
1300.	184.0	6	1.0	1.1	5000.0	20.7	43.2	16.9	NO
1400.	175.5	6	1.0	1.1	5000.0	20.7	46.2	17.7	NO
1500.	167.2	6	1.0	1.1	5000.0	20.7	49.2	18.4	NO

MAXIMUM 1-HR CONCENTRATION AT OR BEYOND 152. M:

546.	222.2	5	1.0	1.1	5000.0	21.7	29.6	14.3	NO

DWASH= MEANS NO CALC MADE (CONC = 0.0)
DWASH=NO MEANS NO BUILDING DOWNWASH USED
DWASH=HS MEANS HUBER-SNYDER DOWNWASH USED
DWASH=SS MEANS SCHULMAN-SCIRE DOWNWASH USED

```
***************************************
*** SUMMARY OF SCREEN MODEL RESULTS ***
***************************************

 CALCULATION           MAX CONC     DIST TO    TERRAIN
  PROCEDURE           (UG/M**3)     MAX (M)     HT (M)
--------------        -----------   -------    -------
SIMPLE TERRAIN          222.2          546.         0.

***************************************************
** REMEMBER TO INCLUDE BACKGROUND CONCENTRATIONS **
***************************************************

RUN ENDED ON 92/07/02 AT 14:55:15
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EPA SCREEN - VERSION 1.1 (DATED 88300)

IBM-PC VERSION (1.04)

SERIAL NUMBER 7683 SOLD TO EI DUPONT

Gill Creek Stripper

SIMPLE TERRAIN INPUTS:

SOURCE TYPE	=	POINT
EMISSION RATE (G/S)	=	1.000
STACK HEIGHT (M)	=	12.19
STK INSIDE DIAM (M)	=	.76
STK EXIT VELOCITY (M/S)	=	3.41
STK GAS EXIT TEMP (K)	=	289.00
AMBIENT AIR TEMP (K)	=	293.00
RECEPTOR HEIGHT (M)	=	.00
IOPT (1=URB,2=RUR)	=	2
BUILDING HEIGHT (M)	=	.00
MIN HORIZ BLDG DIM (M)	=	.00
MAX HORIZ BLDG DIM (M)	=	.00

D = 30"

TA > TS!!! BUOY. FLUX SET = 0.0

BUOY. FLUX = .00 M**4/S**3; MOM. FLUX = 1.72 M**4/S**2.

*** FULL METEOROLOGY ***

****
*** SCREEN AUTOMATED DISTANCES ***
****

*** TERRAIN HEIGHT OF 0. M ABOVE STACK BASE USED FOR FOLLOWING DISTANCES **

DIST (M)	CONC (UG/M**3)	STAB	U10M (M/S)	USTK (M/S)	MIX HT (M)	PLUME HT (M)	SIGMA Y (M)	SIGMA Z (M)	DWASH
152.	318.1	2	1.0	1.0	320.0	19.9	28.3	15.9	NO
200.	348.9	3	1.0	1.0	320.0	19.8	23.7	14.2	NO
300.	303.4	4	1.0	1.0	320.0	19.8	22.7	12.3	NO
400.	314.8	5	1.0	1.1	5000.0	18.1	22.1	11.0	NO
500.	318.3	5	1.0	1.1	5000.0	18.1	27.1	13.0	NO
600.	296.7	5	1.0	1.1	5000.0	18.1	32.0	14.8	NO
700.	301.4	6	1.0	1.1	5000.0	17.5	24.5	11.1	NO
800.	299.2	6	1.0	1.1	5000.0	17.5	27.7	12.1	NO
900.	289.2	6	1.0	1.1	5000.0	17.5	30.8	13.1	NO
1000.	275.4	6	1.0	1.1	5000.0	17.5	33.9	14.1	NO
1100.	259.5	6	1.0	1.1	5000.0	17.5	37.0	14.9	NO
1200.	243.7	6	1.0	1.1	5000.0	17.5	40.1	15.8	NO
1300.	228.6	6	1.0	1.1	5000.0	17.5	43.1	16.6	NO
1400.	214.3	6	1.0	1.1	5000.0	17.5	46.1	17.4	NO
1500.	201.1	6	1.0	1.1	5000.0	17.5	49.1	18.1	NO

MAXIMUM 1-HR CONCENTRATION AT OR BEYOND 152. M:

196.	349.1	3	1.0	1.0	320.0	19.8	23.4	14.0	NO

DWASH= MEANS NO CALC MADE (CONC = 0.0)
DWASH=NO MEANS NO BUILDING DOWNWASH USED
DWASH=HS MEANS HUBER-SNYDER DOWNWASH USED
DWASH=SS MEANS SCHULMAN-SCIRE DOWNWASH USED

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***************************************
*** SUMMARY OF SCREEN MODEL RESULTS ***
***************************************
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CALCULATION PROCEDURE	MAX CONC (UG/M**3)	DIST TO MAX (M)	TERRAIN HT (M)
SIMPLE TERRAIN	349.1	196.	0.

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***************************************************
** REMEMBER TO INCLUDE BACKGROUND CONCENTRATIONS **
***************************************************
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RUN ENDED ON 92/07/02 AT 14:49:11

Woodward-Clyde Consultants - Air Stripper Modeling Program
Version 3.0 - December 10, 1990

Job Title: GILL CREEK OHM 54-INCH DIA TOWER
Job Number: 22915-219

June 16, 1992 Run by: JPS

Prediction of Removals for a Specified Packed Tower Design

54" ϕ
18' ht
2" Jaeger

Flowrate Data:

Water Flowrate: 250.00 GPM

Temperature: 60.00 F

Pressure: 1.00 atm

Flowrate of Air to Stripper: 3300.00 CFM

Air Flowrate Measured at: Pressure of: 1.000 ATM

Temperature of: 68.00 F

Contaminant Data:

Compound	Concentration in Water to be Treated	
VINYL CHLORIDE	2832.0000	PPB
1,1-DICHLOROETHENE	148.0000	PPB
METHYLENE CHLORIDE	2649.0000	PPB
CHLOROFORM	863.0000	PPB
1,1,1-TRICHLOROETHANE	296.0000	PPB
CARBON TETRACHLORIDE	136.0000	PPB
TRICHLOROETHYLENE	22624.0000	PPB
TETRACHLOROETHYLENE	7205.0000	PPB
1,1,2,2-TETRACHLOROETHANE	7076.0000	PPB
CHLOROBENZENE	1959.0000	PPB
HEXACHLOROETHANE	111.0000	PPB
1,[illegible]-DICHLOROBENZENE	387.0000	PPB
1,[illegible]DICHLOROBENZENE	558.0000	PPB
TOTAL ORGANICS	46.8440	PPM

Tower Design Parameters:

Tower Packing: 2 INCH POLYPROPYLENE JAEGER TRI-PACK

Packing Properties:

Surface Area per Unit Volume: 157.00 M**2/M**3

Nominal Diameter: 5.08 CM

Pa ing Factor: 49.000 1/M

Physical Properties of Compounds:

Compound	H ATM	DL M**2/S	DG M**2/S
VINYL CHLORIDE	1.362E+03	9.900E-10	1.154E-05
1,1-DICHLOROETHENE	1.078E+03	8.381E-10	9.495E-06
METHYLENE CHLORIDE	1.074E+02	9.155E-10	1.036E-05
CHLOROFORM	1.391E+02	8.044E-10	9.017E-06
1,1,1-TRICHLOROETHANE	4.851E+02	7.068E-10	8.046E-06
CARBON TETRACHLORIDE	9.812E+02	7.117E-10	7.976E-06
TRICHLOROETHYLENE	3.436E+02	7.357E-10	8.223E-06
TETRACHLOROETHYLENE	6.082E+02	6.611E-10	7.366E-06
1, ?,2-TETRACHLOROETHANE	1.635E+01	6.392E-10	7.104E-06
CHLOROBENZENE	1.294E+02	6.981E-10	7.854E-06
XACHLOROETHANE	3.850E+02	5.439E-10	6.097E-06
4-DICHLOROBENZENE	9.952E+01	6.325E-10	7.028E-06
1,2-DICHLOROBENZENE	7.118E+01	6.325E-10	7.008E-06

Calculated Tower Properties:

Tower Diameter: 1.372 M

Water Mass Velocity: 10.654 KG/S/M**2

Air Mass Velocity: 1.270 KG/S/M**2

Interfacial Area for Mass Transfer: 69.55 M**2/M**3

Pressure Drop: 0.001 INCHES WATER PER FOOT

Mass Transfer Properties:

Compound	kla MOLE/S/M**3	kga MOLE/S/M**3	KLa MOLE/S/M**3
VINYL CHLORIDE	7.8989E+02	3.4143E+01	7.7670E+02
1,1-DICHLOROETHENE	7.2676E+02	2.9977E+01	7.1078E+02
METHYLENE CHLORIDE	7.5958E+02	3.1761E+01	6.2123E+02
CHLOROFORM	7.1200E+02	2.8963E+01	6.0507E+02
1,1,1-TRICHLOROETHANE	6.6742E+02	2.6843E+01	6.3488E+02
CARBON TETRACHLORIDE	6.6971E+02	2.6689E+01	6.5301E+02
TRICHLOROETHYLENE	6.8094E+02	2.7235E+01	6.3475E+02
TETRACHLOROETHYLENE	6.4548E+02	2.5309E+01	6.1950E+02
1,1,2,2-TETRACHLOROETHANE	6.3468E+02	2.4705E+01	2.4681E+02
CHLOROBENZENE	6.6328E+02	2.6414E+01	5.5549E+02
HEXACHLOROETHANE	5.8547E+02	2.2311E+01	5.4811E+02
1,4-DICHLOROBENZENE	6.3135E+02	2.4529E+01	5.0161E+02
1,2-DICHLOROBENZENE	6.3135E+02	2.4483E+01	4.6345E+02

Woodward-Clyde Consultants - Air Stripper Modeling Program
Version 3.0 - December 10, 1990

Job Title: GILL CREEK OHM 54-INCH DIA TOWER
Job Number: 22915-219

June 16, 1992 Run by: JPS

Compound	Stripping Factor	NOL	HOL M
VINYL CHLORIDE	******	7.206	0.761
1,1-DICHLOROETHENE	79.967	6.594	0.832
METHYLENE CHLORIDE	7.965	5.763	0.952
CHLOROFORM	10.318	5.613	0.977
1,1,1-TRICHLOROETHANE	35.980	5.890	0.931
CARBON TETRACHLORIDE	72.774	6.058	0.906
TRICHLOROETHYLENE	25.484	5.889	0.932
TETRACHLOROETHYLENE	45.113	5.747	0.955
1,1,2,2-TETRACHLOROETHANE	1.212	2.290	2.396
CHLOROBENZENE	9.598	5.153	1.065
[illegible] CHLOROETHANE	28.558	5.085	1.079
1,4-DICHLOROBENZENE	7.381	4.654	1.179
1,2-DICHLOROBENZENE	5.279	4.299	1.276

Tower Design:

Tower Diameter: 1.372 M 4.500 FEET

Tower Packed Height: 5.49 M 18.00 FEET

Tower Packing: 2 INCH POLYPROPYLENE JAEGER TRI-PACK

Total Pressure Drop for Air Flow Through Column: 2.02 INCHES OF WATER
(includes 2 inches water for distribution and support)

Mass Balance for Stripping Tower Operation:

Mass Flowrate of Water: 2.999E+06 LB/DAY

Mass Flowrate of Air: 3.574E+05 LB/DAY

Volume Flowrate of Water: 249.97 GPM

Volume Flowrate of Air: 3075.05 SCFM

Co..caminant Mass Balance for Water Stream:

Compound	Influent		Effluent	
	ppb	lb/day	ppb	lb/day
VINYL CHLORIDE	2832.0	8.49	2.24	0.0067
1,1-DICHLOROETHENE	148.0	0.44	0.22	0.0007
METHYLENE CHLORIDE	2649.0	7.94	15.01	0.0450
CHLOROFORM	863.0	2.59	4.90	0.0147
1,1,1-TRICHLOROETHANE	296.0	0.89	0.94	0.0028
CARBON TETRACHLORIDE	136.0	0.41	0.34	0.0010
TRICHLOROETHYLENE	22624.0	67.84	75.89	0.2276
TETRACHLOROETHYLENE	7205.0	21.60	25.54	0.0766
1,1,2,2-TETRACHLOROETHANE	7076.0	21.22	1853.77	5.5586
CHLOROBENZENE	1959.0	5.87	17.37	0.0521
HEXACHLOROETHANE	111.0	0.33	0.79	0.0024
1,4-DICHLOROBENZENE	387.0	1.16	6.00	0.0180
1,2-DICHLOROBENZENE	558.0	1.67	13.95	0.0418
TOTAL ORGANICS	46844.0	140.46	2016.97	6.0479

Woodward-Clyde Consultants - Air Stripper Modeling Program
Version 3.0 - December 10, 1990

Job Title: GILL CREEK OHM 54-INCH DIA TOWER
Job Number: 22915-219

June 16, 1992

Run by: JPS

Air Emissions:

Compound	ppm	lb/day	
VINYL CHLORIDE	10.99724	8.48510	0.0445
1,1-DICHLOROETHENE	0.37028	0.44313	0.0023
METHYLENE CHLORIDE	7.53208	7.89805	0.0415
CHLOROFORM	1.74560	2.57302	0.0135
1,1,1-TRICHLOROETHANE	0.53724	0.88475	0.0046
CARBON TETRACHLORIDE	0.21424	0.40678	0.0021
TRICHLOROETHYLENE	41.68005	67.61089	0.3550
TETRACHLOROETHYLENE	10.51769	21.52772	0.1130
1,1,2,2-TETRACHLOROETHANE	7.55922	15.65893	0.0822
CHLOROBENZENE	4.18834	5.82201	0.0306
HEXACHLOROETHANE	0.11309	0.33046	0.0017
1,4-DICHLOROBENZENE	0.62953	1.14243	0.0060
1,2-DICHLOROBENZENE	0.89896	1.63136	0.0056
TOTAL ORGANICS	86.98358	134.41463	

Woodward-Clyde Consultants - Air Stripper Modeling Program
Version 3.0 - December 10, 1990

Job Title: GILL CREEK OHM 54-INCH DIA TOWER
Job Number: 22915-219

June 16, 1992 Run by: JPS

Prediction of Removals for a Specified Packed Tower Design

Flowrate Data:

Water Flowrate: 250.00 GPM

Temperature: 60.00 F

Pressure: 1.00 atm

Flowrate of Air to Stripper: 3300.00 CFM

Air Flowrate Measured at: Pressure of: 1.000 ATM

Temperature of: 68.00 F

Contaminant Data:

Compound	Concentration in Water to be Treated	
HEXACHLOROBUTADIENE	357.0000	PPB
BENZENE	5477.0000	PPB
1,2-DICHLOROETHENE	5501.0000	PPB
HEXACHLOROBENZENE	16.5000	PPB
1,3-DICHLOROBENZENE	175.0000	PPB
1,2,4-TRICHLOROBENZENE	894.0000	PPB
TOTAL ORGANICS	12.4205	PPM

Tower Design Parameters:

Tower Packing: 2 INCH POLYPROPYLENE JAEGER TRI-PACK

Packing Properties:

Surface Area per Unit Volume: 157.00 M**2/M**3

Nominal Diameter: 5.08 CM

Packing Factor: 49.000 1/M

Physical Properties of Compounds:

Compound	H ATM	DL M**2/S	DG M**2/S
HEXACHLOROBUTADIENE	3.896E+02	8.255E-10	7.961E-06
BENZENE	1.958E+02	7.832E-10	9.183E-06
1,2-DICHLOROETHENE	2.077E+02	8.381E-10	9.435E-06
HEXACHLOROBENZENE	6.430E+01	4.759E-10	5.186E-06
1,3-DICHLOROBENZENE	9.622E+01	6.325E-10	7.031E-06
1,2,4-TRICHLOROBENZENE	5.374E+01	5.811E-10	6.408E-06

Calculated Tower Properties:

Tower Diameter: 1.372 M

Water Mass Velocity: 10.654 KG/S/M**2

Air Mass Velocity: 1.270 KG/S/M**2

Interfacial Area for Mass Transfer: 69.55 M**2/M**3

Pressure Drop: 0.001 INCHES WATER PER FOOT.

Mass Transfer Properties:

Compound	kla MOLE/S/M**3	kga MOLE/S/M**3	KLa MOLE/S/M**3
HEXACHLOROBUTADIENE	7.2129E+02	2.6653E+01	6.7444E+02
BENZENE	7.0256E+02	2.9317E+01	6.2595E+02
1,2-DICHLOROETHENE	7.2676E+02	2.9851E+01	6.5049E+02
HEXACHLOROBENZENE	5.4763E+02	2.0028E+01	3.8424E+02
1,3-DICHLOROBENZENE	6.3135E+02	2.4536E+01	4.9814E+02
1,2,4-TRICHLOROBENZENE	6.0516E+02	2.3065E+01	4.0663E+02

Compound	Stripping Factor	NOL	HOL M
HEXACHLOROBUTADIENE	28.896	6.257	0.877
BENZENE	14.522	5.807	0.945
1,2-DICHLOROETHENE	15.402	6.035	0.909
HEXACHLOROBENZENE	4.769	3.565	1.539
1,3-DICHLOROBENZENE	7.137	4.621	1.187
1,2,4-TRICHLOROBENZENE	3.986	3.772	1.454

Tower Design:

Tower Diameter: 1.372 M 4.500 FEET

Tower Packed Height: 5.49 M 18.00 FEET

Tower Packing: 2 INCH POLYPROPYLENE JAEGER TRI-PACK

Total Pressure Drop for Air Flow Through Column: 2.02 INCHES OF WATER
(includes 2 inches water for distribution and support)

Woodward-Clyde Consultants - Air Stripper Modeling Program
Version 3.0 - December 10, 1990

Job Title: GILL CREEK OHM 54-INCH DIA TOWER
Job Number: 22915-219

June 16, 1992 Run by: JPS

Mass Balance for Stripping Tower Operation:

Mass Flowrate of Water: 2.999E+06 LB/DAY

Mass Flowrate of Air: 3.574E+05 LB/DAY

Volume Flowrate of Water: 249.97 GPM

Volume Flowrate of Air: 3075.05 SCFM

Contaminant Mass Balance for Water Stream:

Compound	Influent		Effluent	
	ppb	lb/day	ppb	lb/day
HEXACHLOROBUTADIENE	357.0	1.07	0.82	0.0025
BENZENE	5477.0	16.42	22.88	0.0686
1,2-DICHLOROETHENE	5501.0	16.49	18.23	0.0547
HEXACHLOROBENZENE	16.5	0.05	0.79	0.0024
1,3-DICHLOROBENZENE	175.0	0.52	2.84	0.0085
1,2,4-TRICHLOROBENZENE	894.0	2.68	40.28	0.1208
TOTAL ORGANICS	12420.5	37.24	85.83	0.2574

Woodward-Clyde Consultants - Air Stripper Modeling Program
Version 3.0 - December 10, 1990

Job Title: GILL CREEK OHM 54-INCH DIA TOWER

Job Number: 22915-219

June 16, 1992

Run by: JPS

Air Emissions:

Compound	ppm	lb/day
HEXACHLOROBUTADIENE	0.33172	1.06801
BENZENE	16.96023	16.35428
1,2-DICHLOROETHENE	13.73760	16.44019
HEXACHLOROBENZENE	0.01340	0.04711
1,3-DICHLOROBENZENE	0.28447	0.51623
1,2,4-TRICHLOROBENZENE	1.14312	2.55989
TOTAL ORGANICS	32.47054	36.98571

Woodward-Clyde Consultants - Air Stripper Modeling Program
Version 3.0 - December 10, 1990

Job Title: GILL CREEK OHM 84-INCH DIA TOWER
Job Number: 22915-219

June 16, 1992 Run by: JPS

Prediction of Removals for a Specified Packed Tower Design

84" ϕ
18' ht
3 1/2" Jaeger

Flowrate Data:

Water Flowrate: 500.00 GPM

Temperature: 60.00 F

Pressure: 1.00 atm

Flowrate of Air to Stripper: 7200.00 CFM

Air Flowrate Measured at: Pressure of: 1.000 ATM

Temperature of: 68.00 F

Contaminant Data:

Compound	Concentration in Water to be Treated	
VINYL CHLORIDE	2832.0000	PPB
1,1-DICHLOROETHENE	148.0000	PPB
METHYLENE CHLORIDE	2649.0000	PPB
CHLOROFORM	863.0000	PPB
1,1,1-TRICHLOROETHANE	296.0000	PPB
CARBON TETRACHLORIDE	136.0000	PPB
TRICHLOROETHYLENE	22624.0000	PPB
TETRACHLOROETHYLENE	7205.0000	PPB
1,1,2,2-TETRACHLOROETHANE	7076.0000	PPB
CHLOROBENZENE	1959.0000	PPB
HEXACHLOROETHANE	111.0000	PPB
1,4-DICHLOROBENZENE	387.0000	PPB
1 -DICHLOROBENZENE	558.0000	PPB
TOTAL ORGANICS	46.8440	PPM

Job Title: GILL CREEK OHM 84-INCH DIA TOWER
Job Number: 22915-219

June 16, 1992 Run by: JPS

Tower Design Parameters:

Tower Packing: 3-1/2 INCH POLYPROPYLENE JAEGER TRI-PACK

Packing Properties:

Surface Area per Unit Volume: 138.00 M**2/M**3

Nominal Diameter: 8.90 CM

Pr ing Factor: 46.000 1/M

Woodward-Clyde Consultants - Air Stripper Modeling Program
Version 3.0 - December 10, 1990

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o Title: GILL CREEK OHM 84-INCH DIA TOWER
Job Number: 22915-219

June 16, 1992 Run by: JPS

Physical Properties of Compounds:

Compound	H ATM	DL M**2/S	DG M**2/S
VINYL CHLORIDE	1.362E+03	9.900E-10	1.154E-05
1,1-DICHLOROETHENE	1.078E+03	8.381E-10	9.495E-06
METHYLENE CHLORIDE	1.074E+02	9.155E-10	1.036E-05
CHLOROFORM	1.391E+02	8.044E-10	9.017E-06
1,1,1-TRICHLOROETHANE	4.851E+02	7.068E-10	8.046E-06
CARBON TETRACHLORIDE	9.812E+02	7.117E-10	7.976E-06
TRICHLOROETHYLENE	3.436E+02	7.357E-10	8.223E-06
TETRACHLOROETHYLENE	6.082E+02	6.611E-10	7.366E-06
1 2,2-TETRACHLOROETHANE	1.635E+01	6.392E-10	7.104E-06
CH..ROBENZENE	1.294E+02	6.981E-10	7.854E-06
EXACHLOROETHANE	3.850E+02	5.439E-10	6.097E-06
4-DICHLOROBENZENE	9.952E+01	6.325E-10	7.028E-06
1,2-DICHLOROBENZENE	7.118E+01	6.325E-10	7.008E-06

Woodward-Clyde Consultants - Air Stripper Modeling Program
Version 3.0 - December 10, 1990

Job Title: GILL CREEK OHM 84-INCH DIA TOWER
Job Number: 22915-219

June 16, 1992 Run by: JPS

Calculated Tower Properties:

Tower Diameter: 2.134 M

Water Mass Velocity: 8.806 KG/S/M**2

Air Mass Velocity: 1.145 KG/S/M**2

Interfacial Area for Mass Transfer: 59.75 M**2/M**3

Pressure Drop: 0.000 INCHES WATER PER FOOT

Ma . Transfer Properties:

Compound	kla MOLE/S/M**3	kga MOLE/S/M**3	KLa MOLE/S/M**3
VINYL CHLORIDE	7.8598E+02	1.1067E+01	7.4703E+02
1,1-DICHLOROETHENE	7.2316E+02	9.7164E+00	6.7646E+02
METHYLENE CHLORIDE	7.5581E+02	1.0295E+01	4.4891E+02
CHLOROFORM	7.0848E+02	9.3877E+00	4.5930E+02
1,1,1-TRICHLOROETHANE	6.6412E+02	8.7007E+00	5.7383E+02
CARBON TETRACHLORIDE	6.6640E+02	8.6506E+00	6.1788E+02
TRICHLOROETHYLENE	6.7756E+02	8.8277E+00	5.5384E+02
TETRACHLOROETHYLENE	6.4228E+02	8.2034E+00	5.6903E+02
1,1,2,2-TETRACHLOROETHANE	6.3154E+02	8.0078E+00	1.0843E+02
CHLOROBENZENE	6.6000E+02	8.5616E+00	4.1361E+02
HEXACHLOROETHANE	5.8257E+02	7.2318E+00	4.8177E+02
1,4-DICHLOROBENZENE	6.2822E+02	7.9507E+00	3.5018E+02
1,2-DICHLOROBENZENE	6.2822E+02	7.9357E+00	2.9743E+02

Woodward-Clyde Consultants - Air Stripper Modeling Program
Version 3.0 - December 10, 1990

Title: GILL CREEK OHM 84-INCH DIA TOWER
Job Number: 22915-219

June 16, 1992 Run by: JPS

Compound	Stripping Factor	NOL	HOL M
VINYL CHLORIDE	******	8.385	0.654
1,1-DICHLOROETHENE	87.237	7.593	0.723
METHYLENE CHLORIDE	8.689	5.039	1.089
CHLOROFORM	11.256	5.155	1.064
1,1,1-TRICHLOROETHANE	39.251	6.441	0.852
CARBON TETRACHLORIDE	79.390	6.935	0.791
TRICHLOROETHYLENE	27.801	6.216	0.883
TETRACHLOROETHYLENE	49.214	6.387	0.859
1,1,2,2-TETRACHLOROETHANE	1.323	1.217	4.508
CHLOROBENZENE	10.471	4.642	1.182
HF"ACHLOROETHANE	31.154	5.408	1.015
1, DICHLOROBENZENE	8.052	3.931	1.396
.2-DICHLOROBENZENE	5.759	3.338	1.643

Tower Design:

Tower Diameter: 2.134 M 7.000 FEET

Tower Packed Height: 5.49 M 18.00 FEET

Tower Packing: 3-1/2 INCH POLYPROPYLENE JAEGER TRI-PACK

Total Pressure Drop for Air Flow Through Column: 2.00 INCHES OF WATER
(includes 2 inches water for distribution and support)

Job Title: GILL CREEK OHM 84-INCH DIA TOWER
Job Number: 22915-219

June 16, 1992 Run by: JPS

Mass Balance for Stripping Tower Operation:

Mass Flowrate of Water: 5.997E+06 LB/DAY

Mass Flowrate of Air: 7.797E+05 LB/DAY

Volume Flowrate of Water: 499.93 GPM

Volume Flowrate of Air: 6709.20 SCFM

Co..aminant Mass Balance for Water Stream:

Compound	Influent ppb	Influent lb/day	Effluent ppb	Effluent lb/day
VINYL CHLORIDE	2832.0	16.98	0.69	0.0041
1,1-DICHLOROETHENE	148.0	0.89	0.08	0.0005
METHYLENE CHLORIDE	2649.0	15.89	27.17	0.1630
CHLOROFORM	863.0	5.18	7.18	0.0430
1,1,1-TRICHLOROETHANE	296.0	1.78	0.54	0.0033
CARBON TETRACHLORIDE	136.0	0.82	0.14	0.0009
TRICHLOROETHYLENE	22624.0	135.68	54.46	0.3266
TETRACHLOROETHYLENE	7205.0	43.21	13.53	0.0811
1,1,2,2-TETRACHLOROETHANE	7076.0	42.44	2927.64	17.5572
CHLOROBENZENE	1959.0	11.75	26.63	0.1597
HEXACHLOROETHANE	111.0	0.67	0.57	0.0034
1,4-DICHLOROBENZENE	387.0	2.32	10.89	0.0653
1,2-DICHLOROBENZENE	558.0	3.35	29.55	0.1772
TOTAL ORGANICS	46844.0	280.93	3099.08	18.5853

ɔodward-Clyde Consultants - Air Stripper Modeling Program
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Title: GILL CREEK OHM 84-INCH DIA TOWER — Page 7 of 7
Job Number: 22915-219

June 16, 1992 — Run by: JPS

ir Emissions:

Compound	ppm	lb/day	g/s
INYL CHLORIDE	10.08631	16.97946	0.0591
,1-DICHLOROETHENE	0.33974	0.88708	0.0047
METHYLENE CHLORIDE	6.87253	15.72318	0.0525
CHLOROFORM	1.59590	5.13240	0.0269
,1,1-TRICHLOROETHANE	0.49313	1.77187	0.0093
ARBON TETRACHLORIDE	0.19668	0.81474	0.0042
TRICHLOROETHYLENE	38.24304	135.35033	0.7106
ETRACHLOROETHYLENE	9.65735	43.12749	0.2264
,ʾ 2,2-TETRACHLOROETHANE	5.50439	24.87784	0.1306
CH ROBENZENE	3.82099	11.58847	0.0605
XACHLOROETHANE	0.10387	0.66223	0.0035
-DICHLOROBENZENE	0.56968	2.25557	0.0118
,2-DICHLOROBENZENE	0.80041	3.16915	0.0166
OTAL ORGANICS	78.28403	262.33984	

Woodward-Clyde Consultants - Air Stripper Modeling Program
Version 3.0 - December 10, 1990

Job Title: GILL CREEK OHM 84-INCH DIA TOWER
Job Number: 22915-219

June 18, 1992

Run by: JPS

Prediction of Removals for a Specified Packed Tower Design

84" ⌀
18' G.
6" Jaeger
500 ppb Benzene
inlet

Flowrate Data:

Water Flowrate: 500.00 GPM

Temperature: 60.00 F

Pressure: 1.00 atm

Flowrate of Air to Stripper: 7200.00 CFM

Air Flowrate Measured at: Pressure of: 1.000 ATM

Temperature of: 68.00 F

Contaminant Data:

Compound	Concentration in Water to be Treated	
HEXACHLOROBUTADIENE	357.0000	PPB
BENZENE	500.0000	PPB
1,2-DICHLOROETHENE	5501.0000	PPB
HEXACHLOROBENZENE	16.5000	PPB
1,3-DICHLOROBENZENE	175.0000	PPB
1,2,4-TRICHLOROBENZENE	894.0000	PPB
TOTAL ORGANICS	7.4435	PPM

Job Title: GILL CREEK OHM 84-INCH DIA TOWER
Job Number: 22915-219

June 18, 1992 Run by: JPS

Tower Design Parameters:

Tower Packing: 2 INCH POLYPROPYLENE JAEGER TRI-PACK

Packing Properties:

Surface Area per Unit Volume: 157.00 M**2/M**3

Nominal Diameter: 5.08 CM

Packing Factor: 49.000 1/M

Physical Properties of Compounds:

Compound	H ATM	DL M**2/S	DG M**2/S
HEXACHLOROBUTADIENE	3.896E+02	8.255E-10	7.961E-06
BENZENE	1.958E+02	7.832E-10	9.183E-06
1,2-DICHLOROETHENE	2.077E+02	8.381E-10	9.435E-06
HEXACHLOROBENZENE	6.430E+01	4.759E-10	5.186E-06
1,3-DICHLOROBENZENE	9.622E+01	6.325E-10	7.031E-06
1,2,4-TRICHLOROBENZENE	5.374E+01	5.811E-10	6.408E-06

Job Title: GILL CREEK OHM 84-INCH DIA TOWER
Job Number: 22915-219

June 18, 1992 Run by: JPS

Calculated Tower Properties:

Tower Diameter: 2.134 M

Water Mass Velocity: 8.806 KG/S/M**2

Air Mass Velocity: 1.145 KG/S/M**2

Interfacial Area for Mass Transfer: 65.72 M**2/M**3

Pressure Drop: 0.000 INCHES WATER PER FOOT

ss Transfer Properties:

Compound	kla MOLE/S/M**3	kga MOLE/S/M**3	KLa MOLE/S/M**3
HEXACHLOROBUTADIENE	6.2335E+02	2.3423E+01	5.8349E+02
BENZENE	6.0717E+02	2.5764E+01	5.4194E+02
1,2-DICHLOROETHENE	6.2808E+02	2.6233E+01	5.6315E+02
HEXACHLOROBENZENE	4.7328E+02	1.7601E+01	3.3372E+02
1,3-DICHLOROBENZENE	5.4562E+02	2.1562E+01	4.3201E+02
1,2,4-TRICHLOROBENZENE	5.2299E+02	2.0269E+01	3.5334E+02

Job Title: GILL CREEK OHM 84-INCH DIA TOWER
Job Number: 22915-219

June 18, 1992 Run by: JPS

Compound	Stripping Factor	NOL	HOL M
HEXACHLOROBUTADIENE	31.523	6.549	0.838
BENZENE	15.842	6.083	0.902
1,2-DICHLOROETHENE	16.802	6.321	0.868
HEXACHLOROBENZENE	5.202	3.746	1.465
1,3-DICHLOROBENZENE	7.786	4.849	1.131
1,2,4-TRICHLOROBENZENE	4.348	3.966	1.383

Tower Design:

Tower Diameter: 2.134 M 7.000 FEET

Tower Packed Height: 5.49 M 18.00 FEET

Tower Packing: 2 INCH POLYPROPYLENE JAEGER TRI-PACK

Total Pressure Drop for Air Flow Through Column: 2.00 INCHES OF WATER
(includes 2 inches water for distribution and support)

Woodward-Clyde Consultants - Air Stripper Modeling Program
Version 3.0 - December 10, 1990

Job Title: GILL CREEK OHM 84-INCH DIA TOWER
Job Number: 22915-219

June 18, 1992 Run by: JPS

Mass Balance for Stripping Tower Operation:

Mass Flowrate of Water: 5.997E+06 LB/DAY

Mass Flowrate of Air: 7.797E+05 LB/DAY

Volume Flowrate of Water: 499.93 GPM

Volume Flowrate of Air: 6709.20 SCFM

ontaminant Mass Balance for Water Stream:

Compound	Influent ppb	Influent lb/day	Effluent ppb	Effluent lb/day
HEXACHLOROBUTADIENE	357.0	2.14	0.61	0.0037
BENZENE	500.0	3.00	1.57	0.0094
1,2-DICHLOROETHENE	5501.0	32.99	13.56	0.0813
HEXACHLOROBENZENE	16.5	0.10	0.65	0.0039
1,3-DICHLOROBENZENE	175.0	1.05	2.23	0.0134
1,2,4-TRICHLOROBENZENE	894.0	5.36	32.83	0.1969
TOTAL ORGANICS	7443.5	44.64	51.45	0.3086

Job Title: GILL CREEK OHM 84-INCH DIA TOWER

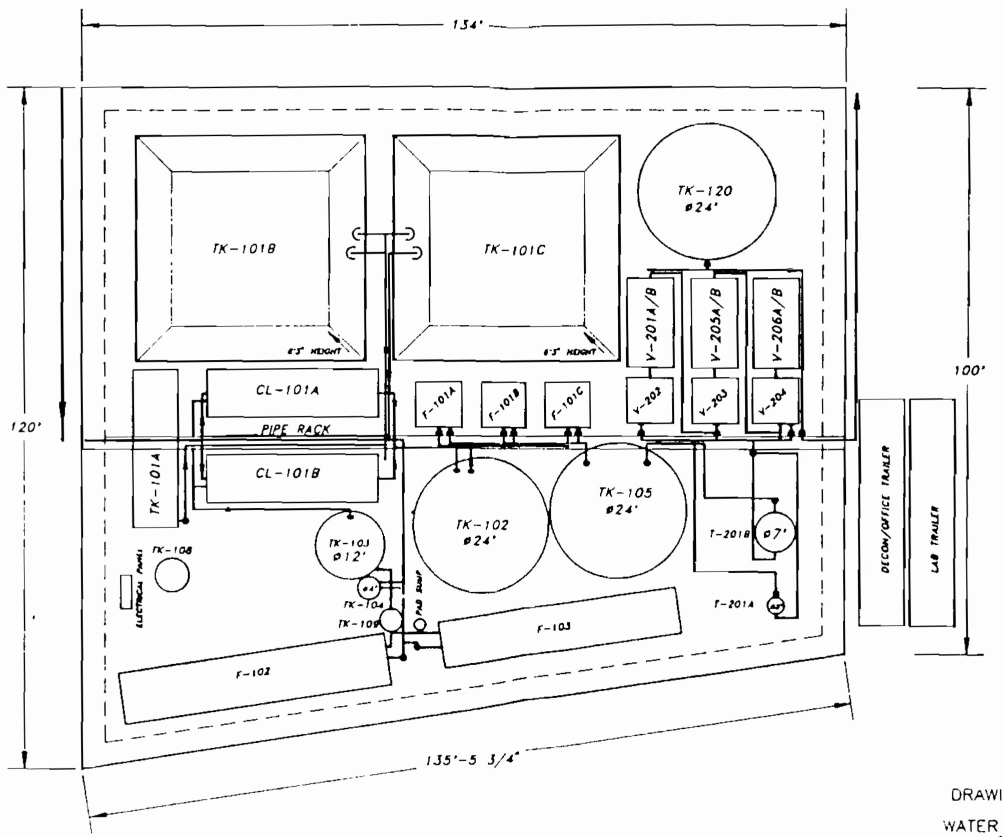
Job Number: 22915-219

June 18, 1992

Run by: JPS

Air Emissions:

Compound	ppm	lb/day
HEXACHLOROBUTADIENE	0.30426	2.13729
BENZENE	1.42077	2.98910
1,2-DICHLOROETHENE	12.60353	32.90839
HEXACHLOROBENZENE	0.01239	0.09504
1,3-DICHLOROBENZENE	0.26168	1.03609
1,2,4-TRICHLOROBENZENE	1.05700	5.16446
TOTAL ORGANICS	15.65963	44.33037



DRAWING NO. 12722-03

WATER TREATMENT SYSTEM
PLOT PLAN DRAWING
GILL CREEK REMEDIATION

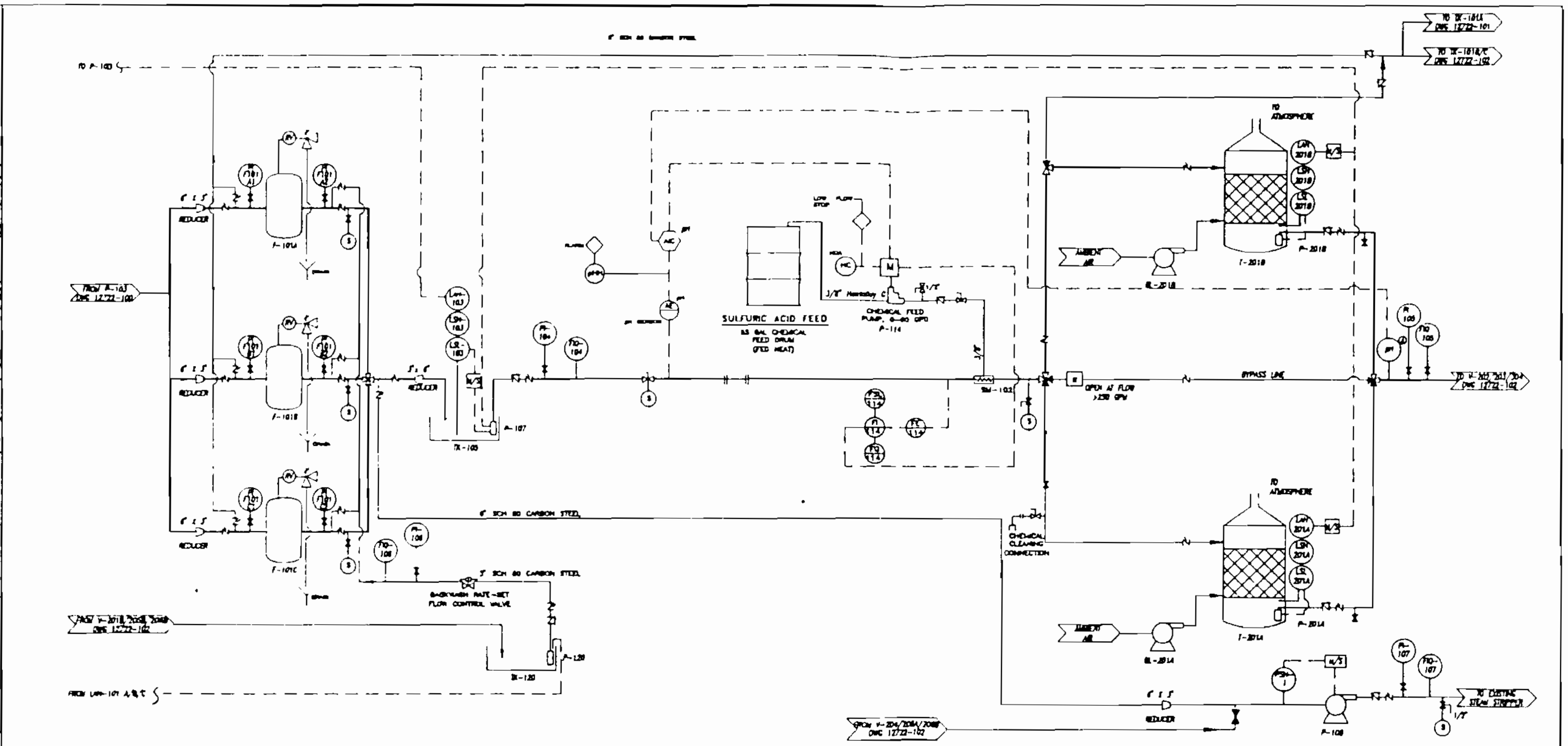
PREPARED FOR

DU PONT/OLIN
NIAGARA FALLS, NEW YORK

OHM Corporation

OHM CORPORATION PRINCETON, NJ	DRAWN BY	CHECKED BY	APPROVED BY	DRAWING NUMBER
	VW 5-15-92	6-11-92	6-11-92	12722-03

PLOT SCALE 1" = 10'



OHM CORPORATION PRINCETON, NJ	DRAWN BY J BARBERI 6-5-92	REVISED BY 8-11-92	APPROVED BY	DRAWING NUMBER 12722

LEGEND

SOLENOID VALVE		FLOW CONTROL VALVE		ANALYZER-INDICATOR-CONTROLLER (pH FACTOR)		LEVEL SWITCH, LOW, LOW	
CLOSED VALVE		BUTTERFLY VALVE		FLOW SWITCH "LOW"		LEVEL SWITCH, NORMAL	
BALL VALVE		IN-LINE STATIC MIXER		FLOW ELEMENT		pH ALARM, LOW (LAMP, HORN)	
3-WAY VALVE		LOCAL INSTRUMENT		FLOW INDICATOR		pH ALARM, HIGH (LAMP, HORN)	
CHECK VALVE		PANEL INSTRUMENT		FLOW INDICATOR TRANSMITTER		LEVEL ALARM, HIGH (LAMP)	
FLOAT STOP VALVE		INTERLOCK, RELAY		FLOW TOTALIZER		LEVEL ALARM, LOW (LAMP)	
RELIEF VALVE		HAND CONTROL (HAND-OFF-AUTO)		LEVEL SWITCH, HIGH		SAMPLE LOCATION	
MOTOR OPERATED BALL VALVE				LEVEL SWITCH, LOW		PRESSURE INDICATOR	
PRESSURE CONTROL VALVE							

DRAWING No.12722-101

GILL CREEK REMEDIATION
WATER TREATMENT SYSTEM
PROCESS AND INSTRUMENTATION DIAGRAM

SHEET 2 OF 3
PREPARED FOR
DUPONT/OLIN
NIAGARA FALLS, NY
OHM PROJECT 12722

OHM Corporation

NEW YORK STATE
DEPARTMENT OF ENVIRONMENTAL CONSERVATION

PROCESS, EXHAUST OR VENTILATION SYSTEM

APPLICATION FOR PERMIT TO CONSTRUCT OR CERTIFICATE TO OPERATE

LOCATION | FACILITY | EMISSION POINT

ADD / CHANGE / DELETE

READ INSTRUCTIONS CONTAINED IN FORM 76-11-12 BEFORE ANSWERING ANY QUESTION

WHITE – ORIGINAL; GREEN – DIVISION OF AIR; WHITE – REGIONAL OFFICE; WHITE – FIELD REP.; YELLOW – APPLICANT

NAME OF OWNER / FIRM: du Pont de Nemours and Company

STREET ADDRESS: '07 Market Street

TOWN / VILLAGE: Wilmington | STATE: DE | ZIP: 19898

OWNER CLASSIFICATION: COMMERCIAL; INDUSTRIAL (X); UTILITY; FEDERAL; STATE; MUNICIPAL; EDUCATIONAL / INSTITUTIONAL; HOSPITAL; RESIDENTIAL; OTHER

NAME & TITLE OF OWNER'S REPRESENTATIVE: Richard Gentilucci, Manager Environmental Affairs | TELEPHONE: (716) 278-5162

9 NAME OF AUTHORIZED AGENT | 10 TELEPHONE

11 NUMBER AND STREET ADDRESS

12 CITY / TOWN / VILLAGE | 13 STATE | 14 ZIP

15 NAME OF P.E. OR ARCHITECT PREPARING APPLICATION: W. L. Quon | 16 N.Y.S. P.E. OR ARCHITECT LICENSE NO: 063343 | 17 TELEPHONE: (716) 278-5504

18 SIGNATURE OF OWNER'S REPRESENTATIVE OR AGENT WHEN APPLYING FOR A PERMIT TO CONSTRUCT

19 FACILITY NAME (IF DIFFERENT FROM OWNER / FIRM)

20 FACILITY LOCATION (NUMBER AND STREET ADDRESS): Buffalo Avenue and 26th Street

21 CITY / TOWN / VILLAGE: Niagara Falls | 22 ZIP: 14302

23 BUILDING NAME OR NUMBER: Gill Creek Remediation | 24 FLOOR NAME OR NUMBER: Ground

25 START UP DATE: 8 / 92 (MO / YR) | 26 DRAWING NUMBERS OF PLANS SUBMITTED: EE-40-5337

27 PERMIT TO CONSTRUCT: A (X) NEW SOURCE; B MODIFICATION

28 CERTIFICATE TO OPERATE: A NEW SOURCE; B MODIFICATION; C EXISTING SOURCE

EMISSION POINT ID	30 GROUND ELEVATION (FT)	31 HEIGHT ABOVE STRUCTURE (FT)	32 STACK HEIGHT (FT)	33 INSIDE DIMENSIONS (IN)	34 EXIT TEMP (°F)	35 EXIT VELOCITY (FT/SEC)	36 EXIT FLOW RATE (ACFM)	37 SOURCE CODE	38 HRS/DAY	39 DAYS/YR	40 % OPERATION BY SEASON Winter	Spring	Summer	Fall
GI 11	568	30	40	30	68	6.9	414		24	120	10		30	60

DESCRIBE PROCESS OR UNIT:
This is a temporary air emission source. It is an 84-inch diameter air stripper (packed tower). The project is the remediation of the Gill Creek sediments. The two air strippers will run alternately, depending on the water flow rate.

EMISSION CONTROL EQUIPMENT I.D.	CONTROL TYPE	MANUFACTURER'S NAME AND MODEL NUMBER	DISPOSAL METHOD	DATE INSTALLED MONTH / YEAR	USEFUL LIFE
	99			/	
				/	

CALCULATIONS

See attached

CONTAMINANT NAME	CAS NUMBER	INPUT OR PRODUCTION	UNIT	ENV RATING	EMISSIONS ACTUAL	UNIT	HOW DET	PERMISSIBLE	% CONTROL EFFIC'CY	HOURLY EMISSIONS (LBS/HR) ERP	HOURLY ACTUAL	ANNUAL EMISSIONS (LBS/YR) ACTUAL	10ⁿ	PERMISSIBLE
Vinyl chloride	75-01-4				0.707	1	6		0	0.707	0.707	2.038	3	
1 -Dichloroethene	75-35-4				0.037	1	6		0	0.037	0.037	1.064	2	
Dichloromethane	75-09-2				0.655	1	6		0	0.655	0.655	1.887	3	
Chloroform	67-66-3				0.214	1	6		0	0.214	0.214	6.159	2	
1 ,1-Trichloroethane	71-55-6				0.074	1	6		0	0.074	0.074	2.126	2	
CONTINUED . . .														

SOLID FUEL TONS/YR	% S	LIQUID FUEL TYPE	THOUSANDS OF GALLONS/YR	% S	GAS TYPE	THOUSANDS OF CF/YR	BTU/CF	APPLICABLE RULE	APPLICABLE RULE

Upon completion of construction sign the statement below and forward to the appropriate field representative. THE PROCESS, EXHAUST OR VENTILATION SYSTEM HAS BEEN CONSTRUCTED AND WILL BE OPERATED IN ACCORDANCE WITH STATED CONDITIONS AND IN CONFORMANCE WITH ALL PROVISIONS OF EXISTING REGULATIONS

155 SIGNATURE OF AUTHORIZED REPRESENTATIVE OR AGENT | DATE

LOCATION CODE	157 FACILITY ID NO	158 U.T.M. (E)	159 U.T.M. (N)	160 SIC NUMBER	161 DATE APPL. RECEIVED	162 DATE APPL. REVIEWED	163 REVIEWED BY
					/ /	/ /	

P E R M I T T O C O N S T R U C T

DATE ISSUED	165 EXPIRATION DATE	166 SIGNATURE OF APPROVAL	167 FEE
/ /	/ /		

168
1 DEVIATION FROM APPROVED APPLICATION SHALL VOID THIS PERMIT
2 THIS IS NOT A CERTIFICATE TO OPERATE
3 TESTS AND/OR ADDITIONAL EMISSION CONTROL EQUIPMENT MAY BE REQUIRED PRIOR TO THE ISSUANCE OF A CERTIFICATE TO OPERATE

C E R T I F I C A T E T O O P E R A T E

DATE ISSUED	170 EXPIRATION DATE	171 SIGNATURE OF APPROVAL	172 FEE
/ /	/ /		

173
1 ☐ INSPECTED BY ____________ DATE ________
2 ☐ INSPECTION DISCLOSED DIFFERENCES AS BUILT VS. PERMIT, CHANGES INDICATED ON FORM
3 ☐ ISSUE CERTIFICATE TO OPERATE FOR SOURCE AS BUILT
4 ☐ APPLICATION FOR C.O. DENIED ________ DATE ________ INITIALED

SPECIAL CONDITIONS

AGENCY USE ONLY

LOCATION | FACILITY | EMISSION POINT

NEW YORK STATE
DEPARTMENT OF ENVIRONMENTAL CONSERVATION

WHITE – ORIGINAL
GREEN – DIVISION OF AIR
WHITE – REGIONAL OFFICE
WHITE – FIELD REP
YELLOW – APPLICANT

A ADD
C CHANGE
D DELETE

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PROCESS, EXHAUST OR VENTILATION SYSTEM

APPLICATION FOR PERMIT TO CONSTRUCT OR CERTIFICATE TO OPERATE

1 NAME OF OWNER / FIRM
2 NUMBER AND STREET ADDRESS
3 CITY TOWN VILLAGE | 4 STATE | 5 ZIP
6 OWNER CLASSIFICATION: A ☐ COMMERCIAL B ☐ INDUSTRIAL C ☐ UTILITY D ☐ FEDERAL E ☐ STATE F ☐ MUNICIPAL G ☐ EDUCATIONAL INST H ☐ HOSPITAL I ☐ RESIDENTIAL J ☐ OTHER
7 NAME & TITLE OF OWNERS REPRESENTATIVE | 8 TELEPHONE
9 NAME OF AUTHORIZED AGENT | 10 TELEPHONE
11 NUMBER AND STREET ADDRESS
12 CITY TOWN VILLAGE | 13 STATE | 14 ZIP
15 NAME OF P E OR ARCHITECT PREPARING APPLICATION | 16 N Y S P E OR ARCHITECT LICENSE NO | 17 TELEPHONE
18 SIGNATURE OF OWNERS REPRESENTATIVE OR AGENT WHEN APPLYING FOR A PERMIT TO CONSTRUCT
19 FACILITY NAME (IF DIFFERENT FROM OWNER / FIRM)
20 FACILITY LOCATION (NUMBER AND STREET ADDRESS)
21 CITY TOWN VILLAGE | 22 ZIP
23 BUILDING NAME OR NUMBER | 24 FLOOR NAME OR NUMBER
25 START UP DATE __ / __ MO YR | 26 DRAWING NUMBERS OF PLANS SUBMITTED
27 PERMIT TO CONSTRUCT: A ☐ NEW SOURCE B ☐ MODIFICATION
28 CERTIFICATE TO OPERATE: A ☐ NEW SOURCE ☐ EXISTING SOURCE B ☐ MODIFICATION

29 EMISSION POINT ID	30 GROUND ELEVATION (FT)	31 HEIGHT ABOVE STRUCTURES (FT)	32 STACK HEIGHT (FT)	33 INSIDE DIMENSIONS (IN)	34 EXIT TEMP (°F)	35 EXIT VELOCITY (FT/SEC)	36 EXIT FLOW RATE (ACFM)	37 SOURCE CODE	38 HRS / DAY	39 DAYS / YR	40 % OPERATION BY SEASON Winter Spring Summer Fall
G I L L 1											

41 DESCRIBE PROCESS OR UNIT
1 | 2
3 | 4
5 | 6
7 | 8

EMISSION CONTROL EQUIPMENT I.D.	CONTROL TYPE	MANUFACTURER'S NAME AND MODEL NUMBER	DISPOSAL METHOD	DATE INSTALLED MONTH / YEAR	USEFUL LIFE
42	43	44	45	46 /	47
48	49	50	51	52 /	53

CALCULATIONS

CONTAMINANT NAME	CAS NUMBER	INPUT OR PRODUCTION	UNIT	ENV RATING	EMISSIONS ACTUAL	EMISSIONS UNIT	HOW DET	PERMISSIBLE	% CONTROL EFFIC'CY	HOURLY EMISSIONS (LBS/HR) ERP	HOURLY EMISSIONS (LBS/HR) ACTUAL	ANNUAL EMISSIONS (LBS/YR) ACTUAL	10ⁿ	PERMISSIBLE
54 Carbon tetrachloride	55 56-23-5	56	57	58	59 0.034	60 1	61 6	62	63 0	64 0.034	65 0.034	66 97.77	67 0	68
69 Trichloroethylene	70 79-01-6	71	72	73	74 5.64	75 1	76 6	77	78 0	79 5.64	80 5.64	81 16.24	82 3	83
84 Tetrachloroethylene	85 127-18-4	86	87	88	89 1.797	90 1	91 6	92	93 0	94 1.797	95 1.797	96 5.175	97 3	98
99 1,1,2,2-Tetrachloroethane	100 79-34-5	101	102	103	104 1.037	105 1	106 6	107	108 0	109 1.037	110 1.037	111 2.985	112 3	113
114 Chlorobenzene	115 108-90-7	116	117	118	119 0.483	120 1	121 6	122	123 0	124 0.483	125 0.483	126 1.391	127 3	128
129 CONTINUED . . .	130	131	132	133	134	135	136	137	138	139	140	141	142	143

SOLID FUEL TYPE	SOLID FUEL TONS / YR	% S	LIQUID FUEL TYPE	LIQUID FUEL THOUSANDS OF GALLONS/YR	% S	GAS TYPE	GAS THOUSANDS OF CF/YR	BTU/CF	APPLICABLE RULE	APPLICABLE RULE
144	145	146	147	148	149	150	151	152	153	154

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155 SIGNATURE OF AUTHORIZED REPRESENTATIVE OR AGENT | DATE

156 LOCATION CODE | 157 FACILITY ID NO | 158 U T M (E) | 159 U T M (N) | 160 SIC NUMBER | 161 DATE APPL RECEIVED | 162 DATE APPL REVIEWED | 163 REVIEWED BY

PERMIT TO CONSTRUCT

164 DATE ISSUED / / | 165 EXPIRATION DATE / / | 166 SIGNATURE OF APPROVAL | 167 FEE

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AGENCY USE ONLY

174 SPECIAL CONDITIONS
1 | 2
3 | 4
5 | 6
7 | 8

NEW YORK STATE
DEPARTMENT OF ENVIRONMENTAL CONSERVATION

LOCATION | FACILITY | EMISSION POINT

WHITE – ORIGINAL
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WHITE – REGIONAL OFFICE
WHITE – FIELD REP
YELLOW – APPLICANT

ADD / CHANGE / DELETE

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PROCESS, EXHAUST OR VENTILATION SYSTEM

APPLICATION FOR PERMIT TO CONSTRUCT OR CERTIFICATE TO OPERATE

NAME OF OWNER / FIRM | 9 NAME OF AUTHORIZED AGENT | 10 TELEPHONE | 19 FACILITY NAME (IF DIFFERENT FROM OWNER / FIRM)

NUMBER AND STREET ADDRESS | 11 NUMBER AND STREET ADDRESS | 20 FACILITY LOCATION (NUMBER AND STREET ADDRESS)

CITY TOWN VILLAGE | STATE | 5 ZIP | 12 CITY TOWN VILLAGE | 13 STATE | 14 ZIP | 21 CITY TOWN VILLAGE | 22 ZIP

23 BUILDING NAME OR NUMBER | 24 FLOOR NAME OR NUMBER

OWNER CLASSIFICATION: A COMMERCIAL; B INDUSTRIAL; C UTILITY; D FEDERAL; E STATE; F MUNICIPAL; G MED INST; H HOSPITAL; I RESIDENTIAL; J OTHER

15 NAME OF P.E. OR ARCHITECT PREPARING APPLICATION | 16 N.Y.S. P.E. OR ARCHITECT LICENSE NO. | 17 TELEPHONE

25 START UP DATE (MO / YR) | 26 DRAWING NUMBERS OF PLANS SUBMITTED

NAME & TITLE OF OWNERS REPRESENTATIVE | 8 TELEPHONE | 18 SIGNATURE OF OWNERS REPRESENTATIVE OR AGENT WHEN APPLYING FOR A PERMIT TO CONSTRUCT

27 PERMIT TO CONSTRUCT: A. NEW SOURCE; B. MODIFICATION

28 CERTIFICATE TO OPERATE: A. NEW SOURCE; B. MODIFICATION; C. EXISTING SOURCE

EMISSION POINT ID | 30 GROUND ELEVATION (FT) | 31 HEIGHT ABOVE STRUCTURES (FT) | 32 STACK HEIGHT (FT) | 33 INSIDE DIMENSIONS (IN) | 34 EXIT TEMP (°F) | 35 EXIT VELOCITY (FT/SEC) | 36 EXIT FLOW RATE (ACFM) | 37 SOURCE CODE | 38 HRS / DAY | 39 DAYS / YR | 40 % OPERATION BY SEASON: Winter, Spring, Summer, Fall

DESCRIBE PROCESS OR UNIT

EMISSION CONTROL EQUIPMENT I.D. | CONTROL TYPE | MANUFACTURER'S NAME AND MODEL NUMBER | DISPOSAL METHOD | DATE INSTALLED MONTH / YEAR | USEFUL LIFE

CALCULATIONS

CONTAMINANT NAME	CAS NUMBER	INPUT OR PRODUCTION	UNIT	ENV. RATING	EMISSIONS ACTUAL	EMISSIONS UNIT	HOW DET	EMISSIONS PERMISSIBLE	% CONTROL EFFIC'CY	HOURLY EMISSIONS (LBS/HR) ERP	HOURLY EMISSIONS (LBS/HR) ACTUAL	ANNUAL EMISSIONS (LBS/YR) ACTUAL	10ⁿ	ANNUAL EMISSIONS (LBS/YR) PERMISSIBLE
Hexachloroethane	67-72-1				0.028	1	6		0	0.028	0.028	7.947	1	
[illegible]-Dichlorobenzene	106-46-7				0.094	1	6		0	0.094	0.094	2.707	2	
[illegible]2-Dichlorobenzene	95-50-1				0.132	1	6		0	0.132	0.132	3.80	2	
Benzene	71-43-2				0.127	1	6		0	0.127	0.127	365	0	
[illegible]achlorobutadiene	87-68-3				0.089	1	6		0	0.089	0.089	2.56	2	
CONTINUED . . .														

SOLID FUEL TONS / YR | % S | LIQUID FUEL TYPE | THOUSANDS OF GALLONS/YR | % S | GAS TYPE | THOUSANDS OF CF/YR | BTU/CF | APPLICABLE RULE | APPLICABLE RULE

Upon completion of construction sign the statement listed below and forward to the appropriate field representative

PROCESS EXHAUST OR VENTILATION SYSTEM HAS BEEN CONSTRUCTED AND WILL BE OPERATED IN ACCORDANCE WITH STATED SPECIFICATIONS AND IN CONFORMANCE WITH ALL PROVISIONS OF EXISTING REGULATIONS

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LOCATION CODE | 157 FACILITY ID NO | 158 U.T.M. (E) | 159 U.T.M. (N) | 160 SIC NUMBER | 161 DATE APPL. RECEIVED | 162 DATE APPL. REVIEWED | 163 REVIEWED BY

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AGENCY USE ONLY

SPECIAL CONDITIONS

LOCATION | FACILITY | EMISSION POINT 1

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7 NAME & TITLE OF OWNERS REPRESENTATIVE | 8 TELEPHONE
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G I L L I											

41 DESCRIBE PROCESS OR UNIT: 1 / 2 / 3 / 4 / 5 / 6 / 7 / 8

EMISSION CONTROL EQUIPMENT ID	CONTROL TYPE	MANUFACTURER'S NAME AND MODEL NUMBER	DISPOSAL METHOD	DATE INSTALLED MONTH / YEAR	USEFUL LIFE
42	43	44	45	46 /	47
48	49	50	51	52 /	53

CALCULATIONS

CONTAMINANT NAME	CAS NUMBER	INPUT OR PRODUCTION	UNIT	ENV RATING	EMISSIONS ACTUAL	EMISSIONS UNIT	EMISSIONS HOW DET	EMISSIONS PERMISSIBLE	% CONTROL EFFIC'CY	HOURLY EMISSIONS (LBS/HR) ERP	HOURLY EMISSIONS (LBS/HR) ACTUAL	ANNUAL EMISSIONS (LBS/YR) ACTUAL	10ˣ	ANNUAL EMISSIONS (LBS/YR) PERMISSIBLE
54 1,2-Dichloroethene	55 540-59-0	56	57	58	59 1.370	60 1	61 6	62	63 0	64 1.370	65 1.370	66 3.94	67 3	68
69 Hexachlorobenzene	70 118-74-1	71	72	73	74 3.72	75 2	76 6	77	78 0	79 0.004	80 0.004	81 1.072	82 1	83
84 1,3-Dichlorobenzene	85 541-73-1	86	87	88	89 0.042	90 1	91 6	92	93 0	94 0.042	95 0.042	96 1.222	97 2	98
99 1,2,4-Trichlorobenzene	100 120-82-1	101	102	103	104 0.201	105 1	106 6	107	108 0	109 0.201	110 0.201	111 5.798	112 2	113
114	115 - -	116	117	118	119	120	121	122	123	124	125	126	127	128
129	130 - -	131	132	133	134	135	136	137	138	139	140	141	142	143

SOLID FUEL TYPE	TONS / YR	% S	LIQUID FUEL TYPE	THOUSANDS OF GALLONS/YR	% S	GAS TYPE	THOUSANDS OF CF/YR	BTU/CF	APPLICABLE RULE	APPLICABLE RULE
144	145	146	147	148	149	150	151	152	153	154

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174 SPECIAL CONDITIONS
1 | 2
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GREEN - DIVISION OF AIR
WHITE - REGIONAL OFFICE
WHITE - FIELD REP
YELLOW - APPLICANT

NAME OF OWNER / FIRM: du Pont de Nemours and Company

STREET ADDRESS: 1007 Market Street

TOWN / VILLAGE: Wilmington | STATE: DE | ZIP: 19898

OWNER CLASSIFICATION: COMMERCIAL / INDUSTRIAL / STATE / UTILITY / FEDERAL / HOSPITAL / MUNICIPAL / EDUC INST / RESIDENTIAL / OTHER — INDUSTRIAL

NAME & TITLE OF OWNERS REPRESENTATIVE: Richard Gentilucci, Manager Environmental Affairs | TELEPHONE: (716) 278-5162

9 NAME OF AUTHORIZED AGENT:
10 TELEPHONE:
11 NUMBER AND STREET ADDRESS:
12 CITY TOWN VILLAGE | 13 STATE | 14 ZIP

15 NAME OF P.E. OR ARCHITECT PREPARING APPLICATION: W. L. Quon
16 N.Y.S. P.E. OR ARCHITECT LICENSE NO: 063343
17 TELEPHONE: (716) 278-5504

18 SIGNATURE OF OWNERS REPRESENTATIVE OR AGENT WHEN APPLYING FOR A PERMIT TO CONSTRUCT:

19 FACILITY NAME (IF DIFFERENT FROM OWNER / FIRM):
20 FACILITY LOCATION (NUMBER AND STREET ADDRESS): Buffalo Avenue and 26th Street
21 CITY TOWN VILLAGE: Niagara Falls | ZIP: 14302
23 BUILDING NAME OR NUMBER: Gill Creek Remediation
24 FLOOR NAME OR NUMBER: Ground
25 START UP DATE: 8 / 92 (MO / YR)
26 DRAWING NUMBERS OF PLANS SUBMITTED: EE-40-5337
27 PERMIT TO CONSTRUCT: A [X] NEW SOURCE B [ ] MODIFICATION
28 CERTIFICATE TO OPERATE: A [ ] NEW SOURCE C [ ] EXISTING SOURCE B [ ] MODIFICATION

EMISSION POINT ID	30 GROUND ELEVATION (FT)	31 HEIGHT ABOVE STRUCTURES (FT)	32 STACK HEIGHT (FT)	33 INSIDE DIMENSIONS (IN)	34 EXIT TEMP (°F)	35 EXIT VELOCITY (FT/SEC)	36 EXIT FLOW RATE (ACFM)	37 SOURCE CODE	38 HRS/DAY	39 DAYS/YR	40 % OPERATION BY SEASON (Winter Spring Summer Fall)
G I L L 2	568	30	40	30	68	3.4	204		24	120	0 10 30 60

DESCRIBE PROCESS OR UNIT:
This is a temporary air emission source. It is a 54-inch diameter air stripper (packed tower). The project is the remediation of the Gill Creek sediments. The two air strippers will run alternately, depending on the water flow rate.

EMISSION CONTROL EQUIPMENT I.D.	CONTROL TYPE	MANUFACTURER'S NAME AND MODEL NUMBER	DISPOSAL METHOD	DATE INSTALLED MONTH / YEAR	USEFUL LIFE
42	43 99	44	45	46 /	47
	49	50	51	52 /	53

CALCULATIONS

See attached

CONTAMINANT NAME	CAS NUMBER	INPUT OR PRODUCTION	UNIT	ENV RATING	EMISSIONS ACTUAL	UNIT	HOW DET	PERMISSIBLE	% CONTROL EFFIC'CY	HOURLY EMISSIONS (LBS/HR) ERP	HOURLY ACTUAL	ANNUAL EMISSIONS (LBS/YR) ACTUAL	%	PERMISSIBLE
Vinyl chloride	75-01-4				0.354	1	6		0	0.354	0.354	1.018	3	
1,1-Dichloroethene	75-35-4				0.018	1	6		0	0.018	0.018	53.18	0	
Dichloromethane	75-09-2				0.329	1	6		0	0.329	0.329	947	0	
Chloroform	67-66-3				0.107	1	6		0	0.107	0.107	308	0	
1,1,1-Trichloroethane	71-55-6				0.037	1	6		0	0.037	0.037	106	0	
CONTINUED . . .														

SOLID FUEL TONS/YR | % S | LIQUID FUEL TYPE | THOUSANDS OF GALLONS/YR | % S | GAS TYPE | THOUSANDS OF CF/YR | BTU/CF | APPLICABLE RULE | APPLICABLE RULE

Upon completion of construction sign the statement listed below and forward to the appropriate field representative.
PROCESS, EXHAUST OR VENTILATION SYSTEM HAS BEEN CONSTRUCTED AND WILL BE OPERATED IN ACCORDANCE WITH STATED SPECIFICATIONS AND IN CONFORMANCE WITH ALL PROVISIONS OF EXISTING REGULATIONS.

155 SIGNATURE OF AUTHORIZED REPRESENTATIVE OR AGENT | DATE

LOCATION CODE | 157. FACILITY ID NO | 158. U.T.M. (E) | 159 U.T.M. (N) | 160 SIC NUMBER | 161 DATE APPL. RECEIVED | 162 DATE APPL. REVIEWED | 163 REVIEWED BY

PERMIT TO CONSTRUCT

DATE ISSUED / / | 165 EXPIRATION DATE / / | 166 SIGNATURE OF APPROVAL | 167 FEE

168
1. DEVIATION FROM APPROVED APPLICATION SHALL VOID THIS PERMIT
2. THIS IS NOT A CERTIFICATE TO OPERATE
3. TESTS AND/OR ADDITIONAL EMISSION CONTROL EQUIPMENT MAY BE REQUIRED PRIOR TO THE ISSUANCE OF A CERTIFICATE TO OPERATE

CERTIFICATE TO OPERATE

DATE ISSUED / / | 170 EXPIRATION DATE / / | 171 SIGNATURE OF APPROVAL | 172 FEE

173
1 [ ] INSPECTED BY ______ DATE ______
2 [ ] INSPECTION DISCLOSED DIFFERENCES AS BUILT VS. PERMIT. CHANGES INDICATED ON FORM
3 [ ] ISSUE CERTIFICATE TO OPERATE FOR SOURCE AS BUILT
4 [ ] APPLICATION FOR C.O. DENIED ______ DATE ______ INITIALED

SPECIAL CONDITIONS

AGENCY USE ONLY

LOCATION | FACILITY | EMISSION POINT

NEW YORK STATE
DEPARTMENT OF ENVIRONMENTAL CONSERVATION

WHITE – ORIGINAL
GREEN – DIVISION OF AIR
WHITE – REGIONAL OFFICE
WHITE – FIELD REP
YELLOW – APPLICANT

A ADD
C CHANGE
D DELETE

READ INSTRUCTIONS CONTAINED IN FORM 76 BEFORE ANSWERING ANY QUESTION

PROCESS, EXHAUST OR VENTILATION SYSTEM

APPLICATION FOR PERMIT TO CONSTRUCT OR CERTIFICATE TO OPERATE

1 NAME OF OWNER / FIRM
2 NUMBER AND STREET ADDRESS
3 CITY TOWN VILLAGE | 4 STATE | 5 ZIP
6 OWNER CLASSIFICATION: A ☐ COMMERCIAL B ☐ INDUSTRIAL C ☐ UTILITY D ☐ FEDERAL E ☐ STATE F ☐ MUNICIPAL G ☐ EDUC INST H ☐ HOSPITAL I ☐ RESIDENTIAL J ☐ OTHER
7 NAME & TITLE OF OWNERS REPRESENTATIVE | 8 TELEPHONE
9 NAME OF AUTHORIZED AGENT | 10 TELEPHONE
11 NUMBER AND STREET ADDRESS
12 CITY TOWN VILLAGE | 13 STATE | 14 ZIP
15 NAME OF P.E. OR ARCHITECT PREPARING APPLICATION | 16 N.Y.S. P.E. OR ARCHITECT LICENSE NO | 17 TELEPHONE
18 SIGNATURE OF OWNERS REPRESENTATIVE OR AGENT WHEN APPLYING FOR A PERMIT TO CONSTRUCT
19 FACILITY NAME (IF DIFFERENT FROM OWNER / FIRM)
20 FACILITY LOCATION (NUMBER AND STREET ADDRESS)
21 CITY TOWN VILLAGE | 22 ZIP
23 BUILDING NAME OR NUMBER | 24 FLOOR NAME OR NUMBER
25 START UP DATE MO / YR | 26 DRAWING NUMBERS OF PLANS SUBMITTED
27 PERMIT TO CONSTRUCT: A ☐ NEW SOURCE B ☐ MODIFICATION | 28 CERTIFICATE TO OPERATE: A ☐ NEW SOURCE ☐ EXISTING SOURCE B ☐ MODIFICATION

29 EMISSION POINT ID	30 GROUND ELEVATION (FT)	31 HEIGHT ABOVE STRUCTURES (FT)	32 STACK HEIGHT (FT)	33 INSIDE DIMENSIONS (IN)	34 EXIT TEMP (°F)	35 EXIT VELOCITY (FT/SEC)	36 EXIT FLOW RATE (ACFM)	37 SOURCE CODE	38 HRS / DAY	39 DAYS / YR	40 % OPERATION BY SEASON: Winter Spring Summer Fall

41 DESCRIBE PROCESS OR UNIT: 1 / 2 / 3 / 4 / 5 / 6 / 7 / 8

EMISSION CONTROL EQUIPMENT ID	CONTROL TYPE	MANUFACTURER'S NAME AND MODEL NUMBER	DISPOSAL METHOD	DATE INSTALLED MONTH / YEAR	USEFUL LIFE
42	43	44	45	46 /	47
48	49	50	51	52 /	53

CALCULATIONS

CONTAMINANT NAME	CAS NUMBER	INPUT OR PRODUCTION	UNIT	ENV RATING	EMISSIONS ACTUAL	EMISSIONS UNIT	HOW DET.	PERMISSIBLE	% CONTROL EFFICIENCY	HOURLY EMISSIONS (LBS/HR) ERP	HOURLY EMISSIONS (LBS/HR) ACTUAL	ANNUAL EMISSIONS (LBS/YR) ACTUAL	10ⁿ	PERMISSIBLE
Carbon tetrachloride	56-23-5				0.017	1	6		0	0.017	0.017	48.81	0	
Trichloroethylene	79-01-6				2.817	1	6		0	2.817	2.817	8.113	3	
Tetrachloroethylene	127-18-4				0.897	1	6		0	0.897	0.897	2.583	3	
1,1,2,2-Tetrachloroethane	79-34-5				0.652	1	6		0	0.652	0.652	1.879	3	
Chlorobenzene	108-90-7				0.243	1	6		0	0.243	0.243	689	0	
CONTINUED . . .														

SOLID FUEL TYPE	TONS / YR	% S	LIQUID FUEL TYPE	THOUSANDS OF GALLONS/YR	% S	GAS TYPE	THOUSANDS OF CF/YR	BTU/CF	APPLICABLE RULE	APPLICABLE RULE
144	145	146	147	148	149	150	151	152	153	154

On completion of construction sign the statement listed below and forward to the appropriate field representative.
THE PROCESS, EXHAUST OR VENTILATION SYSTEM HAS BEEN CONSTRUCTED AND WILL BE OPERATED IN ACCORDANCE WITH STATED SPECIFICATIONS AND IN CONFORMANCE WITH ALL PROVISIONS OF EXISTING REGULATIONS.
155 SIGNATURE OF AUTHORIZED REPRESENTATIVE OR AGENT | DATE

156 LOCATION CODE | 157 FACILITY ID NO | 158 U.T.M (E) | 159 U.T.M (N) | 160 SIC NUMBER | 161 DATE APPL. RECEIVED | 162 DATE APPL. REVIEWED | 163 REVIEWED BY

PERMIT TO CONSTRUCT
164 DATE ISSUED | 165 EXPIRATION DATE | 166 SIGNATURE OF APPROVAL | 167 FEE
168
1 DEVIATION FROM APPROVED APPLICATION SHALL VOID THIS PERMIT
2 THIS IS NOT A CERTIFICATE TO OPERATE
3 TESTS AND/OR ADDITIONAL EMISSION CONTROL EQUIPMENT MAY BE REQUIRED PRIOR TO THE ISSUANCE OF A CERTIFICATE TO OPERATE

CERTIFICATE TO OPERATE
169 DATE ISSUED | 170 EXPIRATION DATE | 171 SIGNATURE OF APPROVAL | 172 FEE
173
1 ☐ INSPECTED BY ____ DATE ____
2 ☐ INSPECTION DISCLOSED DIFFERENCES AS BUILT VS PERMIT CHANGES INDICATED ON FORM
3 ☐ ISSUE CERTIFICATE TO OPERATE FOR SOURCE AS BUILT
4 ☐ APPLICATION FOR C.O. DENIED ____ DATE ____ INITIALED

AGENCY USE ONLY

174 SPECIAL CONDITIONS
1 / 2 / 3 / 4 / 5 / 6 / 7 / 8

LOCATION | FACILITY | EMISSION POINT

NEW YORK STATE
DEPARTMENT OF ENVIRONMENTAL CONSERVATION

READ INSTRUCTIONS CONTAINED IN FORM 76-11-12 BEFORE ANSWERING ANY QUESTION

PROCESS EXHAUST OR VENTILATION SYSTEM

APPLICATION FOR PERMIT TO CONSTRUCT OR CERTIFICATE TO OPERATE

NAME OF OWNER / FIRM	9 NAME OF AUTHORIZED AGENT	10 TELEPHONE	19 FACILITY NAME IF DIFFERENT FROM OWNER / FIRM
NUMBER AND STREET ADDRESS	11 NUMBER AND STREET ADDRESS		20 FACILITY LOCATION (NUMBER AND STREET ADDRESS)
TOWN / VILLAGE / 4 STATE / 5 ZIP	12 CITY / TOWN / VILLAGE / 13 STATE / 14 ZIP		21 CITY / TOWN / VILLAGE / ZIP
			23 BUILDING NAME OR NUMBER / 24 FLOOR NAME OR NUMBER
OWNER CLASSIFICATION: COMMERCIAL / INDUSTRIAL / STATE / UTILITY / FEDERAL / MUNICIPAL / EDUC. INST. / HOSPITAL / RESIDENTIAL / OTHER	15 NAME OF P.E. OR ARCHITECT PREPARING APPLICATION / 16 N.Y.S. P.E. OR ARCHITECT LICENSE NO.	17 TELEPHONE	25 START UP DATE / 26 DRAWING NUMBERS OF PLANS SUBMITTED
NAME & TITLE OF OWNERS REPRESENTATIVE / TELEPHONE	18 SIGNATURE OF OWNERS REPRESENTATIVE OR AGENT WHEN APPLYING FOR A PERMIT TO CONSTRUCT		27 PERMIT TO CONSTRUCT: A NEW SOURCE, B MODIFICATION / 28 CERTIFICATE TO OPERATE: NEW SOURCE, EXISTING SOURCE, MODIFICATION

29 EMISSION POINT ID	30 GROUND ELEVATION (FT)	31 HEIGHT ABOVE STRUCTURES (FT)	32 STACK HEIGHT (FT)	33 INSIDE DIMENSIONS (IN)	34 EXIT TEMP (°F)	35 EXIT VELOCITY (FT/SEC)	36 EXIT FLOW RATE (ACFM)	37 SOURCE CODE	38 HRS / DAY	39 DAYS / YR	40 % OPERATION BY SEASON (Winter, Spring, Summer, Fall)
LL2											

DESCRIBE PROCESS OR UNIT: 1 / 2 / 3 / 4 / 5 / 6 / 7 / 8

EMISSION CONTROL EQUIPMENT I.D.	CONTROL TYPE	MANUFACTURER'S NAME AND MODEL NUMBER	DISPOSAL METHOD	DATE INSTALLED MONTH / YEAR	USEFUL LIFE
	43	44	45	46 /	47
	49	50	51	52 /	53

CALCULATIONS

CONTAMINANT NAME	CAS NUMBER	INPUT OR PRODUCTION	UNIT	ENV RATING	EMISSIONS ACTUAL	EMISSIONS UNIT	HOW DET	PERMISSIBLE	% CONTROL EFFIC'CY	HOURLY EMISSIONS (LBS/HR) ERP	HOURLY EMISSIONS (LBS/HR) ACTUAL	ANNUAL EMISSIONS (LBS/YR) ACTUAL	10ⁿ	PERMISSIBLE
Hexachloroethane	67-72-1				0.014	1	6		0	0.014	0.014	39.66	0	
1 -Dichlorobenzene	106-46-7				0.048	1	6		0	0.048	0.048	137	0	
1,2-Dichlorobenzene	95-50-1				0.068	1	6		0	0.068	0.068	195	0	
H achlorobutadiene	87-68-3				0.045	1	6		0	0.045	0.045	128	0	
B zene	71-43-2				0.681	1	6		0	0.681	0.681	1.963	3	
CONTINUED . . .														

SOLID FUEL TONS / YR | % S | TYPE | LIQUID FUEL THOUSANDS OF GALLONS / YR | % S | TYPE | GAS THOUSANDS OF CF / YR | BTU/CF | APPLICABLE RULE | APPLICABLE RULE

Upon completion of construction sign the statement listed below and forward to the appropriate field representative.

PROCESS EXHAUST OR VENTILATION SYSTEM HAS BEEN CONSTRUCTED AND WILL BE OPERATED IN ACCORDANCE WITH STATED CONDITIONS AND IN CONFORMANCE WITH ALL PROVISIONS OF EXISTING REGULATIONS

155 SIGNATURE OF AUTHORIZED REPRESENTATIVE OR AGENT | DATE

LOCATION CODE | 157 FACILITY ID NO | 158 U.T.M. (E) | 159 U.T.M. (N) | 160 SIC NUMBER | 161 DATE APPL. RECEIVED | 162 DATE APPL. REVIEWED | 163 REVIEWED BY

PERMIT TO CONSTRUCT

DATE ISSUED | 165 EXPIRATION DATE | 166 SIGNATURE OF APPROVAL | 167 FEE

168
1. DEVIATION FROM APPROVED APPLICATION SHALL VOID THIS PERMIT
2. THIS IS NOT A CERTIFICATE TO OPERATE
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CERTIFICATE TO OPERATE

ISSUED | 170 EXPIRATION DATE | 171 SIGNATURE OF APPROVAL | 172 FEE

173
1. INSPECTED BY ____ DATE ____
2. INSPECTION DISCLOSED DIFFERENCES AS BUILT VS PERMIT. CHANGES INDICATED ON FORM
3. ISSUE CERTIFICATE TO OPERATE FOR SOURCE AS BUILT
4. APPLICATION FOR C.O. DENIED ____ DATE ____ INITIALED

SPECIAL CONDITIONS

AGENCY USE ONLY

NEW YORK STATE
DEPARTMENT OF ENVIRONMENTAL CONSERVATION

LOCATION | FACILITY | EMISSION POINT

A ADD / C CHANGE / D DELETE

READ INSTRUCTIONS CONTAINED IN FORM 76-11-12 BEFORE ANSWERING ANY QUESTION

PROCESS, EXHAUST OR VENTILATION SYSTEM

APPLICATION FOR PERMIT TO CONSTRUCT OR CERTIFICATE TO OPERATE

NAME OF OWNER / FIRM

NUMBER AND STREET ADDRESS

CITY, TOWN, VILLAGE | STATE | ZIP

OWNER CLASSIFICATION: COMMERCIAL / INDUSTRIAL / UTILITY / FEDERAL / STATE / MUNICIPAL / EDUC. INST. / HOSPITAL / RESIDENTIAL / OTHER

NAME OF OWNER'S REPRESENTATIVE | TELEPHONE

9 NAME OF AUTHORIZED AGENT | 10 TELEPHONE

11 NUMBER AND STREET ADDRESS

12 CITY, TOWN, VILLAGE | 13 STATE | 14 ZIP

15 NAME OF P.E. OR ARCHITECT PREPARING APPLICATION | 16 N.Y.S. P.E. OR ARCHITECT LICENSE NO. | 17 TELEPHONE

Hilbert Fm

18 SIGNATURE OF OWNER'S REPRESENTATIVE OR AGENT WHEN APPLYING

19 FACILITY NAME (IF DIFFERENT FROM OWNER / FIRM)

20 FACILITY LOCATION (NUMBER AND STREET ADDRESS)

21 CITY, TOWN, VILLAGE

23 BUILDING NAME OR NUMBER | 24 FLOOR NAME OR NUMBER

25 START UP DATE | 26 DRAWING NUMBERS

27 PERMIT TO CONSTRUCT: A NEW SOURCE / B MODIFICATION

28 CERTIFICATE TO OPERATE: A NEW SOURCE / B MODIFICATION

29 EMISSION POINT ID	30 GROUND ELEVATION (FT)	31 HEIGHT ABOVE STRUCTURES (FT)	32 STACK HEIGHT (FT)	33 INSIDE DIMENSIONS (IN)	34 EXIT TEMP (°F)	35 EXIT VELOCITY (FT/SEC)	36 EXIT FLOW RATE (ACFM)	37 SOURCE CODE	38 HRS/DAY	39 DAYS/YR	40 % OPERATION BY SEASON
G I L L 2											

DESCRIBE PROCESS OR UNIT

EMISSION CONTROL EQUIPMENT ID	CONTROL TYPE	MANUFACTURER'S NAME AND MODEL NUMBER	DISPOSAL METHOD	DATE INSTALLED MONTH/YEAR	USEFUL LIFE
				/	
				/	

CALCULATIONS

CONTAMINANT NAME	CAS NUMBER	INPUT OR PRODUCTION	UNIT	ENV RATING	EMISSIONS ACTUAL	UNIT	HOW DET	PERMISSIBLE	% CONTROL EFFICIENCY	HOURLY EMISSIONS (LBS/HR) ERP	HOURLY EMISSIONS (LBS/HR) ACTUAL	ANNUAL EMISSIONS (LBS/YR) ACTUAL		PERMISSIBLE
1,2-Dichloroethene	540-59-0				0.685	1	6		0	0.685	0.685	1.973	3	
Hexachlorobenzene	118-74-1				1.963	2	6		0	0.002	0.002	5.653	0	
1,3-Dichlorobenzene	541-73-1				0.022	1	6		0	0.022	0.022	61.95	0	
1,2,4-Trichlorobenzene	120-82-1				0.107	1	6		0	0.107	0.107	307	0	

SOLID FUEL TONS/YR | % S | LIQUID FUEL THOUSANDS OF GALLONS/YR | % S | GAS THOUSANDS OF CF/YR | BTU/CF | APPLICABLE RULE | APPLICABLE RULE

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155 SIGNATURE OF AUTHORIZED REPRESENTATIVE OR AGENT | DATE

156 LOCATION CODE | 157 FACILITY ID NO | 158 UTM (E) | 159 UTM (N) | 160 SIC NUMBER | 161 DATE APPL. RECEIVED | 162 DATE APPL. REVIEWED | 163 REVIEWED BY

P E R M I T   T O   C O N S T R U C T

164 DATE ISSUED | 165 EXPIRATION DATE | 166 SIGNATURE OF APPROVAL | 167 FEE

168
1. DEVIATION FROM APPROVED APPLICATION SHALL VOID THIS PERMIT
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3. TESTS AND/OR ADDITIONAL EMISSION CONTROL EQUIPMENT MAY BE REQUIRED PRIOR TO THE ISSUANCE OF A CERTIFICATE TO OPERATE

C E R T I F I C A T E   T O   O P E R A T E

169 DATE ISSUED | 170 EXPIRATION DATE | 171 SIGNATURE OF APPROVAL | 172 FEE

173
1. INSPECTED BY ______ DATE ______
2. INSPECTION DISCLOSED DIFFERENCES AS BUILT VS. PERMIT. CHANGES INDICATED ON FORM
3. ISSUE CERTIFICATE TO OPERATE FOR SOURCE AS BUILT
4. APPLICATION FOR C.O. DENIED ______ DATE ______ INITIALED

174 SPECIAL CONDITIONS

New York State Department of Environmental Conservation

Thomas C. Jorling
Commissioner

cc: Jim Brown

June 30, 1992

Ms. Leslie Warner
DuPont Chemicals
P.O. Box 787
Niagara Falls, NY 14302

Dear Ms. Warner:

Gill Creek Remediation
Site #932013

Due to the restrictive time constraints involved with the above referenced project this Department has no objections to DuPont and Olin starting site preparation activities and construction of the coffer dam prior to formal Department approval for this project. Be advised the companies are proceeding at their own risk and this concurrence does not apply to aspects of the project which require separate approvals by federal or local government.

However, activities directly associated with the sediment removal such as the diversion structure construction, creek dewatering and actual sediment removal cannot be performed until all outstanding issues are resolved and Department approval is obtained.

If you have any questions, please call me at 716-851-7220.

Sincerely,

Michael J. Hinton

Michael J. Hinton, P.E.
Environmental Engineer II

cc: Mr. Peter Buechi
Mr. Joseph Sciascia
Mr. Glen Bailey

DU PONT

CHEMICALS

P.O. Box 787
Buffalo Ave. & 26th Street
Niagara Falls, NY 14302-0787
(716) 278-5100

July 17, 1992

Mr. David Leemhuis
Environmental Engineer II
NYS Dept. of Environmental Conservation
270 Michigan Avenue
Buffalo, NY 14203-2999

Dear Mr. Leemhuis:

REMEDIATION BENCH-SCALE TESTING REPORT - VOLUME 1

Enclosed is the above-mentioned report relative to the remediation of Gill Creek per your request during our July 16 conference call.

If you should have any questions, please contact Steve Constable at (302) 366-2375 or Leslie Warner at (716) 278-5452.

Sincerely,

David P. Spanfelner /klf

David P. Spanfelner
Engineer, Engineering and
Environmental Affairs

DPS:klf
Enc.
19923

REV 11/90

DU PONT

CHEMICALS

P.O. Box 787
Buffalo Ave. & 26th Street
Niagara Falls, NY 14302-0787
(716) 278-5100

File 52.5C
Re: Bench Scale Report

July 17, 1992

Mr. Albert C. Zaepfel
Industrial Monitoring Coordinator
Department of Wastewater Facilities
1200 Buffalo Avenue
Niagara Falls, NY 14302

Dear Mr. Zaepfel:

REMEDIATION BENCH-SCALE TESTING REPORT - VOLUME 1

Enclosed is the above-mentioned report relative to the remediation of Gill Creek per your request during our July 16 conference call.

If you should have any questions, please contact Steve Constable at (302) 366-2375 or Leslie Warner at (716) 278-5452.

Sincerely,

David P. Spanfelner /klf

David P. Spanfelner
Engineer, Engineering and
Environmental Affairs

DPS:klf
Enc.
19923

REV 11/90

DU PONT

CHEMICALS

P.O. Box 787
Buffalo Ave. & 26th Street
Niagara Falls, NY 14302-0787
(716) 278-5100

July 17, 1992

Mr. Ed Struzeski
SAIC
999 Eighteenth Street
North Tower, Room 855
Denver, CO 80202

Dear Mr. Struzeski:

REMEDIATION BENCH-SCALE TESTING REPORT - VOLUMES 1 AND 2

Enclosed is the above-mentioned report relative to the remediation of Gill Creek per your request during our July 16 conference call.

If you should have any questions, please contact Steve Constable at (302) 366-2375 or Leslie Warner at (716) 278-5452.

Sincerely,

David P. Spanfelner /klf

David P. Spanfelner
Engineer, Engineering and
Environmental Affairs

DPS:klf
Enc.
19923

REV 11/90

DU PONT

CHEMICALS

P.O. Box 787
Buffalo Ave. & 26th Street
Niagara Falls, NY 14302-0787
(716) 278-5100

July 17, 1992

Mr. Hank Mazzucca
U.S. Environmental Protection Agency
26 Federal Plaza
New York, NY 10278

Dear Mr. Mazzucca:

REMEDIATION BENCH-SCALE TESTING REPORT - VOLUME 1

Enclosed is the above-mentioned report relative to the remediation of Gill Creek per your request during our July 16 conference call.

If you should have any questions, please contact Steve Constable at (302) 366-2375 or Leslie Warner at (716) 278-5452.

Sincerely,

David P. Spanfelner / klf

David P. Spanfelner
Engineer, Engineering and
Environmental Affairs

DPS:klf
Enc.
19923

11/90

DU PONT

CHEMICALS

P.O. Box 787
Buffalo Ave. & 26th Street
Niagara Falls, NY 14302-0787
(716) 278-5100

MVermersch* - WCC
REAustin* - Legal, D7016-
DEEllis* - Chem, Bellevue
JELeemann* - Chem, B16271
PBButler* - Chem, B12228
RWPorter/J Manning*
RJGentilucci/File 52150*

* cover letter only

kw: Bench Scale Study

July 22, 1992

Mr. Michael J. Hinton, P.E.
New York State Department of
Environmental Conservation
Division of Hazardous Waste Remediation
270 Michigan Avenue
Buffalo, NY 14203-2999

Dear Mr. Hinton:

DU PONT/OLIN GILL CREEK REMEDIATION PROJECT

Enclosed please find two copies of "Remediation Bench-Scale Testing Report, Gill Creek Remediation," Volumes I and II (Woodward-Clyde Consultants, July 1992). Du Pont and Olin are submitting these test results as previously agreed since they support the basis for the design of the remediation project. By separate cover, a copy has been provided to H. Mazzucca (EPA Region II), E. Struzeski (SAIC - Denver), D. Leemhuis (NYSDEC - Buffalo), and A. Zaepfel (POTW - Niagara Falls).

If you should have any questions, please contact me at (716) 278-5452.

Sincerely,

Leslie A. Warner

Leslie A. Warner
Senior Engineer, Engineering
and Environmental Affairs

LAW:new
Enc.

cc: NYSDEC - Division of Environmental Enforcement (Buffalo)*
NYSDEC - Division of Hazardous Waste Remediation (Albany)*
NYSDOH - Bureau of Environmental Exposure Investigation (Albany)*
James C. Brown - Olin (cover letter only)

* Two copies Volume I, one copy Volume II

REV 11/90

bcc: JFMcClincy*
DPSpanfelner*
D Ellis/CHEM*
WONeill, Corporate Real Estate
RJG/File 52150 kw: City Floodplain permit

DU PONT
CHEMICALS

P.O. Box 787
Buffalo Ave. & 26th Street
Niagara Falls, NY 14302-0787
(716) 278-5100

July 21, 1992

Dr. Frank Shiappetti, Director
Department of Environmental Services
City of Niagara Falls
745 Main Street
Niagara Falls, NY 14302-0069

Dear Dr. Shiappetti:

DU PONT/OLIN GILL CREEK REMEDIATION PROJECT

Enclosed you will find two copies of the Floodplain Development Permit Application, sent to comply with requirements for activities planned for floodplain areas. As requested, Du Pont and Olin are submitting this application for a project that may temporarily impact floodplain areas within the jurisdiction of the City of Niagara Falls. At the completion of the project (December 1992) all floodway obstructions will be removed.

Completion of this application was delayed until the City of Niagara Falls and Du Pont/Olin agreed to the basic plan for utilizing Hyde Park Lake for floodplain mitigation which is now incorporated into this application. As agreed in prior conversations between Paula Daukas of Woodward-Clyde Consultants and you, construction for the Gill Creek remediation project has begun. As agreed, the cellular cofferdam will not be completed until this application has been reviewed and approved. We anticipate completing the cofferdam by September 1, 1992, and therefore request approval by the end of August.

As agreed, we have not completed several sections of this application since they pertain to developments of a permanent nature. Should additional information be needed, please contact me at (716) 278-5452. Thank you for your kind assistance.

Sincerely,

Leslie A. Warner

Leslie A. Warner
Senior Engineer, Engineering
and Environmental Affairs

LAW:new
Enc.

c: J. C. Brown, Olin, Charleston, TN*
P. Daukas, WCC, N. Tonawanda, NY*
M. Hinton, NYSDEC, Buffalo, NY
A. Zaepfel, NF Wastewater Treatment, Niagara Falls, NY*

* cover letter only

DU PONT

CHEMICALS

P.O. Box 787
Buffalo Ave. & 26th Street
Niagara Falls, NY 14302-0787
(716) 278-5100

bcc: RJGentilucci/File 52150

kw: City, Floodplain, permit

August 4, 1992

Dr. Frank Shiappetti, Director
Department of Environmental Services
City of Niagara Falls
745 Main Street
Niagara Falls, NY 14302-0069

Dear Dr. Shiappetti:

DU PONT/OLIN GILL CREEK REMEDIATION PROJECT

Regarding the Gill Creek project, two copies of the Floodplain Development Permit Application were sent to you on July 21, 1992. It has come to our attention that two figures in the application are missing information. Enclosed are two corrected copies of Figures A-2 and A-3.

In addition Du Pont and Olin have agreed to notify property owners in the Gill Creek floodplain of the potential affect of the project on flood heights. Enclosed is the text we propose to have printed in the Niagara Gazette. We would appreciate your review and comment.

Should additional information be needed, please contact me at (716) 278-5452. Thank you for your assistance.

Sincerely,

Leslie A Warner

Leslie A. Warner
Senior Engineer, Engineering and Environmental Affairs

LAW:klf
20088

cc: Jim Brown - Olin*
Mike Hinton - NYSDEC

* cover letter only

GILL CREEK REMEDIATION FLOODPLAIN DEVELOPMENT PERMIT APPLICATION

July 1992

Prepared for
City of Niagara Falls
Department of Environmental Services
745 Main Street
Niagara Falls, NY 14302-0069

Prepared by
E.I. du Pont de Nemours and Co., Inc.
and Olin Corporation

Woodward-Clyde

Woodward-Clyde Consultants
4582 South Ulster Street
Stanford Place 3, Suite 1000
Denver, Colorado 80237

Project 22915

FLOODPLAIN DEVELOPMENT PERMIT APPLICATION

This form is to be filled out in duplicate.

SECTION 1: GENERAL PROVISIONS (APPLICANT to read and sign):

1. No work may start until a permit is issued.
2. The permit may be revoked if any false statements are made herein.
3. If revoked, all work must cease until permit is re-issued.
4. Development shall not be used or occupied until a Certificate of Compliance is issued.
5. The permit will expire if no work is commenced within six months of issuance.
6. Applicant is hereby informed that other permits may be required to fulfill local, state and federal regulatory requirements.
7. Applicant hereby gives consent to the Local Administrator or his/her representative to make reasonable inspections required to verify compliance.
8. I, THE APPLICANT, CERTIFY THAT ALL STATEMENTS HEREIN AND IN ATTACHMENTS TO THIS APPLICATION ARE, TO THE BEST OF MY KNOWLEDGE, TRUE AND ACCURATE.

(APPLICANT'S SIGNATURE) original submitted separately DATE ___

SECTION 2: PROPOSED DEVELOPMENT (To be completed by APPLICANT) (Information provided on attached sheet.)

NAME	ADDRESS	TELEPHONE
APPLICANT		
E.I. du Pont de Nemours and Co., Inc. and Olin Corporation		
BUILDER		
Sevenson Environmental Services, Inc.		
ENGINEER		
Woodward-Clyde Consultants		

PROJECT LOCATION:

To avoid delay in processing the application, please provide enough information to easily identify the project location. Provide the street address, lot number or legal description (attach) and, outside urban areas, the distance to the nearest intersecting road or well-known landmark. A sketch attached to this application showing the project location would be helpful.

Refer to Attachments A and B.

DESCRIPTION OF WORK (Check all applicable boxes):

A. STRUCTURAL DEVELOPMENT

ACTIVITY	STRUCTURE TYPE	
☒ New Structure (temp.)	☐ Residential (1-4 Family)	☒ Temporary diversion structures and cofferdam
☐ Addition	☐ Residential (More than 4 Family)	
☐ Alteration	☐ Non-residential (Floodproofing? ☐ Yes)	
☐ Relocation	☐ Combined Use (Residential & Commercial)	
☐ Demolition	☐ Manufactured (Mobile) Home (In Manufactured Home Park? ☐ Yes)	
☐ Replacement		

ESTIMATED COST OF PROJECT $ 15 million (cost includes entire remediation project, including disposal of sediments)

CO-APPLICANTS:

E.I. du Pont de Nemours and Company, Inc. (Du Pont)
26th Street and Buffalo Avenue
P.O. Box 787
Niagara Falls, NY 14302

Contact: Leslie A. Warner, Senior Engineer, 716-278-5452

Olin Corporation
Lower River Road
P.O. Box 248
Charleston, TN 37310

Contact: James C. Brown, Manager, Environmental Technology, 615-336-4308

BUILDER:

Sevenson Environmental Services, Inc.
2749 Lockport Road
Niagara Falls, NY 14302

Contact: Frank A. Francassi, General Superintendent, 716-284-0431

ENGINEER:

Woodward-Clyde Consultants
Stanford Place 3, Suite 1000
4582 South Ulster Street
Denver, CO 80237

Contact: Max Vermersch, Project Manager, 303-740-3852

B. OTHER DEVELOPMENT ACTIVITIES:

- ☒ Fill ☐ Mining ☐ Drilling ☐ Grading
- ☒ Excavation (Except for Structural Development Checked Above)
- ☐ Watercourse Alteration (Including Dredging and Channel Modifications)
- ☐ Drainage Improvements (Including Culvert Work)
- ☐ Road, Street or Bridge Construction
- ☐ Subdivision (New or Expansion)
- ☐ Individual Water or Sewer System
- ☒ Other (Please Specify) construction of temporary diversion structures and excavation of contaminated sediments in Gill Creek

After completing SECTION 2, APPLICANT should submit form to Local Administrator for review.

SECTION 3: FLOODPLAIN DETERMINATION (To be completed by LOCAL ADMINISTRATOR)

The proposed development is located on FIRM Panel No.________, Dated__________________.

The Proposed Development:

☐ Is NOT located in a Special Flood Hazard Area (Notify the applicant that the application review is complete and NO FLOODPLAIN DEVELOPMENT PERMIT IS REQUIRED).

☐ Is located in a Special Flood Hazard Area.
FIRM zone designation is ______________.
100-Year flood elevation at the site is: _________Ft. NGVD (MSL)
☐ Unavailable

☐ The proposed development is located in a floodway.
FBFM Panel No.______________________ Dated____________________

☐ See Section 4 for additional instructions.

SIGNED____DATE____________________

SECTION 4: ADDITIONAL INFORMATION REQUIRED (To be completed by LOCAL ADMINISTRATOR)

The applicant must submit the documents checked below before the application can be processed:

☐ A site plan showing the location of all existing structures, water bodies, adjacent roads, lot dimensions and proposed development.

☐ Development plans, drawn to scale, and specifications, including where applicable: details for anchoring structures, proposed elevation of lowest floor (including basement), types of water resistant materials used below the first floor, details of floodproofing of utilities located below the first floor and details of enclosures below the first floor.
Also,____

☐ Subdivision or other development plans (If the subdivision or other development exceeds 50 lots or 5 acres, whichever is the lesser, the applicant must provide 100-year flood elevations if they are not otherwise available).

☐ Plans showing the extent of watercourse relocation and/or landform alterations.

☐ Top of new fill elevation _________Ft. NGVD (MSL).

☐ Floodproofing protection level (non-residential only) _________Ft. NGVD (MSL). For floodproofed structures, applicant must attach certification from registered engineer or architect.

☐ Certification from a registered engineer that the proposed activity in a regulatory floodway will not result in any increase in the height of the 100-year flood. A copy of all data and calculations supporting this finding must also be submitted.

☐ Other:____
____
____

SECTION 5: PERMIT DETERMINATION (To be completed by LOCAL ADMINISTRATOR)

I have determined that the proposed activity: A. ☐ Is
B. ☐ Is not
in conformance with provisions of Local Law #____, 19___. The permit is issued subject to the conditions attached to and made part of this permit.

SIGNED____________________________, DATE__________________________

If BOX A is checked, the Local Administrator may issue a Development Permit upon payment of designated fee.
If BOX B is checked, the Local Administrator will provide a written summary of deficiencies. Applicant may revise and resubmit an application to the Local Administrator or may request a hearing from the Board of Appeals.

APPEALS: Appealed to Board of Appeals? ☐ Yes ☐ No
Hearing date:____________________
Appeals Board Decision --- Approved? ☐ Yes ☐ No

Conditions____

SECTION 6: AS-BUILT ELEVATIONS (To be submitted by APPLICANT before Certificate of Compliance is issued)

The following information must be provided for project structures. This section must be completed by a registered professional engineer or a licensed land surveyor (or attach a certification to this application). Complete 1 or 2 below.

1. Actual (As-Built) Elevation of the top of the lowest floor, including basement (in Coastal High Hazard Areas, bottom of lowest structural member of the lowest floor, excluding piling and columns) is: ____________FT. NGVD (MSL).

2. Actual (As-Built) Elevation of floodproofing protection is ____________ FT. NGVD (MSL).

NOTE: Any work performed prior to submittal of the above information is at the risk of the Applicant.

SECTION 7: COMPLIANCE ACTION (To be completed by LOCAL ADMINISTRATOR)

The LOCAL ADMINISTRATOR will complete this section as applicable based on inspection of the project to ensure compliance with the community's local law for flood damage prevention.

INSPECTIONS: DATE__________BY__________DEFICIENCIES? ☐ YES ☐ NO
DATE__________BY__________DEFICIENCIES? ☐ YES ☐ NO
DATE__________BY__________DEFICIENCIES? ☐ YES ☐ NO

SECTION 8: CERTIFICATE OF COMPLIANCE (To be completed by LOCAL ADMINISTRATOR)

Certificate of Compliance issued: DATE:____________ BY:__________________________

ATTACHMENT A
PROJECT OVERVIEW

This section of the application provides an overview of the sediment remediation activities and the results of the hydrologic analyses conducted to develop a plan for managing storm water flow in Gill Creek.

ATTACHMENT A
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LIST OF TABLES

LIST OF FIGURES

1.0 PROJECT DESCRIPTION

E.I. du Pont de Nemours and Company, Inc. (Du Pont) and Olin Corporation (Olin) are undertaking the remediation of contaminated sediments in Gill Creek. In accordance with the terms of the Order on Consent No. B9-0206-90-01 (March 20, 1991), Du Pont and Olin agree to cooperate with the New York State Department of Environmental Conservation (NYSDEC) in implementing the remedial alternatives approved in the Record of Decision issued by the NYSDEC on March 30, 1992.

The proposed action involves constructing a series of temporary diversion structures from just north of Buffalo Avenue to the mouth of Gill Creek and temporarily diverting the creek flow into the Buffalo Avenue Diversion Sewer (Figure A-1). The contaminated sediments will be removed by vacuum dredging and mechanical excavation. Remediation waters will be treated on-site and discharged to the municipal POTW. The excavated sediments will be transported from within the Du Pont/Olin property via railcars and/or trucks to a RCRA and TSCA permitted facility for disposal. After the sediment removal is completed, the creek bed will be restored to approximately its pre-remediation conditions. The diversion structures will be removed and the creek flow will be restored. The proposed activities are expected to occur between July and December 1992.

During the remediation period, a diversion structure (No. 1) will be constructed north of Buffalo Avenue to divert creek flow through an existing sewer inlet to the Buffalo Avenue Diversion Sewer. On April 30, 1992, Du Pont and Olin submitted a monitoring plan for the diversion sewer to the City of Niagara Falls Department of Wastewater Facilities. The plan was also submitted for review on May 28, 1992 to the U.S. Environmental Protection Agency. During storm events, the water level in the diversion sewer will be monitored and the gate inlet closed as needed, so that additional flow to the sewer does not pressurize the sewer pipe. Diversion Structure No. 1 will be limited in height so that water backing up behind the diversion structure is confined within the Gill Creek channel. However, during larger flood flows, water that cannot either be directed into the sewer or stored behind the diversion structure will overflow into the areas being remediated.

To reduce the probability of overtopping the diversion structures and subsequent delays to the completion of the work, Du Pont and Olin have proposed to use Hyde Park Lake for flood storage capacity while the sediment removal activities are in progress. After Labor Day (September 7) and the end of the main public-use season of Hyde Park Lake, the lake will be partially drained approximately 2 feet to provide 40 acre-feet of storage capacity. To further reduce the risk of overtopping the diversion structures, Du Pont and Olin will request permission to lower the lake approximately 3 feet to provide 60 acre-feet of storage volume.

The information provided in this document as part of the floodplain development permit application describes the hydraulic analyses conducted for the remediation effort and a proposed plan for regulating the storage capacity of Hyde Park Lake. Also provided as Attachment B to this permit application, is a proposed flood mitigation plan.

2.0 MANAGEMENT OF GILL CREEK WATERSHED

2.1 BACKWATER ANALYSIS

2.1.1 General

The Federal Emergency Management Agency (FEMA) Flood Insurance Study (FIS) step backwater model for Gill Creek was obtained as a basis for beginning the backwater analysis. The FIS study was conducted in July 1981 by Dewberry and Davis using the COE's HEC-2, step backwater program. The HEC-2 program is used for calculating water surface profiles for gradually varied flow in streams with natural and man-made obstructions. Surveyed floodplain cross sections, bridge data, diversion structures and discharge information are input into the model to estimate the depth of flow throughout the length of the stream channel.

The FIS HEC-2 model created for Gill Creek is known to have survey errors which probably can be attributed to differences in regionally used datums (NYSDEC 1992). The NYSDEC has attempted to make some of the corrections for the survey errors from the confluence of the Niagara River to Buffalo Avenue. The original survey does not have consistent errors and the model cannot be corrected to the same datum with the existing available information. The combined HEC-2 data were entered and checked to confirm that no data entry errors existed. In addition to the survey errors, the original hydrology used in the FIS study has major differences in contributing drainage areas compared to the evaluation completed for this project. The NYSDEC has recommended to the City of Niagara Falls that the study be re-evaluated to account for survey and hydrologic errors in the original study.

2.1.2 Methodology and Results

The original FIS model of Gill Creek was supplemented with data received from the NYSDEC and from survey information associated with the ongoing remedial activities. The HEC-2 model created for this project represents the available survey information to date. All survey information entered in the model was transferred to National Geodetic Vertical Datum (NGVD) since NGVD is the datum used in the FIS model.

The uncorrected FIS model 10- and 100-year regulatory flows (930 and 1600 cfs, respectively) were entered into the updated HEC-2 model to establish the baseline flood elevations from the confluence of the Niagara River to the downstream face of the Hyde Park Dam. The Buffalo Avenue Diversion Structure No. 1 (crest elevation 563.5 feet, NGVD) and the Niagara River Cofferdam (spillway crest elevation 563.5 feet, NGVD) were incorporated into the baseline model to compare the upstream flood heights resulting from the diversion structures with the baseline conditions. Critical depth over the Niagara River Cofferdam was assumed as starting conditions for the project model. The Niagara River Cofferdam has been designed with the spillway crest elevation at 563.5 feet NGVD, a spillway crest width of 120 feet, and the dam crest elevation at 566.0 feet, NGVD. This spillway design will pass the 10-year regulatory flow of 930 cfs without overtopping the dam. The proposed configuration of diversion structures will increase flood heights upstream of Buffalo Avenue to Hyde Park Lake Dam. The increase ranges from 0.6 feet at Buffalo Avenue to 0.0 feet at Hyde Park Lake Dam for the 100-year event and from 0.8 feet at Buffalo Avenue to 0.3 feet at Hyde Park Lake Dam, for the 10-year event (Table A-1). The flood profiles with and without the diversion structures for the study reach are shown in Figures A-2 and A-3. The number of structures within the floodplain was estimated based on the flood heights. There are approximately 950 structures within the current 100-year floodplain and 1,110 structures within the 100-year with-project floodplain.

2.2 FLOOD MITIGATION

The increases in flood elevations will be mitigated by breaching the Niagara River Cofferdam. The breach will be located in the west abutment of the Niagara River Cofferdam and will be about 50 feet wide and extend down to Elevation 561.5 feet, NGVD. The Cofferdam will be breached in accordance with the operating procedures in the flood mitigation plan (Attachment B). Should flooding depths increase as a result of the Cofferdam and diversion structures, the incremental damages will be the responsibility of Du Pont and Olin. Table 2-1 shows the flood elevation when the Cofferdam is breached.

The increased flood heights between the Niagara River Cofferdam and Staub Road are greater than one foot. This increase will be mitigated by placing sandbags at the existing floodplain limits (Elevation 563.9 feet). The with-project flood elevation is approximately 566.2 feet NGVD and the sandbag crest will be approximately 570.0 feet. A letter requesting permission to temporarily increase flood heights on New York Power Authority (NYPA) property between Staub Road and the Niagara River was submitted to NYPA on May 21, 1992.

2.3 PUBLIC NOTICE

The projected increased flood heights between the Buffalo Avenue Diversion Structure No. 1 and the Hyde Park Dam are less than one foot. The potentially affected property owners in this reach within the 100-year floodplain with-project condition without the cofferdam breach will be notified. Notification will consist of placing a public notice in the local newspaper.

TABLE A-1

FLOOD ELEVATIONS FOR SELECT LOCATIONS

	Base Condition	Base Condition with Diversion Structures	Base Condition with Diversion Structures and Breach in Cofferdam
		100-Year	
Buffalo Avenue	569.6	570.2	569.8
Niagara Avenue	570.8	571.1	571.0
Hyde Park Dam	573.5	573.5	573.5
		10-Year	
Buffalo Avenue	566.4	567.1	566.7
Niagara Avenue	568.4	569.1	568.9
Hyde Park Dam	571.3	571.6	571.5

Note: Flood elevations are in feet NGVD.

3.0 MANAGEMENT OF HYDE PARK LAKE

Hyde Park Lake will be regulated during the remediation activities (September through December) in such a manner to minimize disturbance to the lake and its public uses. Hyde Park Lake is designated a Class B water body suitable for primary and secondary contact recreation, fishing and fish propagation and survival (6 NYCRR Part 701.7). No wetlands or significant habitats as defined by the NYSDEC are located within the project vicinity. Based on information provided by the U.S. Fish and Wildlife Service for remediation projects, there are no known Federally listed or proposed endangered threatened species in the project vicinity. The NYSDEC annually stocks Hyde Park Lake in late April to early May with approximately 4,000 pan fish. Species typically include brown bullhead (Ameiurus nebulosus), rock bass (Ambloplites rupestris), blue gill sunfish (Lepomis macrochirus), pumpkinseed sunfish (L. gibbosus), yellow perch (Perca flavescens), white crappie (Pomoxis annularis), and black crappie (P. nigromacro latus). There are no data on the existing fish population in the lake or number of fish remaining at the end of the public use season (Steven Moradian, NYSDEC-Olean, Personal Communication).

Pending City review and approval, after Labor Day, the level of Hyde Park Lake will be temporarily lowered two or three feet to elevation 570.0 or 569.0 feet NGVD. The lake level will be maintained by regulating the release through the low-level outlet which has a maximum discharge rate of approximately 40 cfs. Both the water level and outlet will be monitored to control the lake level and to ensure the discharge from the low level outlet will not exceed the maximum diversion capacity at the Buffalo Avenue Diversion Sewer. A staff gage will be installed on the dam to monitor the lake level so that the water surface elevation does not fall below 570.0 or 569.0 feet NGVD depending on the drawdown scenario. An approximate contour map of Hyde Park Lake based on a survey conducted in May 1992 by Klettke Land Surveyors and the USGS topographic map is shown on Figure A-4. The water depth in the main body of the lake ranges from 6.4 to 7.7 feet, based on the May 1992 survey.

The water circulation through the lake should not be interrupted during the remediation activities. The inflow from the NYPA Robert Moses Power Plant reservoir will be maintained. Based on the 1992 survey, the lake cross-sections indicated that the lake shoreline is very steep. A two or three-foot drawdown should result in very little reduction in shoreline. After the remediation activities have been completed, Hyde Park Lake will be restored to its normal elevation (572.0 feet) with discharge over the spillway.

4.0
REFERENCES

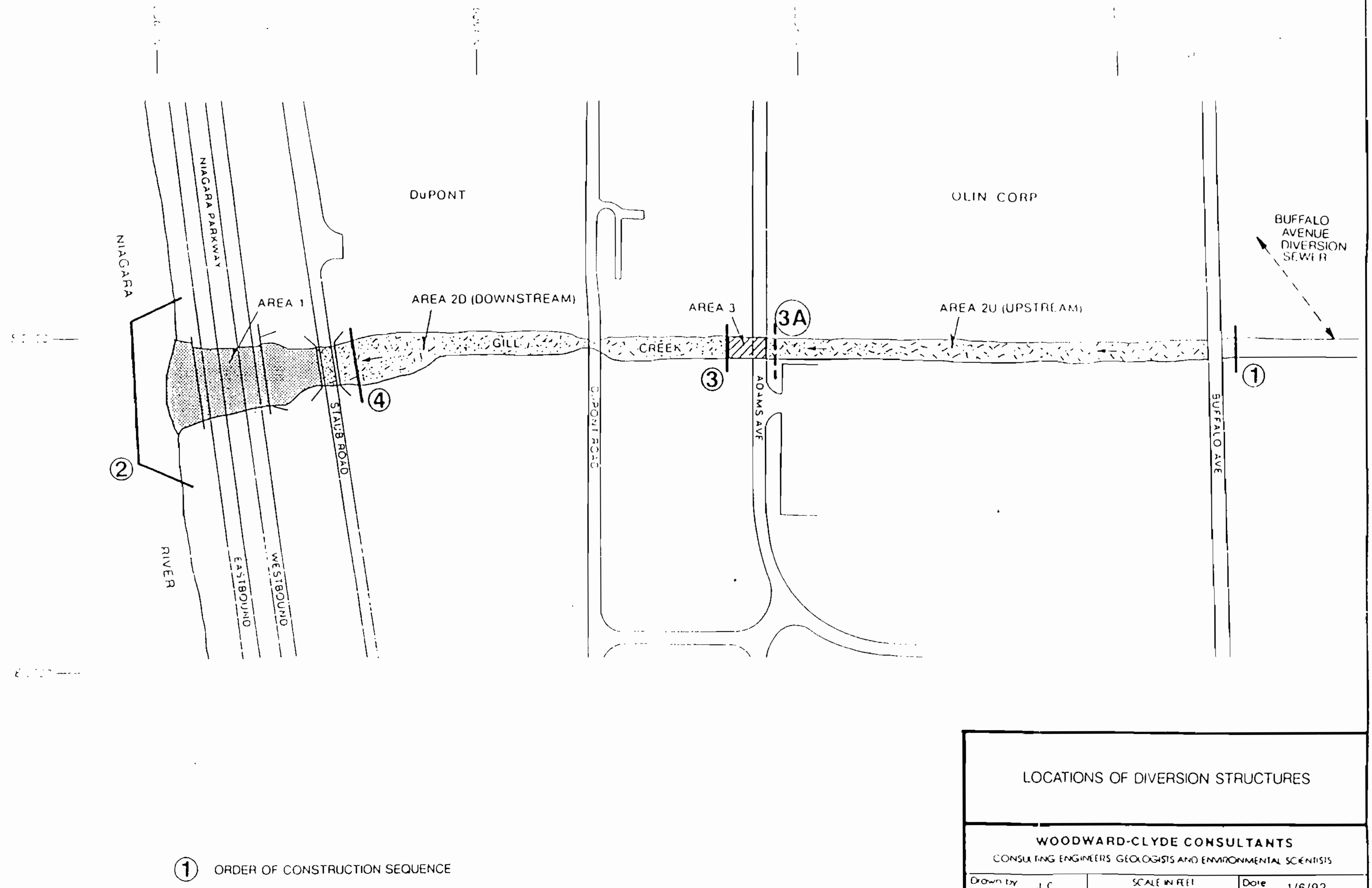
National Oceanic and Atmospheric Administration (NOAA). 1961. Rainfall Frequency Atlas of the United States. Technical Paper No. 40. May.

New York State Department of Environmental Conservation (NYSDEC). 1992. Personal communication between M. Bortolini (WCC) and Frank Parker. February 12, 1992.

Nussbaumer and Clarke, Inc. 1979. Restoration of Hyde Park Lake, Niagara County, NY, Hyde Park Lake Profiles. Buffalo, NY. October.

Soil Conservation Service (SCS). 1986. Urban Hydrology for Small Watersheds. Technical Release 55. June.

Woodward-Clyde Consultants (WCC). 1991. Feasibility Study Remediation of Gill Creek Sediments. August.

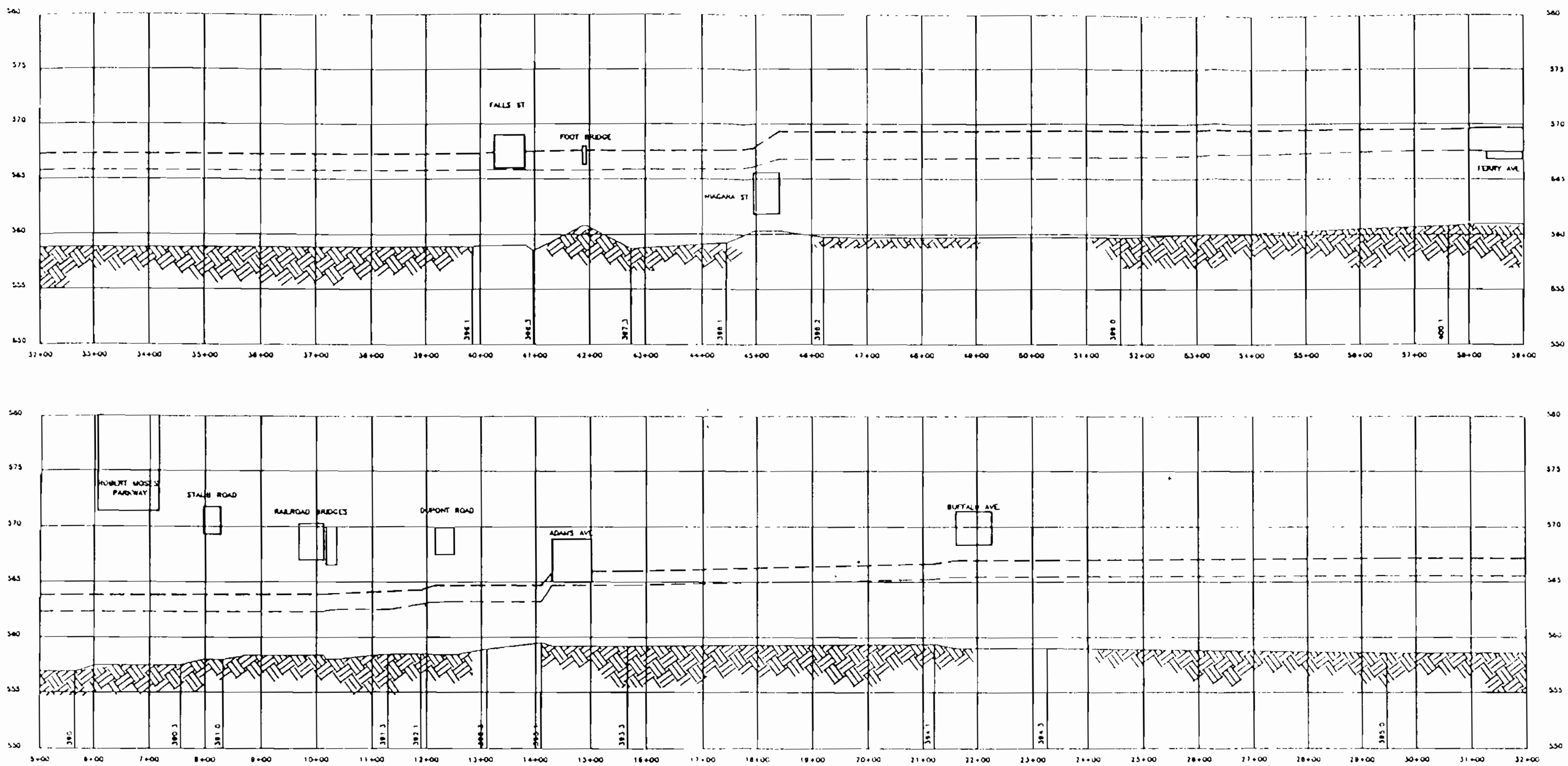


LOCATIONS OF DIVERSION STRUCTURES

WOODWARD-CLYDE CONSULTANTS CONSULTING ENGINEERS GEOLOGISTS AND ENVIRONMENTAL SCIENTISTS		
Drawn by J C	SCALE IN FEET 0 150	Date 1/6/92
Checked by R G	75%	Job 22915

FIGURE A-1

rd-Clyde Consultc



REFERENCES FOR PROFILE DATA

1 PROFILE BASED ON ORIGINAL NIAGARA FALLS FLOOD INSURANCE STUDY HEC-2 MODEL (1982)

2 HEC-2 MODEL ADJUSTED WITH
DEC REVISED MODEL FOR CROSS SECTIONS FROM ROBERT MOSES PARKWAY TO DUPONT ROAD
DUPONT PLANT CONSTRUCTION DRAWINGS
NYPA CONSTRUCTION DRAWINGS
OLIN CONSTRUCTION DRAWINGS

3 DISCHARGES USED IN THIS ANALYSIS ARE FROM THE RESULTS OF THE HEC-1 MODEL DEVELOPED BY WCC (100 YEAR DISCHARGE = 1100 CFS AND 10 YEAR DISCHARGE = 700 CFS)

4 STORM FLOWS USED IN HEC-2 ARE LESS THAN THE FLOWS USED IN THE FIS

5 ELEVATIONS ARE BASED FROM NGVD

HORIZ SCALE 1" = 200'
VERT SCALE 1" = 10'

x 78%

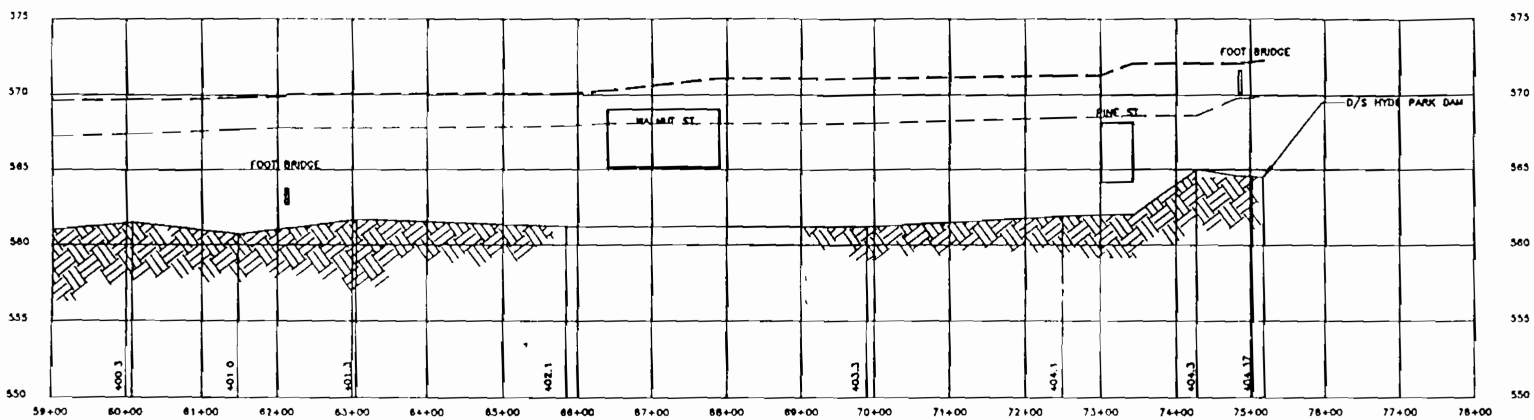
10 YEAR WITHOUT PROJECT — — — —
100 YEAR WITHOUT PROJECT — — — —

Job No	22915
Prepared by	C T T
Date	3/20/92

10 - 100 YEAR FLOOD PROFILES

CONTINUED ON FOLLOWING FIGURE

A-2



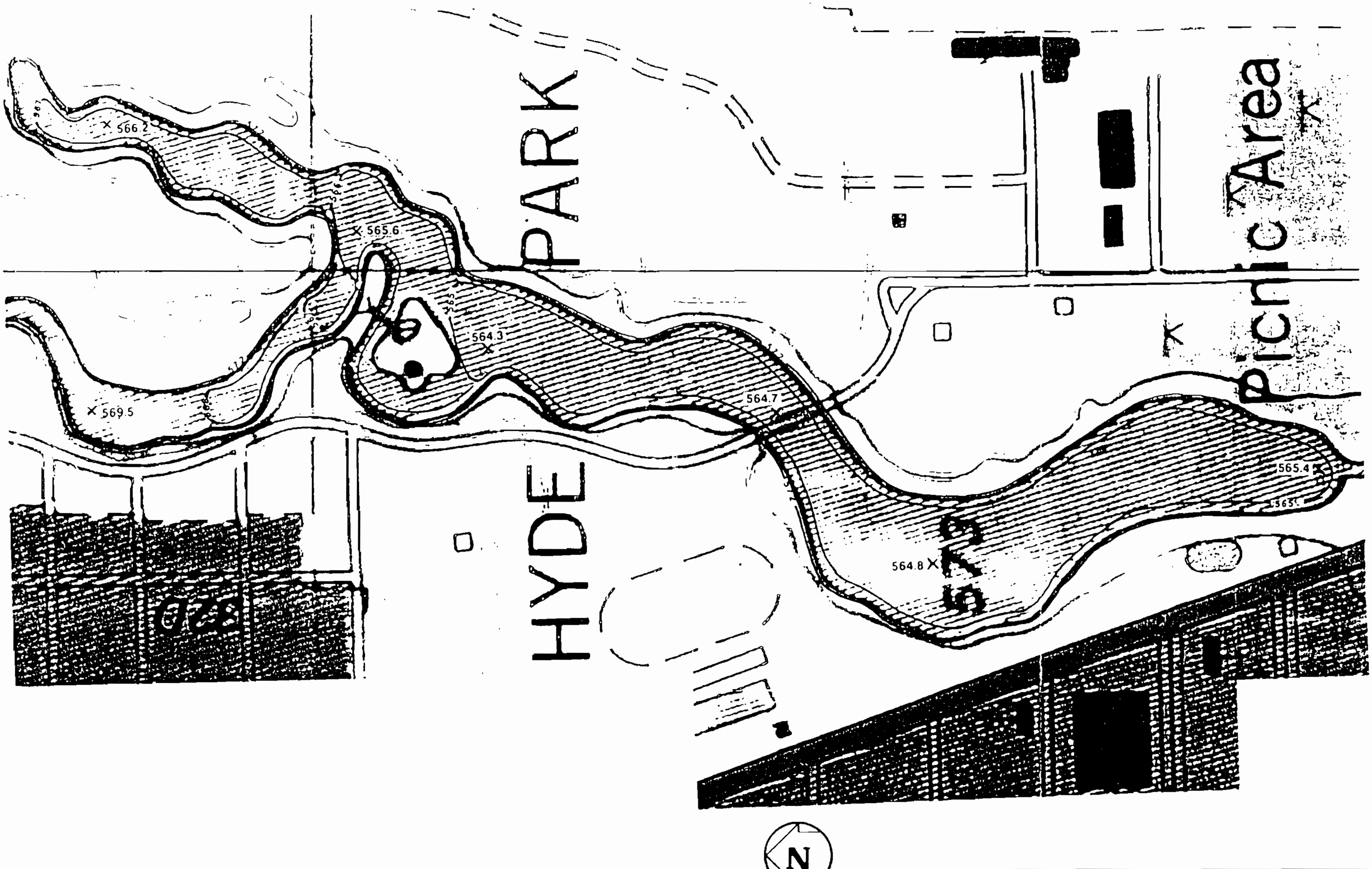
HORIZ SCALE 1" = 200'
VERT SCALE 1" = 10'

x 78%

10 YEAR WITHOUT PROJECT — - —

100 YEAR WITHOUT PROJECT — — —

Job No.	22915	10 - 100 YEAR FLOOD PROFILES CONTINUED
Prepared by	C.T.T.	
Date	2/26/92	



× INDICATES SPOT ELEVATIONS FROM 1992 SURVEY

NOTE CONTOURS DRAWN FROM RESTORATION OF HYDE PARK LAKE, NIAGARA COUNTY, NY CONSTRUCTION PLANS DATED 11/79 BASEMAP IS USGS QUAD MAP

0 250 500
SCALE IN FEET Y78%

Job No	22915
Prepared by	JHS
Date	6/3/92

HYDE PARK LAKE

FIG

A-4

ATTACHMENT B
FLOOD MITIGATION PLAN

This section of the application contains the proposed flood mitigation plan. The plan has been prepared in the format of a "stand-alone" document because, once approved, it will be distributed to the construction management personnel responsible for implementing the procedures.

ATTACHMENT B
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LIST OF FIGURES

GILL CREEK SEDIMENT REMEDIATION FLOOD MITIGATION PLAN

1.0 INTRODUCTION

1.1 PROJECT OVERVIEW

E.I. du Pont de Nemours and Company, Inc. (Du Pont) and Olin Corporation (Olin) are undertaking the remediation of contaminated sediments in Gill Creek. In accordance with the terms of the Order on Consent No. B9-0206-90-01 (March 20, 1991), Du Pont and Olin agree to cooperate with the New York State Department of Environmental Conservation (NYSDEC) in implementing the remedial alternatives approved in the Record of Decision issued by the NYSDEC on March 30, 1992.

During the remediation activities in Gill Creek several diversion structures will be constructed within the Gill Creek channel from upstream of Buffalo Avenue to the confluence with the Niagara River. The two major components of this design are Diversion Structure No. 1 located upstream of Buffalo Avenue and the Niagara River Cofferdam. Diversion Structure No. 1 has a crest elevation of 563.0 ft. Edward Dean Adams Station Datum (EDASD) and sandbags to elevation 564.0 ft. EDASD (add 0.5 feet to convert elevation from EDASD to NGVD). The Niagara River Cofferdam has a spillway crest of 563.0 ft. EDASD with the top of dam at elevation 565.5 ft. EDASD. The spillway has sandbags from elevation 563.0 ft. EDASD to elevation 564.0 ft. EDASD.

1.2 PURPOSE OF FLOOD MITIGATION PLAN

This document outlines the operating procedures for mitigating the flood damage within the Gill Creek floodplain in the event of a major flood. A major storm event is defined as a storm event that would result in creek flows exceeding the capacity of the project diversion scheme. This diversion scheme consists of diverting the creek flow into the Buffalo Avenue Diversion Sewer up to the capacity of the sewer and storing the flow in excess of the sewer capacity in the limited reservoir capacity of Hyde Park Lake.

This document will serve as guidance to Du Pont, Olin and the construction team to determine what action needs to be taken to mitigate potential flood damage based on observed rainfall and runoff. The mitigation measures consist of five different levels of action:

- Monitoring the climatic and hydrologic conditions in the Gill Creek watershed;
- Monitoring storm flows in the Buffalo Avenue Diversion Sewer;
- Managing the flow release from Hyde Park Lake;
- Removing the sandbags above the crest of Diversion Structure No. 1 and in the Cofferdam spillway; and
- Breaching of the Niagara River Cofferdam.

The purpose for mitigation measures is to minimize increased flood heights thus reducing the potential for damage to structures between Buffalo Avenue and the downstream face of the Hyde Park Lake dam. Damage to structures could occur for storms above the 50-year 24-hour design storm in the Gill Creek watershed. This estimation is based on WCC's understanding of the Gill Creek watershed given existing available data.

The remediation period will span the summer and fall seasons. Summer season storms typically are characterized by local intense thunderstorms while the fall season storms are characterized by regional low intensity rainfall events.

1.3 WATERSHED CONDITIONS

The Gill Creek watershed upstream of Diversion Structure No. 1 is approximately 8 square miles and is shown in Figure 1. The watershed contributing to Gill Creek flows between the Hyde Park Lake dam and Diversion Structure No. 1 is only 0.07 square miles. The lag time for a storm in the watershed above Hyde Park Lake dam is estimated to be approximately 4 hours. The lag time is the time from the center of the storm until the peak runoff reaches Hyde Park Lake dam. The travel time for the peak flow to travel from Hyde Park Lake dam to Diversion Structure No. 1 is approximately 45 minutes.

1.4 STORM WATER MANAGEMENT CAPACITY

The low level outlet from Hyde Park Lake will be operated to discharge the same rate as the inflow into the Buffalo Avenue Diversion Sewer. The anticipated discharge rate into the City of Niagara Falls Storm Sewer is 16.7 cfs. This rate may be increased if the capacity of the storm sewer is not exceeded.

Storage capacity in Hyde Park Lake is based on surveyed information. The stage-storage curve is shown in Figure 2. The precipitation depth estimated based on the hydrologic analyses conducted for the project, that will result in exceeding the diversion scheme is 2.0 inches within a 24-hour period. This corresponds to about a 1-year, 24-hour storm event.

2.0 MONITORING OF CLIMATIC AND HYDROLOGIC CONDITIONS

2.1 RAIN GAGES

Two rain gages will be placed in the Gill Creek watershed, one will be located near the project site (Rain Gage No. 1) on Du Pont property and the other will be located near the center of the watershed (Rain Gage No. 2). Figure 1 shows approximate locations of the rain gages.

2.2 STAFF GAGES

A staff gage graduated in tenths of a foot will be placed on the crest of the Hyde Park Dam Spillway (Staff Gage No. 1). The staff gage will extend at least 5 feet below the crest of the spillway. Another staff gage shall be placed on the bank of the Niagara River upstream from the Cofferdam (Staff Gage No. 2). Staff Gage No. 2 shall begin at elevation 561.0 ft. EDASD and extend to at least elevation 566.0 ft. EDASD.

2.3 GAGE READINGS

Both rain gages and staff gages will be read and cleaned at approximately the same time each day, preferably in the morning. The depth of rainfall and condition of the rain gage should be noted each day in the daily field logs. During a rainfall event, the gage near the project site (Rain Gage No. 1) will be monitored frequently and Rain Gage No. 2 will be checked periodically. More weight will be placed on the readings of Rain Gage No. 2 when deciding on mitigation measures to be implemented because this gage is more representative of the watershed upstream of Hyde Park Dam. The purpose of Rain Gage No. 1 is to provide data to estimate the frequency at which Rain Gage No. 2 will be monitored. Judgement on the intensity of the rainfall event and the location of the storm will be considered to estimate the frequency of reading Rain Gage No. 2.

It is anticipated that the diversion scheme will be exceeded when the precipitation depth exceeds 2.0 inches in a 24-hour period. It is also anticipated that damage to structures within the floodplain may start to occur for storms equivalent to the 50-year storm event (4.5 inches of precipitation in a 24-hour period). The staff gage at Hyde Park Lake will be monitored periodically during the storm. Once the precipitation depth at Rain Gage No. 2 has reached 2.0 inches within a 24-hour period or 2.0 inches within a 12-hour period (which corresponds to approximately the center of the 50-year, 24-hour storm), the Staff Gage No. 1 at Hyde Park Lake will be monitored constantly. Periodic measurements of Staff Gage No. 2 will made throughout the storm.

2.4 MONITORING BUFFALO AVENUE DIVERSION SEWER

The storm sewers will be monitored by a separate plan which was submitted by Du Pont to the City of Niagara Falls, Department of Wastewater Facilities on April 30, 1992. The storm sewers will be monitored continuously during a storm to bypass as much flow as possible through the Buffalo Avenue Diversion Sewer inlet without surcharging the storm sewer system.

2.5 MONITORING THE FLOODPLAIN DOWNSTREAM OF HYDE PARK LAKE DAM

The operating procedures presented are based on the existing available data. There are known survey data inconsistencies between the different data sets that were used for this analysis. Periodic observations of the floodplain downstream of the Hyde Park Lake Dam should be made once the 2.0 inches of rainfall has occurred within a 12-hour period in the watershed. The operating procedures and mitigation measures (Section 3.0) are designed to breach the cofferdam just before there is damage to structures. Section 4.0 identifies the individuals who should be notified per the instructions in Section 3.0. There will be flow outside of the banks of Gill Creek before damage occurs to structures. If damage is occurring to structures before the peak discharge is reached at the Hyde Park Lake Dam then the cofferdam should be breached.

3.0 MITIGATION MEASURES

3.1 GUIDANCE FOR IMPLEMENTING MITIGATION MEASURES

The following steps will be implemented by the construction manager or his designee:

1. Adjust flow release from the low level outlet at Hyde Park Lake dam to available capacity in the Buffalo Avenue Diversion Sewer.

2. If the precipitation depth over the watershed (Rain Gage No. 2) is greater than 2.0 inches within a 12- or 24-hour period (i.e. precipitation depth that can be handled by the diversion scheme as discussed in Section 2.3), then:

   - Notify Du Pont and Olin.
   - Request remediation contractor to mobilize for removal of sandbags on Diversion Structure No. 1 and request Cofferdam contractor to mobilize breaching of Cofferdam.
   - Protect sediments in the creek bed from erosion by covering sediments with geotextile fabric or plastic sheeting weighed down with sandbags.
   - Remove equipment from creek.

- Monitor Staff Gage No. 1 at Hyde Park Lake continuously.
- Continue monitoring of rain gages.

3. If Staff Gage No. 1 reading is greater than elevation 572.0 ft. (NGVD) (flow over spillway) then:

   - Notify Du Pont and Olin.
   - Request contractors to remove sandbags from Cofferdam and Diversion Structure No. 1 (removal of sandbags from Diversion Structure No.1 may cause flooding of remediation areas).
   - Continue monitoring rain gages and staff gages.

4. If the measurement at Staff Gage No. 1 is greater than 2.5 ft. (elevation 574.5 ft.), then:

   - Notify Du Pont and Olin.
   - Inspect floodplain to identify areas of overbank flows and locations of structures that could become damaged if the flood height increases further.
   - Continue inspection of overbank flows and of structures that could be damaged by flood flows until damage to structures become imminent.

5. If the measurement at Staff Gage No. 1 is greater than 3.1 ft. (elev. 575.1 ft. NGVD) (i.e., flow in creek is such that damage to structure is imminent) or damage to structures is imminent as determined in Step 4; then:

   - Notify Du Pont and Olin.
   - Confirm imminent damage to structures in the floodplain if breaching the Cofferdam would not occur.
   - Breach Cofferdam.
   - Du Pont/Olin notify City of Niagara Falls and NYSDEC.

Numerous rain gage and staff gage readings will be taken at all gages throughout the storm. The date, time and reading will be recorded to document the flood event. The staff gage readings will continue until the flood waters have returned to within the channel banks. High water marks which can be recovered by a surveyor at a later date should be taken in all areas of damage.

3.2 PROCEDURE FOR REMOVAL OF SANDBAGS FROM COFFERDAM AND FROM DIVERSION STRUCTURE NO.1

The sandbags will be removed from the crest of the Cofferdam spillway by hand and with construction equipment (backhoe, loader). The removed sandbags will be stockpiled on the crest of the Cofferdam.

The sandbags will have to be removed from the Diversion Structure No. 1 with a backhoe because the structure will be inundated.

3.3 PROCEDURE FOR BREACHING COFFERDAM

A 50-foot wide emergency-breach section has been provided on the right abutment of the Niagara River Cofferdam. The contractor will begin excavating at the furthest point from the river bank and work towards the bank. At this time there will already be water flowing over the Cofferdam spillway.

3.4 PROCEDURE FOR LOWERING WATER LEVEL IN HYDE PARK LAKE AFTER STORM

The gate opening for the Hyde Park Lake low level outlet will be monitored after a storm event to maintain a constant flow through the outlet. The flow released will be controlled so that it does not exceed the capacity of the Buffalo Avenue Diversion Sewer and the lake level is maintained at or above the agreed lower lake level elevation of 570.0 or 569.0 ft. NGVD.

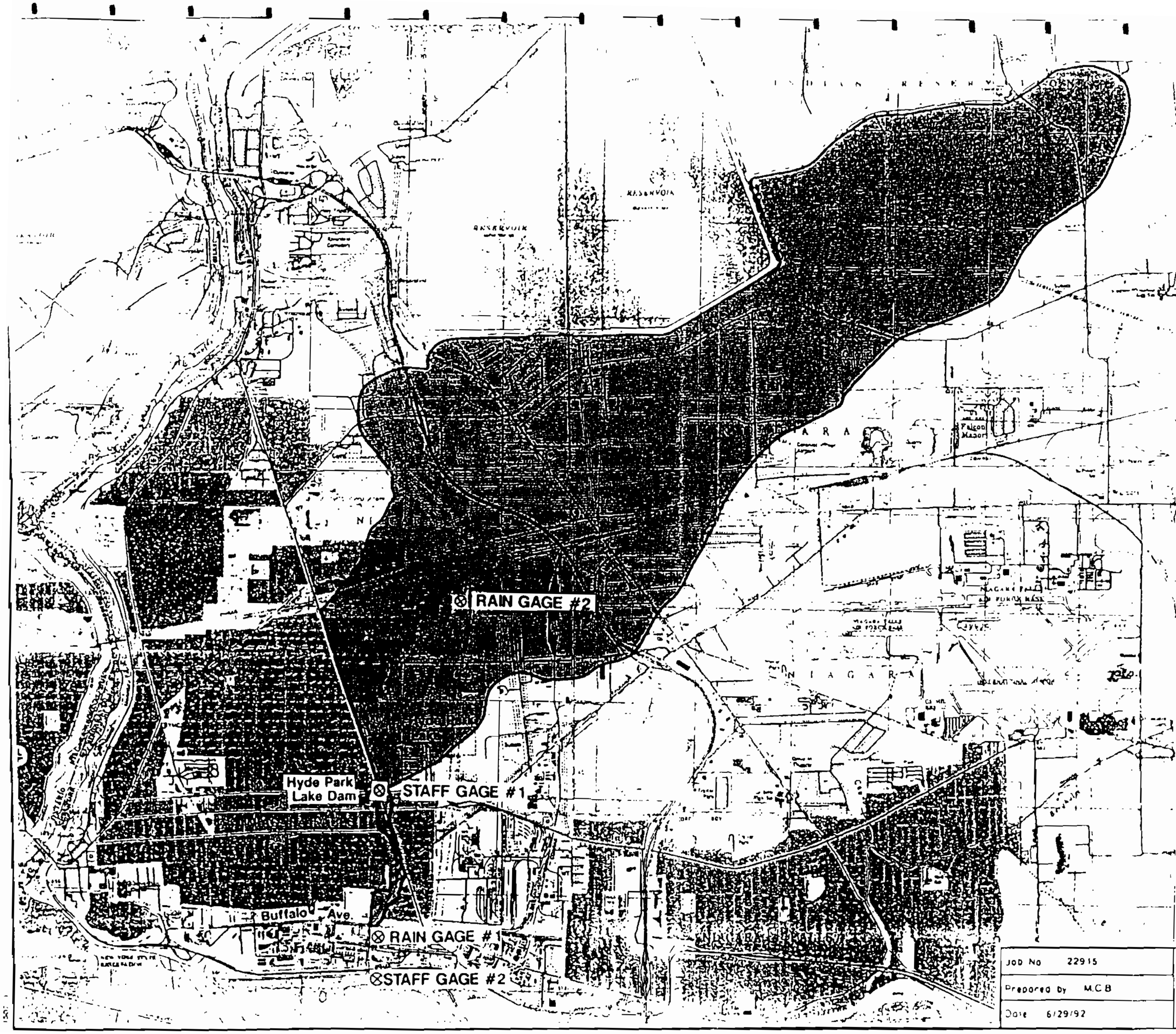
4.0 FLOOD MITIGATION CONTACT PHONE LIST

The following list identifies the key individuals who are responsible for implementing the flood mitigation plan. Arrangements for 24-hour notification will be provided.

OLIN CONTACT:	James C. Brown, Manager, Environmental Technology
work phone:	(615) 336-4306
DU PONT CONTACT:	Leslie A. Warner, Senior Engineer
work phone:	(716) 278-5452
CONSTRUCTION MANAGER:	James McClincy, Du Pont
work phone:	(716) 278-5795
CONTRACTOR CONTACT:	Frank Fracassi, Sevenson Environmental Services, Inc.
work phone:	(716) 284-0431

In the event that it is necessary to breach the Niagara River Cofferdam, the following city and state officials will be contacted by Du Pont or Olin:

CITY OF NIAGARA FALLS:	*(To be determined by the City).*
work phone:	
NYSDEC CONTACT:	Michael Hinton, Environmental Scientist II, Division of Solid and Hazardous Waste
work phone:	(716) 851-7220



NOTES

1. BASE MAP TAKEN FROM USGS TONAWANDA WEST N.Y. (1980) NIAGARA FALLS N.Y. ONT. (1980) RANSOMVILLE, N.Y. (1980) AND LEWISTON, N.Y. (1980) 7.5' QUADRANGLES

SCALE 1"=4000'

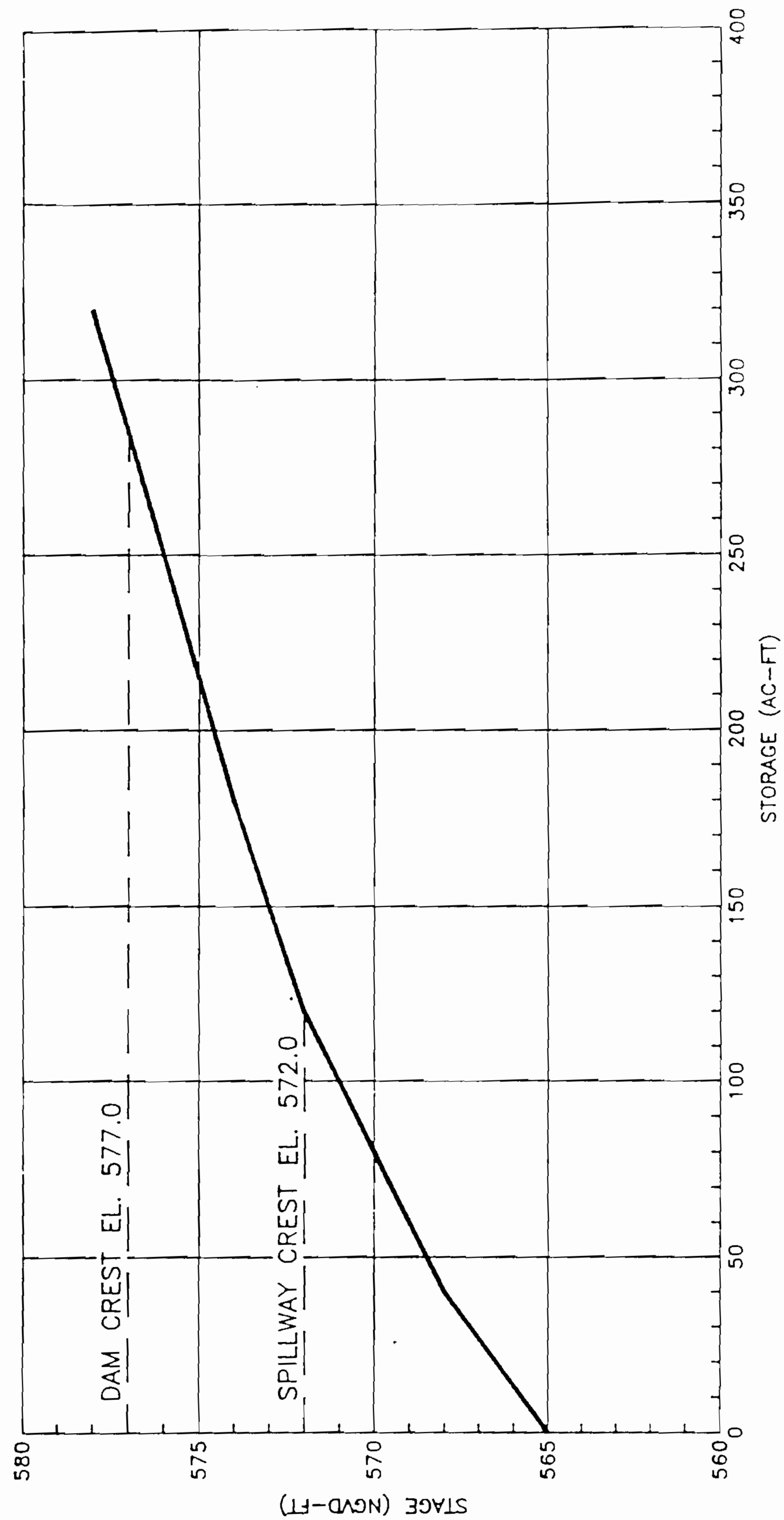
x 787.

Job No	22915
Prepared by	M.C.B
Date	6/29/92

GILL CREEK WATERSHED AREA AND GAGE LOCATIONS

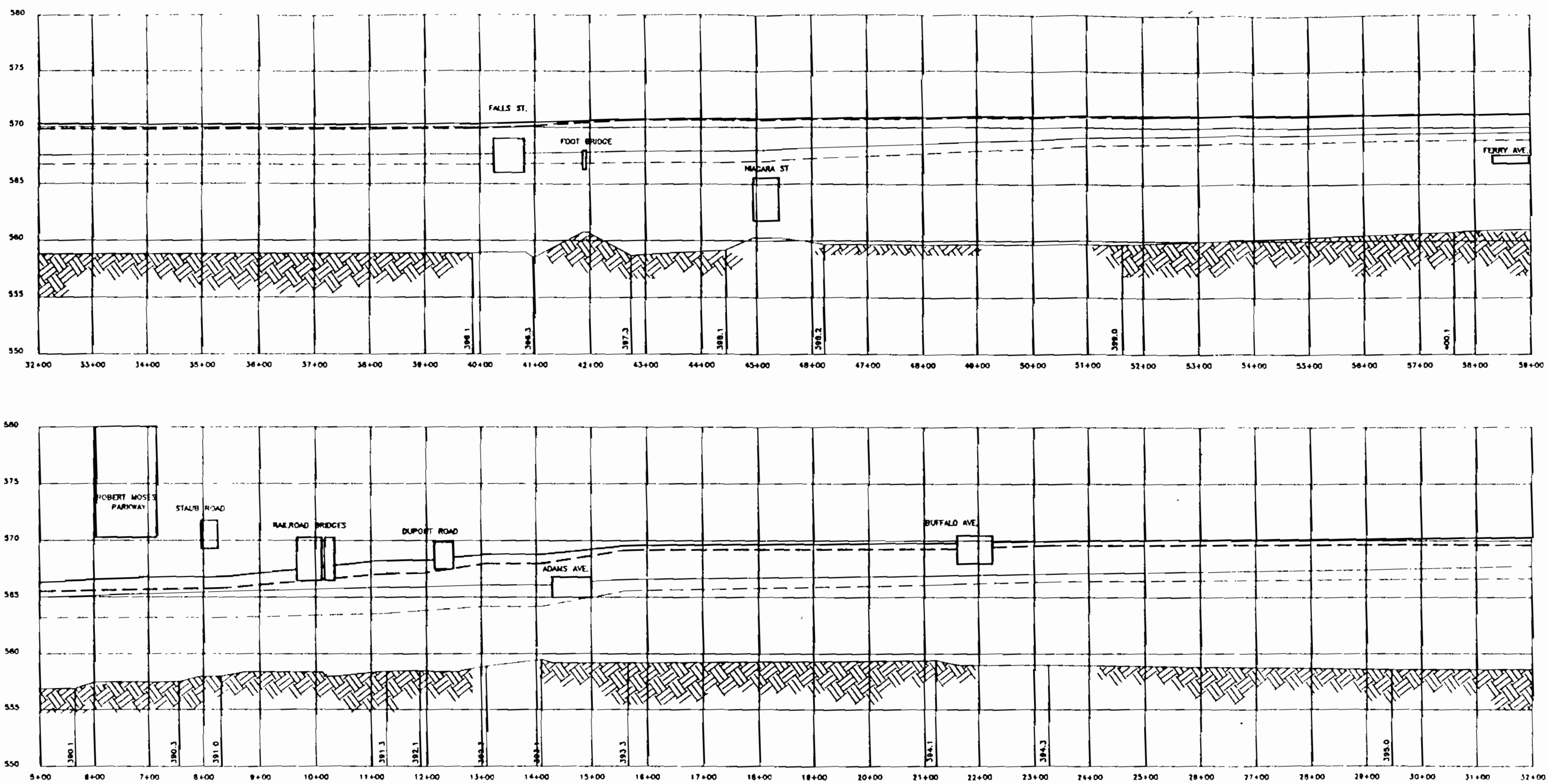
GILL CREEK REMEDIATION PROJECT

FIG.



Job No. : 22915	STAGE–STORAGE CURVE
Prepared by : J.H.S.	
Date : 6/29/92	HYDE PARK LAKE

FIG. 2



REFERENCES FOR PROFILE DATA

1 PROFILE BASED ON ORIGINAL NIAGARA FALLS FLOOD INSURANCE STUDY HEC-2 MODEL (1981)
2 HEC-2 MODEL ADJUSTED WITH:
RECENT SURVEY DATA (UPSTREAM OF BUFFALO AVENUE)
RECENT TOPOGRAPHIC MAP WITHIN PLANT BOUNDARIES (1992)
CROSS SECTIONS USED IN HEC-6 (WCC 1991)
DUPONT PLANT "AS BUILT" DRAWINGS
NYPA "AS BUILT" DRAWINGS
3 DISCHARGES USED IN THIS ANALYSIS ARE FROM THE ORIGINAL F.I.S. (100 YEAR DISCHARGE = 1600 CFS AND 10 YEAR DISCHARGE = 930 CFS)
4 STORM FLOWS FROM ORIGINAL F.I.S. ARE HIGHER THAN THOSE CALCULATED BY WCC
5 ELEVATIONS ARE NGVD

HORIZ SCALE 1" = 200'
VERT SCALE 1" = 10'

10 YEAR WITH PROJECT
10 YEAR WITHOUT PROJECT
100 YEAR WITH PROJECT
100 YEAR WITHOUT PROJECT

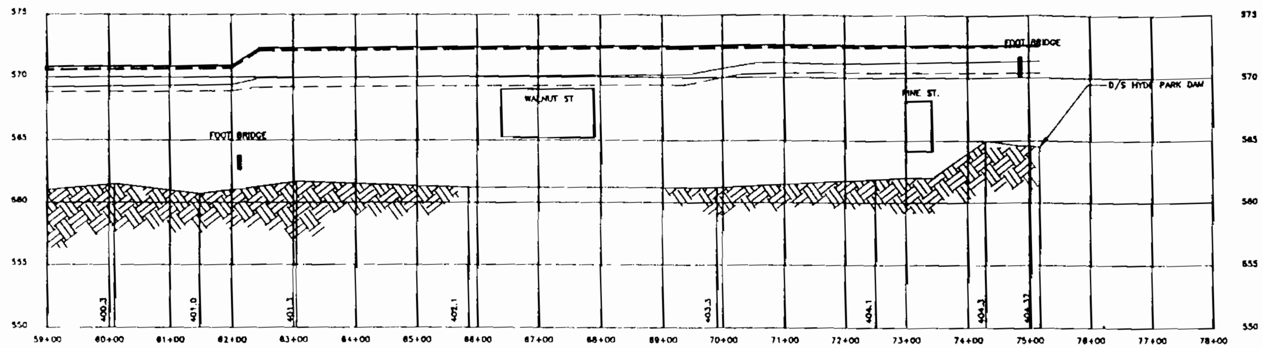
Job No. :	22915
Prepared by :	CTT
Date :	3/13/92

10 - 100 YEAR FLOOD PROFILES

CONTINUED ON FIG A 3

FIG. A 2

150271



HORIZ SCALE 1" = 200'
VERT SCALE 1" = 10'

10 YEAR WITH PROJECT
10 YEAR WITHOUT PROJECT
100 YEAR WITH PROJECT
100 YEAR WITHOUT PROJECT

Job No. : 22915	10 – 100 YEAR FLOOD PROFILES CONTINUED FROM FIG A 2
Prepared by : C.T.T.	
Date : 2/26/92	

GIL-BOR2

FIG A

REV 11/90

DU PONT

CHEMICALS

P.O. Box 787
Buffalo Ave. & 26th Street
Niagara Falls, NY 14302-0787
(716) 278-5100

Post-It™ brand fax transmittal memo 7671	# of pages ▸
To E Struzeski	From L. Warner
Co. SAIC	Co. Du Pont
Dept.	Phone # 8 716 2785452
Fax # 303 292 2087	Fax #

:mit

July 21, 1992

Mr. Albert Zaepfel
Industrial Monitoring Coordinator
Department of Wastewater Facilities
1200 Buffalo Avenue
Niagara Falls, NY 14302

Dear Mr. Zaepfel:

GILL CREEK REMEDIATION PROJECT

Re: Use of the Existing Du Pont Steam Stripper for Treating Gill Creek Wastewaters - Contingency Plan

In recent communications, EPA has expressed reservations concerning the proposed use of Du Pont's existing steam stripper for treatment of wastewaters generated during the Gill Creek Remediation Project. EPA appears to be concerned about the potential discharge of PCBs to the City of Niagara Falls (city) sewers should the steam stripper be employed for organics removal. However, Du Pont believes that there is sufficient justification for EPA to permit steam stripping as a contingency treatment alternative for the following reasons:

1. Treatability investigations have shown that the steam stripper will remove PCBs to a concentration below one part per billion and well within the existing Du Pont site POTW permit limit for PCB discharges. Our treatability tests showed that the use of polymer-assisted settling alone was effective in removing PCBs from a concentration of approximately 1.5 ppm to 10 parts per billion (see Table 6-1 of the "Bench Scale Testing Report," July 1992). These tests were conservative since they were performed using wastewater samples with exceptionally high levels of total suspended solids as compared to the design basis. Therefore the planned pretreatment will remove a significant portion of PCBs prior to steam stripping.

   Further, modeling (using the same computer based program as used for the design of the existing steam stripper) over a range of conditions showed that even at PCB concentrations in excess of the design basis influent concentration of 909 ppb and at the maximum 240 gpm flow contribution to the steam stripper from the Gill Creek project, the steam stripper should be capable of removal of PCBs to below one part per billion. Note that preclarification and filtration should remove PCBs to a degree well below this 909 ppb influent design basis used in the stripper modeling since PCBs are hydrophobic and will tend to partition to the solids. A review of the chemical properties of PCBs also suggests that the design basis of 909 ppb is conservatively high for estimating stripper influent concentrations since standard references show the solubility of PCBs in the range of 40-200 ppb.

2. Should the steam stripper effluent contain a PCB level of 1 ppb, PCB mass discharges will be insignificantly low (<.003 ppd) and well within existing POTW PCB discharge permit limitations (0.02 ppd average). At this level, PCBs will be undetectable in the site discharges through the 023 outfall and undetectable in the POTW influent.

3. Flexibility is required so that Du Pont/Olin can respond to site-specific conditions such as weather effects or down time. Du Pont's experience with the existing steam stripper is an illustration of potential circumstances requiring flexibility. Even after extensive lab-scale testing of this technology including testing of anti-scalant agents, Du Pont has experienced carbonate scaling problems in the operation of this system. Although we believe it unlikely, carbonate scaling, other forms of scaling, or other unforeseen circumstances may constrain us from using air strippers or GAC alternatives at select times during the project. However, the contained area of the Gill Creek bed must be kept as dry as possible during the remedial work so that the project can be completed before the onset of winter weather, and this requires that we have a treatment system on line as close to 24 hours per day as possible. Our proposed contingency organic treatment systems - GAC only and steam stripping only - provide us with the needed flexibility to assure that work can proceed.

4. This project is temporary and will require water treatment operations for approximately four months. Sampling and monitoring during the remediation will assure that Du Pont's discharges are within the permitted and deminimus POTW limitations.

Although we believe that we have adequately demonstrated the feasibility of steam stripping alone for PCB removal, we recognize that EPA may have continued concerns for its use. Therefore, we suggest a short-term full scale test could be conducted which we believe will provide you with the assurance that EPA seeks. Following construction of the proposed Remediation Water Treatment System (i.e., equalization, clarifiers, filters, air strippers, and GAC vessels), Du Pont will, at a convenient time and upon notice to the POTW and DEC, conduct a short-term test (24-120 hours) in which remediation waters will be directed to the steam stripper. Influent and effluent samples will be taken over the course of the test and analyzed for PCBs. The results of the test will be used to show that PCBs are adequately removed. Upon completion of a successful test, subsequent operation of the steam stripper for treating Gill Creek remediation waters will be conducted with routine effluent sampling for PCBs.

Should such a test produce effluent with PCBs above the POTW limits, Du Pont would then use the steam stripper only after pretreating remediation waters using a GAC absorber. In this case, a single GAC (i.e., PCB guard vessel) would be used for PCB removal, in a way similar to the first in series GAC carbon vessel is used in the proposed GAC treatment alternatives. Our current piping design allows such a treatment scheme so this alternative could be easily implemented. However, based on the information already presented we believe that pretreatment by absorption on carbon is unnecessary and would be costly and counter to waste minimization principles.

We ask that POTW/NYSDEC/EPA consider our need for an extremely expeditious review of the water treatment proposal for the Gill Creek remediation project. As of July 14, we have received approvals for all other aspects of the project. We believe that steam stripping may be the most economical organic removal treatment scheme and offers other advantages in some cases over the other treatment alternatives. However, we do not want any reservations for steam stripping to delay approval for the water treatment system that must be installed for the project. Therefore, if our proposal to utilize the existing steam stripper requires further consideration then we propose postponing further discussion of this contingency in the interests of speedy approval of the other water treatment concerns for this project.

Please continue to contact Dr. Steve Constable (302-366-2375) directly to address any outstanding issues. We sincerely appreciate your timely cooperation in this matter. Should you have other questions, please contact me at (716) 278-5452.

Respectfully,

Leslie A. Warner

Leslie A. Warner
Project Leader
Engineering &
Environmental Affairs

LAW:new

cc: H. Mazzucca, EPA, New York, NY
E. Struzeski, SAIC, Denver, CO
D. Leemhuis, NYSDEC, Buffalo, NY
G. Shanahan, EPA, New York, NY
S. Constable, Du Pont, Wilmington, DE
J. Brown, Olin, Charleston, TN
M. Hinton, NYSDEC, Buffalo, NY

New York State Department of Environmental Conservation
270 Michigan Avenue, Buffalo, New York 14203-2999

Thomas C. Jorling
Commissioner

KW: DEC, Health & Safety
RJG / File 52150
J Clark
J McClincy
A. Frith
D&S
JC Brown

July 31, 1992

Ms. Leslie A. Warner
Senior Engineer
DuPont Chemicals
P.O. Box 787
Niagara Falls, NY 14302

Dear Ms. Warner:

Gill Creek Remediation Site #932013
Safety and Health Plan

This department along with the Department of Health have reviewed the Health and Safety Plan for the Gill Creek cleanup project.

The following comments must be incorporated into the Health and Safety Plan for the project:

1. Page 20, Integrated Sampling

   Monitoring for the chemicals listed in this section should also be done at the downwind perimeter of Area 1's exclusion zone at a detection limit of 0.1 ppm (air equivalent). Any other major chemicals greater than 10 ppm should be identified. The sampling should be conducted two times every five work days. The data is to be reviewed by the Safety Officer to determine if any corrective action is needed and to evaluate the impact, if any, on the public utilizing the Robert Moses Parkway.

2. Page 22, Air Monitoring - Response Levels

   Periodic (every 2 hours) PID monitoring is proposed "at the boundary of the remediation work". This location is undefined. The monitoring should be done at downwind perimeter of the exclusion zone and be protective of the public. Thus, the monitoring must be conducted continuously.

3. Page 22, Contingency Plan for Remediation Air Emission

   The fundamental approach in the contingency plan is the application of worker permissible exposure limits (PEL's) as action levels for the public. For example, in Response Level II, access is restricted to personnel/traffic not having the proper personal protective equipment in any area exceeding the PEL. The application of a PEL action level to the public is inappropriate.

A lower action level such as total organic vapor levels approaching 5 ppm above background is more appropriate and has been used for many other site remediations where occupied structures (such as non-site residential or commerical structures) exist downwind. However, this is not the case for Area 1 as the public would normally be "passing through the area" on the Robert Moses Parkway and any exposure to work activities would be of an extremely short time duration. However, in the event of a traffic jam or backup, the exposure could be several hours. Therefore, it is suggested that in the event of a prolonged traffic jam and the total organic vapor level has exceeded or is approaching 5 ppm above background, Response Level III is triggered. Removal work must be halted and vapor suppression procedures be implemented immediately. Work may begin after the traffic condition(s) has been rectified and traffic is flowing normally.

4. Page 25, Dust Control

The use of 10 mg/m^3 action level to initiate dust suppression control measures is inappropriate. The action level normally used on all remediation projects is 150 ug/m^3. A copy of DEC TAGM 4031 is attached and must be included in the DuPont Health and Safety Plan.

5. Page 27, Site Control Measures

There is a typo in the second paragraph, first line. Please clarify.

If you have any questions please call me at 851-7220.

Sincerely,

Michael J. Hinton

Michael J. Hinton, P.E.
Environmental Engineer II

MJH/ad

cc: Mr. E. Joseph Sciascia
Mr. Al Wakeman, NYSDOH
Mr. Vivek J Thakkar, NYSDEC

M. DOSTER

HWR-89-4031
October 27, 1989

New York State Department of Environmental Conservation

MEMORANDUM

TO: Regional Hazardous Waste Remediation Engrs., Bur. Directors & Section Chiefs
FROM: Michael J. O'Toole, Jr., Director, Division of Hazardous Waste Remediation
SUBJECT: DIVISION TECHNICAL AND ADMINISTRATIVE GUIDANCE MEMORANDUM--FUGITIVE DUST SUPPRESSION AND PARTICULATE MONITORING PROGRAM AT INACTIVE HAZARDOUS WASTE SITES
DATE: OCT 27 1989

Michael J. O'Toole

1. Introduction

Fugitive dust suppression, particulate monitoring, and subsequent action levels for such must be used and applied consistently during remedial activities at hazardous waste sites. This guidance provides a basis for developing and implementing a fugitive dust suppression and particulate monitoring program as an element of a hazardous waste site's health and safety program.

2. Background

Fugitive dust is particulate matter--a generic term for a broad class of chemically and physically diverse substances that exist as discrete particles, liquid droplets or solids, over a wide range of sizes--which becomes airborne and contributes to air quality as a nuisance and threat to human health and the environment.

On July 1, 1987, the United States Environmental Protection Agency (USEPA) revised the ambient air quality standard for particulates so as to reflect direct impact on human health by setting the standard for particulate matter less than ten microns in diameter (PM_{10}); this involves fugitive dust whether contaminated or not. Based upon an examination of air quality composition, respiratory tract deposition, and health effects, PM_{10} is considered conservative for the primary standard--that requisite to protect public health with an adequate margin of safety. The primary standards are 150 ug/m^3 over a 24-hour averaging time and 50 ug/m^3 over an annual averaging time. Both of these standards are to be averaged arithmetically.

There exists real-time monitoring equipment available to measure PM_{10} and capable of integrating over a period of six seconds to ten hours. Combined with an adequate fugitive dust suppression program, such equipment will aid in preventing the off-site migration of contaminated soil. It will also protect both on-site personnel from exposure to high levels of dust and the public around the site from any exposure to any dust. While specifically intended for the protection of on-site personnel as well as the public, this program is not meant to replace long-term monitoring which may be required given the contaminants inherent to the site and its air-quality.

3. Guidance

A program for suppressing fugitive dust and monitoring particulate matter at hazardous waste sites can be developed without placing an undue burden on remedial activities while still being protective of health and environment. Since the responsibility for implementing this program ultimately will fall on the party performing the work, these procedures must be incorporated into appropriate work plans. The following fugitive dust suppression and particulate monitoring program will be employed at hazardous waste sites during construction and other activities which warrant its use:

(1) Reasonable fugitive dust suppression techniques must be employed during all site activities which may generate fugitive dust.

(2) Particulate monitoring must be employed during the handling of waste or contaminated soil or when activities on site may generate fugitive dust from exposed waste or contaminated soil. Such activities shall also include the excavation, grading, or placement of clean fill, and control measures therefore should be considered.

(3) Particulate monitoring must be performed using real-time particulate monitors and shall monitor particulate matter less than ten microns (PM_{10}) with the following minimum performance standards:

Object to be measured: Dusts, Mists, Aerosols
Size range: <0.1 to 10 microns
Sensitivity: 0.001 mg/m^3
Range: 0.001 to 10 mg/m^3
Overall Accuracy: $\pm$10% as compared to gravimetric analysis of stearic acid or reference dust

Operating Conditions:
Temperature: 0 to 40°C
Humidity: 10 to 99% Relative Humidity

Power: Battery operated with a minimum capacity of eight hours continuous operation

Automatic alarms are suggested.

Particulate levels will be monitored immediately downwind at the working site and integrated over a period not to exceed 15 minutes. Consequently, instrumentation shall require necessary averaging hardware to accomplish this task; the P-5 Digital Dust Indicator as manufactured by MDA Scientific, Inc. or similar is appropriate.

(4) In order to ensure the validity of the fugitive dust measurements performed, there must be appropriate Quality Assurance/Quality Control (QA/QC). It is the responsibility of the entity operating the equipment to adequately supplement QA/QC Plans to include the following critical features: periodic instrument calibration, operator training, daily instrument performance (span) checks, and a record keeping plan.

(5) The action level will be established at 150 ug/m^3 over the integrated period not to exceed 15 minutes. While conservative, this short-term interval will provide a real-time assessment of on-site air quality to assure both health and safety. If particulate levels are detected in excess of 150 ug/m^3, the upwind background level must be measured immediately using the same portable monitor. If the working site particulate measurement is greater than 100 ug/m^3 above the background level, additional dust suppression techniques must be implemented to reduce the generation of fugitive dust and corrective action taken to protect site personnel and reduce the potential for contaminant migration. Corrective measures may include increasing the level of personal protection for on-site personnel and implementing additional dust suppression techniques (see Paragraph 7). Should the action level of 150 ug/m^3 be exceeded, the Division of Air Resources must be notified in writing within five working days; the notification shall include a description of the control measures implemented to prevent further exceedences.

(6) It must be recognized that the generation of dust from waste or contaminated soil that migrates off-site, has the potential for transporting contaminants off-site. There may be situations when dust is being generated and leaving the site and the monitoring equipment does not measure PM_{10} at or above the action level. Since this situation has the potential to migrate contaminants off-site, it is unacceptable. While it is not practical to quantify total suspended particulates on a real-time basis, it is appropriate to rely on visual observation. If dust is observed leaving the working site, additional dust suppression techniques must be employed. Activities that have a high dusting potential--such as solidification and treatment involving materials like kiln dust and lime--will require the need for special measures to be considered.

(7) The following techniques have been shown to be effective for the controlling of the generation and migration of dust during construction activities:

1. Applying water on haul roads.
2. Wetting equipment and excavation faces.
3. Spraying water on buckets during excavation and dumping.
4. Hauling materials in properly tarped or watertight containers.
5. Restricting vehicle speeds to 10 mph.
6. Covering excavated areas and material after excavation activity ceases.
7. Reducing the excavation size and/or number of excavations.

Experience has shown that utilizing the above-mentioned dust suppression techniques, within reason as not to create excess water which would result in unacceptable wet conditions, the chance of exceeding the 150 ug/m^3 action level at hazardous waste site remediations is remote. Using atomizing sprays will prevent overly wet conditions, conserve water, and provide an effective means of suppressing the fugitive dust.

(8) If the dust suppression techniques being utilized at the site do not lower particulates to an acceptable level (that is, below 150 ug/m^3 and no visible dust), work must be suspended until appropriate corrective measures are approved to remedy the situation. Also, the evaluation of weather conditions will be necessary for proper fugitive dust control--when extreme wind conditions make dust control ineffective, as a last resort remedial actions may need to be suspended.

There may be situations that require fugitive dust suppression and particulate monitoring requirements with action levels more stringent than those provided above. Under some circumstances, the contaminant concentration and/or toxicity may require appropriate toxics monitoring to protect site personnel and the public. Additional integrated sampling and chemical analysis of the dust may also be in order. This must be evaluated when a health and safety plan is developed and when appropriate suppression and monitoring requirements are established for protection of health and the environment.

cc: E. Sullivan
D. Markell
A. DeBarbieri
C. Goddard
R. Tramontano
E. McCandless
A. Fossa
J. Kelleher
J. Colquhoun
M. Keenan
D. Ritter
Regional Directors
Regional Engineers
RSHWE
Reg. Citizen Participation Specs.

Responsiveness Summary
TAGM: Fugitive Dust Suppression and Particulate Monitoring at Inactive Hazardous Waste Sites

The following comments (1. through 12.) have been incorporated into the TAGM:

1. Comment: TAGM covers only dust from hazardous waste; however, dust from non-hazardous construction activity at a site can cause a very troublesome nuisance dust condition that can lead to a considerable public concern and annoyance.

2. Comment: Since solidification and treatment at sites can involve using materials such as kiln dust, lime, etc. that have a high dusting potential, a statement stating the need for special measures for these materials should be considered.

3. Comment: TAGM does not state that when extreme wind conditions make dust control ineffective, as a last resort remedial actions may have to be suspended. In general, evaluation of weather conditions will be necessary for proper dust control.

4. Comment: Piles of excavated material should be covered as well as excluded areas.

5. Comment: A technique for dust suppression should be added for reducing the excavation size and/or the number of excavations.

6. Comment: To insure the validity of the dust measurements performed in accordance with this TAGM, there must be an appropriate QA/QC program.

7. Comment: The TAGM should provide for notification should the action level be exceeded.

8. Comment: For explanatory purposes, it may be useful to explain the significance of the ten micron standard in relation to health effects.

9. Comment: Since the responsibility for implementing this will ultimately fall to the PRP or contractor, the TAGM should state that these procedures must be incorporated into appropriate work plans.

10. Comment: The phrase "increasing the level of protection" should read "increasing the level of personal protection for on-site personnel" for clarity.

11. Comment: Suppression techniques should include atomizing sprays as an effective fugitive dust control method.

12. Comment: Define "fugitive dust."

The following comments (13. through 24.) as noted have been modified for use in the TAGM or rejected as being inappropriate or beyond the scope of the TAGM:

13. Comment: It would be helpful to add a section labeled "Purpose" to outline the specific reasons for monitoring and dust suppression.

Response: The third paragraph of "Background" has been revised to describe the purpose.

14. Comment: The use of calcium chloride as a dust suppressant has been specifically prohibited for this use in the Construction Grants program due to possible adverse environmental effects, and recommendation for its use should be evaluated further.

Response: Calcium chloride has been replaced with water.

15. Comment: The reference to a specific monitoring instrument should be deleted and minimum performance standards be substituted.

16. Comment: The real-time monitors used for monitoring particulates should be equipped with automatic alarms and the necessary averaging hardware.

Response (to 15. and 16.): Minimum performance standards have been adopted. A specific instrument has been kept since it is used by the Division of Air Resources, not as an endorsement but as an example and qualified as such by including "or similar." Automatic alarms are suggested, but not required since they are not minimum standards for performance.

17. Comment: The need for the use of watertight containers is unclear. Although watertight roll-offs may prohibit fine particles from passing through the seals, properly tarped standard dump trucks and roll-offs should provide adequate dust control.

Response: Properly tarping has been added.

18. Comment: In the final paragraph it is suggested that it may be appropriate to modify the particulate standard in consideration of the toxicity of the dust generating material. The PM_{10} standard was developed without regard to the chemical characteristics of the particulate material and it should be used accordingly by the Division.

Response: While particulate monitoring and standards should be virtually independent of the toxicity levels, there may be situations involving toxic dusts that warrant more stringent monitoring and action levels than those conservative levels provided for in this TAGM. If toxic air emissions are a concern, appropriate toxics monitoring and action levels should be in place and this suggestion in the TAGM should remain. However, the details of such are beyond the scope of this TAGM.

19. Comment: TAGM does not address what level of protection should be used for varying concentrations or toxicity of fugitive dust in the work zone.

Response: While increasing the level of personnel protection is addressed as a corrective action to be taken if action level are exceeded, the issue of specific levels of personnel protection is not appropriate for this TAGM.

20. Comment: Since semi-volatiles in vapor phase may not register during the dust or volatile organics monitoring, it is essential that these monitorings by themselves are not construed as providing complete safeguards.

Response: The issue addressed by the TAGM is the possible need for more stringent action levels for dust and particulates--vapors are a whole different issue beyond the scope of the TAGM.

21. Comment: It is not clear if TAGM specifies the long-term collection and analysis of fugitive dust to ascertain whether toxic chemicals are present in any significant level.

Response: Collection and analysis of fugitive dust are not within the scope of this TAGM.

22. Comment: TAGM does not specify what actions should be taken when the concentration and/or toxicity of fugitive dust may require lower action levels (i.e. health risk assessment).

Response: The intent of the TAGM is to provide a real-time measure of air quality due to fugitive dust during remedial activities at inactive hazardous waste sites, and health risk assessment from the toxicity of the dust is beyond the scope of this TAGM.

23. Comment: The particulate monitoring could also be utilized to evaluate the exposure of the general public to dusts created by the remedial activities. Sampling should be conducted downwind at an off-site receptor such as a residence or school.

Response: By monitoring on-site both down- and upwind with discrete and conservative action levels along with employing a feasible dust suppression program, the public will be protected from any potential impact of the dust.

24. Comment: The TAGM could also address a screening analysis to determine if a particular contaminant is a possible concern in dust fallout.

Response: While there may be instances where screening analysis is necessary, methodologies for such are more appropriately outlined in the Division of Air Resources Air Guide-1, Guidelines for the Control of Hazardous Air Contaminants.

REV 11/90

DU PONT

CHEMICALS

P.O. Box 787
Buffalo Ave. & 26th Street
Niagara Falls, NY 14302-0787
(716) 278-5100

bcc: RJGen~~tilucci~~/File 52150

kw: City, Floodplain, permit

August 4, 1992

Dr. Frank Shiappetti, Director
Department of Environmental Services
City of Niagara Falls
745 Main Street
Niagara Falls, NY 14302-0069

Dear Dr. Shiappetti:

DU PONT/OLIN GILL CREEK REMEDIATION PROJECT

Regarding the Gill Creek project, two copies of the Floodplain Development Permit Application were sent to you on July 21, 1992. It has come to our attention that two figures in the application are missing information. Enclosed are two corrected copies of Figures A-2 and A-3.

In addition Du Pont and Olin have agreed to notify property owners in the Gill Creek floodplain of the potential affect of the project on flood heights. Enclosed is the text we propose to have printed in the Niagara Gazette. We would appreciate your review and comment.

Should additional information be needed, please contact me at (716) 278-5452. Thank you for your assistance.

Sincerely,

Leslie A. Warner

Leslie A. Warner
Senior Engineer, Engineering
and Environmental Affairs

LAW:klf
20088

cc: Jim Brown - Olin*
Mike Hinton - NYSDEC

* cover letter only

RJG/File 52150
JCB, DPS, MPC
McClincy
286-4978
AZ

City of Niagara Falls, New York

August 5, 1992

E. I. duPont de Nemours & Co. Inc. Significant Industrial User Permit No. 7 is hereby amended as follows:

Permission is hereby granted to discharge, to the City's combined sewer on Buffalo Avenue, pretreated wastewater generated from the remediation of Gill Creek, subject to the following conditions:

A) The approval is temporary and is granted only for the life of the creek remediation project.

B) Wastewater from infiltration, storm water runoff, dredged creek bed soil drainage, seepage from the diversion (dam) structures, etc. shall receive pretreatment via equalization, clarification, and sand filtration or its equivalent. Followed by either:
   1) an air stripper unit, followed by granular activated carbon[1], or
   2) GAC guard beds[2] followed by a steam stripper unit; or
   3) granular activated carbon only[3], prior to discharge to the City sewer via outfall 023 (MS #2).

C) Because this pretreated wastewater is expected to contain additional pollutant loads, the discharge limitations and monitoring requirements at 023 (MS #2) have been modified. The new (temporary) limits are listed on the table entitled "Temporary Limitations at 023 Gill Creek Remediation." Monitoring frequencies shall be as specified in the Sampling and Analysis Plan for the remedial project, as approved by the State of New York. Upon completion of the project discharge limitations, monitoring, and reporting requirements shall revert to the original limits and requirements.

D) All monitoring results shall be reported in the company's Quarterly Self-Monitoring Report.

---

[1] The activated carbon treatment unit shall have three parallel lines of three beds each in series (nine Carbon beds). At least two lines (six carbon beds) shall be in service at all times of discharge.

[2] There shall be three guard beds available, and at least two guard beds shall be in service at all times.

[3] Same as footnote 1, above.

E) DuPont shall continuously monitor creek flow to the diversion sewer by use of a remote flow level sensor located in the sewer which detects high flow levels. In the event of high flow levels (storms), DuPont personnel shall act immediately to take all necessary actions to prevent a surcharged condition in the diversion sewer.

AZ:mjl

az196

TEMPORARY LIMITATIONS AT 023

GILL CREEK REMEDIATION

POLLUTANT MONITORING AT 023 (MS #2)	ANNUAL AVG	DAILY MAX	UNITS	SAMPLE TYPE
Phosphorous	15.0	38.0	lbs/d	3
Carbon Tetrachloride	0.44	1.10	lbs/d	2
Dichlorobromomethane	0.144	0.36	lbs/d	2
Tetrachloroethylenes	2.29	5.73	lbs/d	2
Tetrachloroethane	2.13	5.33	lbs/d	2
Hexachlorobutadiene	0.40	1.00	lbs/d	2
PCB's	0.02	0.05	lbs/d	3
T. Phenols	2.82	7.05	lbs/d	3
*Chromium	1.0	2.0	lbs/d	3
*Lead	10.0	19.5	lbs.d	3
*Mercury	0.6	1.5	lbs/d	3
*Zinc	25.0	30.0	lbs/d	3
Residual Chlorine	300	750	lbs/d	Grab
Hexachorobenzene	1.00	2.50	lbs/d	3
**Copper	13.0	18.0	lbs/d	3
**Nickel	[illegible]	[illegible]	[illegible]	[illegible]
**Trichlorobenzenes	1.5	3.0	lbs/d	2
**Hexachlorocyclohexane	0.16	0.25	lbs/d	3
**Dichlorophenol	0.1	0.2	lbs/d	3

MEASUREMENT FREQUENCY: See Section "C" of "Gill Creek Remediation Approval" - (Sampling and Analysis Plan).

*Existing Pollutant Limitations modified for Gill Creek Project.

**Pollutant Limitations added for Gill Creek Project.

PIS 11/80

DU PONT

CHEMICALS

P.O. Box 787
Buffalo Ave. & 26th Street
Niagara Falls, NY 14302-0787
(716) 278-5100

bcc: JCBrown - Olin
RJGentilucci/File 52150
LAWarner
DPSpanfelner
AFrith
JCMcClincy

August 14, 1992

Mr. Michael Hinton, P.E.
NYS Dept. of Environmental Conservation
Division of Regulatory Affairs - Region 9
270 Michigan Avenue
Buffalo, NY 14203-2999

Dear Mr. Hinton:

RESPONSE TO COMMENTS
SAFETY AND HEALTH PLAN
GILL CREEK REMEDIATION SITE NO. 932013

The Du Pont and Olin plants appreciate the thorough review of the Safety and Health Plan written for the joint cleanup project. Referencing the comments in your July 31, 1992, letter about the Gill Creek cleanup safety and health plan, we will make the following changes:

- Page 20: Integrated Sampling

  Integrated sampling for the chemicals listed in this section will be done at the exclusion zone's (EZ) downwind perimeter in Area 1 twice every five working days. Identifying chemicals over 10 ppm that cross the EZ boundary will be done (specified in the contingency plan). The site Certified Industrial Hygienist or other plant Occupational Health person will review the data and determine if any corrective action is needed and evaluate the impact, if any, on the public utilizing the Robert Moses Parkway.

- Page 22: Air Monitoring - Response Levels

  The location is the EZ boundary. This section will be changed to read that continuous monitoring at the downwind perimeter of the EZ boundary will protect people on site and in the community.

- Page 22: Contingency Plan for Remediation Air Emission

  This will be changed to reflect your comments to include site and public personnel. In addition, Response Level III will be immediately triggered at 5 ppm above background on PID/OVA during a Robert Moses Parkway backup or traffic jam.

- Page 25: Dust Control

  This will be changed to reflect the 150 ug/m^3 total limit. DEC's procedure TAGM 4031 will be added to the Safety and Health plan.

- Page 27: Site Control Measures

  The line should read "A minimum of three work zones will routinely be used to reduce the accidental . . ."

If you have any questions, please contact me at (716) 278-5509.

Sincerely,

Joseph D. Clark

Joseph D. Clark
Area Engineer, Engineering and Environmental Affairs

JDC:klf
20280

DU PONT

CHEMICALS

P.O. Box 787
Buffalo Ave. & 26th Street
Niagara Falls, NY 14302-0787
(716) 278-5100

bcc: RJGentilucci/File 52150

kw: sampling, analysis, plan

August 20, 1992

Mr. David Leemhuis, P.E.
New York State Department of
Environmental Conservation
Region 9
270 Michigan Avenue
Buffalo, NY 14203-2999

Dear Mr. Leemhuis:

SAMPLING AND ANALYSIS PLAN
DU PONT/OLIN GILL CREEK REMEDIATION PROJECT

Enclosed are Sections 1.0 and 5.0 of the Gill Creek Remediation Sampling and Analysis Plan addressing sampling and analytical activities associated with operation of the Remediation Water Treatment Facility.

We appreciate your consideration of our need for an expeditious review of this plan to facilitate quick resolution of POTW permit sampling issues at Outfall 023.

If you should have any additional questions or concerns, please contact me at 278-5597.

Sincerely,

David P. Spanfelner
Engineer, Engineering and
Environmental Affairs

DPS:klf
Attach.
20346

cc: M. Hinton - NYSDEC (Buffalo)
A. Zaepfel - Niagara Falls POTW
J. Brown - Olin Corporation
S. Constable - Du Pont
L. Warner - Du Pont

DU PONT

CHEMICALS

P.O. Box 787
Buffalo Ave. & 26th Street
Niagara Falls, NY 14302-0787
(716) 278-5100

bcc: ~~R. J. Gentilucci~~/File 5215C
J. C. McClincy
M. Leonard - WCC

kw: cofferdam design change

August 28, 1992

Mr. Michael J. Hinton, P.E.
New York State Department of
Environmental Conservation*
Division of Hazardous Waste Remediation
270 Michigan Avenue
Buffalo, NY 14203-2999

Dear Mr. Hinton:

DU PONT/OLIN GILL CREEK REMEDIATION PROJECT
REQUEST TO RAISE ELEVATION OF BREACH SECTION IN COFFERDAM

Du Pont and Olin are requesting a change in the design of the cofferdam. The breach section was designed as a mitigation measure in the event of a serious flooding event. The Plans and Specifications (P&S) submitted in April 1992 indicate the elevation of the breach would be 561.0 Edward Dean Adams Station Datum (EDASD).

Average water levels in the Niagara River at Gill Creek are presently ranging between 561.4 and 562.7 (approximately). Providing a cutoff at 561 will require underwater cutting. Increasing the cutoff elevation to 562 will permit cutting piles above water if done when river levels are lowest. The breach can be constructed as planned but with some difficulty and delay. Therefore we request that the elevation of the breach be raised by one foot.

A backwater analysis was presented in Section 4 of the P&S. The impact of the project on projected flood heights, both with and without the project, is presented in Table 4-6 of the P&S. Woodward-Clyde Consultants developed the P&S analysis and has completed a review of the requested change in elevation and the impact on the estimate of upstream impacts, which is attached.

Raising the elevation of the breach will result in minor increased flood heights between the cofferdam and Buffalo Avenue, although any flood would be contained within the creek banks. The surrounding property belongs to Du Pont, Olin, and the New York State Power Authority. Du Pont and Olin have received conditional permission from the Power Authority to allow flooding in excess of one foot.

Since the impact on flood heights is minimal and will affect no additional property owners, and since the cutoff can more easily be done at the higher elevation, Du Pont and Olin are requesting this change in the design of the breach, raising the elevation to 562.0 EDASD. Du Pont and Olin will accept responsibility for any incremental damages that may result from the projected increase in flood height.

With installation of the cutoff scheduled to occur in the next few days, we would appreciate a verbal reply today or as early on Monday as possible. We apologize for the short response time requested. Should you have any questions please contact Leslie Warner at (716) 278-5452.

Sincerely,

Leslie A. Warner

Leslie A. Warner
Project Coordinator

LAW:new
16029

cc: R. Anderson, NYSDEC - Division of Water (Buffalo)
T. Meyers, NYSDEC - Division of Water (Buffalo)
F. Shieppati, Environmental Services Director - City of Niagara Falls
NYSDEC - Division of Environmental Enforcement (Buffalo)*
NYSDEC - Division of Hazardous Waste Remediation (Albany)*
NYSDOH - Bureau of Environmental Exposure Investigation (Albany)*
J. C. Brown - Olin
G. McDannell - U.S. Army Corps of Engineers (Buffalo)

* Two copies per order on consent

Woodward-Clyde Consultants

Engineering & sciences applied to the earth & its environment

August 27, 1992

Mr. Jim McClincy
E.I. duPont de Nemours and Company, Inc.
26th Street and Buffalo Avenue
P.O. Box 787
Niagara Falls, NY 14302

Subject: Niagara River Cofferdam Breach Modification, Gill Creek Remediation Project
Project #22915 (T220)

Dear Mr. McClincy:

We have reviewed the contractors request to raise the crest elevation of the Niagara River Cofferdam breach from elevation 561.0 to 562.0 Edward Dean Adams Station Datum (EDASD). The modified breach was input into the U.S. Army Corps of Engineers, HEC-2 step backwater model used for the Gill Creek Remediation design to estimate the extent of the upstream impacts. The hydraulics modeling was completed using the National Geodetic Vertical Datum (NGVD). To convert from NGVD to EDASD subtract 0.5 ft. Table 1 is a summary of the conditions modeled and the upstream impacts associated with the 10- and 100-year regulatory floods.

Based on the results of the modeling, the flood heights associated with modifying the breach are increased between Buffalo Avenue and the Niagara River cofferdam.

If you have any questions please call.

Sincerely,

Vernon T. Keys
Vernon Keys
Associate

John Sikora
John Sikora
Assistant Project Engineer

JHS:ana
(1 copy sent)
Enclosure
1c: Leslie Warner, DuPont
Martin S. Leonard, WCC, Niagara Falls

22915/LE64 08-27-92(8:10am)/RPT/7

Stanford Place 3, Suite 1000 • 4582 South Ulster Street • Denver, Colorado 80237-2637
303-694-2770 • Fax 303-694-3946

TABLE 1

100-YEAR FLOOD ELEVATIONS (NGVD)

Location	Base Condition	With Project No Breach	With Project Original Breach	With Project Modified Breach
Niagara River Cofferdam	565.0	566.3	565.1	565.4
Buffalo Ave.	569.6	570.2	570.0	570.0
		10-Year Flood Elevation		
Niagara River Cofferdam	563.2	565.5	564.3	564.7
Buffalo Ave.	566.4	567.1	566.8	566.8

All results are in NGVD

Base Condition represents flood elevation without cofferdams

With Project Condition represents the cofferdams in place but no breach

With Project With Breach represents the cofferdams in place and a 50-foot breach to elevation 561.0 EDASD

With Project With Modified Breach represents the cofferdams in place and a 50-foot breach to elevation 562.0 EDASD

New York State Department of Environmental Conservation

Thomas C. Jorling
Commissioner

August 31, 1992

CERTIFIED
RETURN RECEIPT REQUESTED

Ms. Leslie A. Warner
DuPont Chemicals
P.O. Box 787
Niagara Falls, NY 14320-0787

Mr. James Brown
Olin Corporation
Lower River Road
P.O. Box 248
Charleston, Tennessee 37310

Dear Ms. Warner:

Gill Creek Remediation Project
Site #932013

Please be advised that the construction plans developed under Order on Consent #B9-0206-90-01, titled "Gill Creek Remediation Plans and Specifications" dated April 1992 along with all revisions and addenda are hereby approved by this Department subject to acceptance of the following conditions by DuPont and Olin:

1. The discharge of water, impounded as a result of this project, to the Niagara River is subject to the requirements of the attached "Effluent Limitations and Monitoring Requirements" and Appendix A General Conditions. These conditions also apply to any storm event which causes the upstream creek flow to overtop the Buffalo Avenue Diversion structure. However, all water collected in the remediation area due to groundwater infiltration, seepage around or through diversion structures and miscellaneous storm runoff must be discharged through the on-site treatment system.

All diversion structures must remain throughout the creek remedial activities. These structures will enable the separating of unremediated and remediated portions of the creek. Gill Creek flows which overtop a diversion structure and enter previously remediated sections of the creek may be discharged directly to the Niagara River without monitoring.

2. The discharge of wastewater to the City of Niagara Falls POTW shall be in accordance with the Sewer Use Ordinance of the City of Niagara Falls, the Industrial User Permit issued by the City to DuPont (SIU #7), as well as State and Federal Pretreatment Regulations and Standards. The effluent limitations and monitoring requirements listed on the attached "TEMPORARY LIMITATIONS AT 023 - GILL CREEK REMEDIATION", shall apply at the DuPont SIU Outfall 023, as specified in the SIU Permit.

In addition, sampling and analysis of the wastewater treated at the pretreatment system shall be conducted as outlined in sections 1 and 5 of the "Gill Creek Remediation Sampling and Analysis Plan", dated August 17, 1992. The results of this sampling and analysis shall be made available to the City of Niagara Falls and the New York State Department of Environmental Conservation, and may be used to evaluate compliance with the SIU Permit limits at SIU outfall 023."

3. The 2 air stripper towers that are to be used as part of the pretreatment system are to be constructed and operated in accordance with the approved plans. The air discharge from these towers must be monitored to ensure compliance with the attached air discharge emission limits.

A monitoring plan indicating frequency of sampling and methodology used must be submitted to the Division of Air Resources Buffalo Regional Office for their review and approval. An adequate monitoring plan must be in place before air strippers are placed into service.

4. The limitations, conditions and operating requirements for the identified water discharge and air emissions shall be subject to the requirements and provisions set forth in Article 17 and 19 of the Environmental Conservation Law and all regulations promulgated pursuant thereto. Any changes, modifications or additions to the provisions stated herein without prior approval of the Department shall be a violation of the Order on Consent.

If you have any questions, please call me at at (716) 851-7220.

Please acknowledge and endorse below the acceptance of these conditions for approval.

By:______________________________

Ms. Leslie Warner
Mr. James Brown
August 31, 1992

Please return a signed copy to this Department within 10 days of receipt.

Sincerely,

Michael J. Hinton

Michael J. Hinton, P.E.
Environmental Engineer II

MJH/ad

cc: Mr. Edward Belmore/Mr. Christopher Allen, DEC
Mr. Peter Buechi/Mr. E. Joseph Sciascia, DEC
Mr. V.J. Thakkar, DAR
Mr. Lawrence Stiller, Region 9, DEC
Mr. Glen Bailey, DEE, DEC
Mr. David Leemhuis, DEC, Region 9 DOW
Mr. Al Wakeman, DOH
Mr. Paul Dicky, NCHD
Mr. Frank Schieppeti, City of Niagara Falls
Mr. Michael Podd, DEC
Mr. Joseph Kelleher, DEC-DOW

AIR DISCHARGE EMISSION LIMITS

Emission Point A: 84" Dia., 40' stack height

Emission Point B: 54" Dia., 40' stack height

	Max. Hourly Emissions (lbs/hour)		Max. Annual Emissions (lbs/year)	
Contaminant	Point A	Point B	Point A	Point B
Vinyl Chloride	0.707	0.354	2.038	1.018
1,1-Dichloroethene	0.037	0.018	1.064	0.531
Dichloromethane	0.655	0.329	1.887	0.947
Chloroform	0.214	0.107	6.159	3.08
1,1,1-Trichloroethane	0.074	0.037	2.126	1.06
Carbon Tetrachloride	0.034	0.017	97.77	48.81
Trichloroethylene	5.64	2.817	16.24	8.113
Tetrachloroethylene	1.797	0.897	5.175	2.583
1,1,2,2-Tetra-chloroethane	1.037	0.652	2.985	1.879
Chlorobenzene	0.483	0.243	1.391	0.689
Hexachloroethane	0.028	0.014	7.947	3.966
1,4-Dichlorobenzene	0.094	0.048	2.707	1.37
1,2-Dichlorobenzene	0.132	0.068	3.80	1.95
Benzene	0.127	0.068	3.65	0.196
Hexachlorobutadiene	0.089	0.045	2.56	1.28
1,2-Dichloroethene	1.370	0.685	3.94	1.973
Hexachlorobenzene	0.004	0.002	1.072	0.565
1,3-Dichlorobenzene	0.042	0.022	1.222	0.619
1,2,4-Trichlorobenzene	0.201	0.107	5.798	3.07

EFFLUENT LIMITATIONS AND MONITORING REQUIREMENTS

During the period beginning with dewatering of Gill Creek

and lasting until completion of Gill Creek remedial activities

the discharges from Gill Creek to the Niagara River shall be limited and monitored by the operator as specified below:

Outfall Number & Effluent Parameter	Discharge Limitations Daily Avg.	Discharge Limitations Daily Max.	Units	Minimum Monitoring Requirements Measurement Frequency	Minimum Monitoring Requirements Sample Type
Gill Creek					
Turbidity	NA	17[1]	NTUs	20 minutes	Meter

NOTES:

1. No discharge to the Niagara River from Gill Creek shall occur when the turbidity of the water in Gill Creek exceeds 17 NTUs.

2. Discharges to the Niagara River shall only occur during initial Gill Creek dewatering and following storm events when normal Gill Creek flows over top the Buffalo Avenue diversion structure.

TEMPORARY LIMITATIONS AT 023

GILL CREEK REMEDIATION

POLLUTANT MONITORING AT 023 (MS #2)	ANNUAL AVG	DAILY MAX	UNITS	MEASUREMT FREQUENCY	SAMPLE TYPE
Phosphorous	15.0	38.0	lbs/d	1/Qtr	3
Carbon Tetrachloride	0.44	1.10	lbs/d	1/Qtr	2
Dichlorobromomethane	0.144	0.36	lbs/d	1/Qtr	2
Tetrachloroethylenes	2.29	5.73	lbs/d	1/Qtr	2
Tetrachloroethane	2.13	5.33	lbs/d	1/Qtr	2
Hexachlorobutadiene	0.40	1.00	lbs/d	1/Qtr	2
PCB's	0.02	0.05	lbs/d	1/Qtr	3
T. Phenols	2.82	7.05	lbs/d	1/Qtr	3
*Chromium	1.0	2.0	lbs/d	1/mo	3
*Lead	10.0	19.5	lbs/d	1/mo	3
*Mercury	0.6	1.5	lbs/d	1/mo	3
*Zinc	25.0	30.0	lbs/d	1/mo	3
Residual Chlorine	300	750	lbs/d	2/shift	Gra
Hexachlorobenzene	1.00	2.50	lbs/d	1/Qtr	3
**Copper	13.0	18.0	lbs/d	1/mo	3
**Nickel	4.0	6.0	lbs/d	1/mo	3
**Trichlorobenzenes	1.5	3.0	lbs/d	1/mo	2
**Hexachlorocyclohexane	0.16	0.25	lbs/d	1/mo	3
**2-chlorophenol	0.1	0.2	lbs/d	1/mo	3

* Existing Pollutant Limitations modified for Gill Creek Project

**Pollutant Limitations added for Gill Creek Project

NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION

APPENDIX A

GENERAL CONDITIONS (Consent Orders)*

* This version of General Conditions is Intended to be incorporated as Appendix A of all Consent Orders for site remediation projects where a State Pollutant Discharge Elimination System permit Is not required but where the order authorizes the treatment and discharge of wastewaters to the surface or groundwaters of New York State.

1. GENERAL PROVISIONS

a. This order, or a true copy, shall be kept readily available for reference at the wastewater treatment facility.

b A determination has been made on the basis of a submitted plans, or other available information, that compliance with the provisions specified in this order will reasonably protect classified water use and assure compliance with applicable water quality standards. Satisfaction of these provisions notwithstanding, if operation pursuant to the order causes or contributes to a condition in contravention of State water quality standards, or if the Department determines, on the basis of notice provided by the operator and any related investigation, inspection or sampling, that a modification of the order is necessary to prevent impairment of the best use of the waters or to assure maintenance of water quality standards or compliance with other provisions of ECL, the Department may require such a modification and may require abatement action to be taken by the operator and may also prohibit the noticed act until the order has been modified.

c. All discharges authorized by this order shall be consistent with the terms and conditions of this order. Facility expansion or other modifications, treatment and disposal system changes which will result in new or increased discharges of pollutants into the waters of the state must be reported by submission of a formal request for modification of this order. The discharge of any pollutant, not identified and authorized, or the discharge of any pollutant more frequently than, or at a level in excess of, that identified and authorized by this order shall constitute a violation of the terms and conditions of this order. Facility modifications which result in decreased discharges of pollutants must be reported by submission of written notice to the Department

d Where the operator becomes aware that he/she failed to submit any relevant facts or submitted incorrect information prior to or in pursuit of this order or in any report to the Department, the operator shall promptly submit such facts or information

e It shall not be a defense for an operator in an enforcement action that it would have been necessary to halt or reduce the authorized activity in order to maintain compliance with the conditions of this order, unless directed by the Department to continue the activity.

f. The filing of a request for a modification of this order, or a notification of planned changes or anticipated noncompliance, does not stay any condition of this order.

g The operator shall furnish to the Department, within a reasonable time, any information which the Department may request to determine whether cause exists for modifying, suspending, or revoking this order, or to determine compliance with this order. The operator shall also furnish to the Department, upon request, copies of records required to be kept by this order.

2. SPECIAL REPORTING REQUIREMENTS

Dischargers must notify the Department as soon as they know or have reason to believe:

a. That any activity has occurred or will occur which would result in the discharge, on a routine or frequent basis, of any toxic pollutant (USEPA Priority Pollutants plus phenols, total) which is not specifically controlled in the order, pursuant to General Provision 1 (c) herein. For the purposes of this section, recurrent accidental or unintentional spills or releases on a frequent basis shall be considered to be a discharge.

b. That any activity has occurred or will occur which would result in any discharge, on a non-routine or infrequent basis, of a toxic pollutant which is not limited in the order, if that discharge will exceed five times the maximum concentration value reported for that pollutant in the information submitted prior to this order; or the level established by the Department

c. That they will begin to use any toxic pollutant which was not reported prior to this order and which is being or may be discharged to waters of the state

3 EXCLUSIONS

a. The issuance of this order by the Department and the receipt thereof by the operator does not supersede, revoke or rescind an order or modification thereof on consent or determination by the Commissioner issued heretofore by the Department or any of the terms, conditions or requirements contained in such order or modification thereof unless specifically intended by said order.

b. The issuance of this order does not convey any property rights in either real or personal property, or any exclusive privileges, nor does it authorize any injury to private property or any invasion of personal rights, nor any infringement of Federal, State or local laws or regulations; nor does it obviate the necessity of obtaining the assent of any other jurisdiction as required by law for the discharge authorized.

c. Unless specifically authorized in this order, the construction of any onshore or offshore physical structures or facilities or the undertaking of any work in any navigable waters is not approved.

4. REPORTING NONCOMPLIANCE

a. Anticipated noncompliance. The operator shall give advance notice to the Department of any planned changes in the authorized facility or activity which may result in noncompliance with this order as soon as the operator becomes aware that non-compliance will be unavoidable.

b. Immediate and twenty-four hour reporting. The operator shall report <u>any</u> noncompliance which may endanger health or the environment. Any unusual situation, caused by a deviation from normal operation or experience (e.g. upsets, bypasses, inoperative treatment process units, spills or illegal chemical discharges or releases to the collection system) which create a potentially hazardous condition shall be orally reported immediately. Other information shall be provided orally within 24 hours from the time he or she becomes aware of the circumstances. A written noncompliance report shall also be provided within five (5) days of the time the operator becomes aware of the circumstances. The written noncompliance report shall contain a description of the noncompliance and its cause; the period of noncompliance, including exact dates and times, and if the noncompliance has not been corrected, the anticipated time it is expected to continue; and steps taken or planned to reduce, eliminate, and prevent the noncompliance and its reoccurrence.

(1) The following shall be included as information which must be reported within 24 hours under paragraph (b) above:

(i) any unanticipated bypass which violates any effluent limitation in the order;

(ii) any upset which violates any effluent limitation in the order;

(iii) violation of a maximum daily discharge limitation for any of the pollutants listed by the Department in the order to be reported within 24 hours.

(2) The Department may waive, at their discretion, the written report on a case-by-case basis if the oral report has been received within 24 hours.

(3) Reports required by this section shall be filed with the Department's regional office having jurisdiction over the facility. During weekends and holidays, oral noncompliance reports, required by this paragraph, may be made at (518) 457-7362.

c. Duty to mitigate. The operator shall take all reasonable steps to minimize or prevent any discharge in violation of this order which has a reasonable likelihood of adversely affecting human health or the environment.

5. INSPECTION AND ENTRY

The operator shall allow the Commissioner of the Department, the New York State Department of Health, the County Health Department, or their authorized representatives, upon the presentation of credentials and other documents as may be required by law, to:

a. enter upon the operator's premises where a regulated facility or activity is located or conducted, or where records must be kept under the conditions of this order;

b. have access to and copy, at reasonable times, any records that must be kept under the conditions of this order, including records maintained for purposes of operation and maintenance;

c. inspect at reasonable times any facilities, equipment (including monitoring and control equipment), practices, or operations regulated or required under this order, and

d. sample or monitor at reasonable times, for the purposes of assuring compliance with this order or as otherwise authorized by the Environmental Conservation Law, any substances or parameters at any location.

a. Prior to construction of any new or modified waste disposal system or modification of a facility generating wastewater which could alter the design volume of, or the method or effect of treatment or disposing of the wastes from an existing waste disposal system, the operator shall submit to the Department or its designated field office for review, an approvable engineering report, plans, and specifications which have been prepared by a person or firm licensed to practice Professional Engineering in the State of New York.

b. The construction of the above new or modified disposal system shall not start until the operator receives written approval of the system from the Department or its designated field office.

c. The construction of the above new or modified disposal system shall be under the general supervision of a person or firm licensed to practice Professional Engineering in New York State. Upon completion of construction, that person or firm shall certify to the Department or its designated field office that the system has been fully completed in accordance with the approved engineering report, plans and specifications and letter of approval; and the operator shall receive written acceptance of such certificate from the Department or designated field agency prior to commencing discharge.

d. The Department and its designated field offices review wastewater disposal system reports, plans, and specifications for treatment process capability only, and approval by either office does not constitute approval of the system's structural integrity.

7. MONITORING, RECORDING, AND REPORTING

7.1 GENERAL

a The operator shall comply with all recording, reporting, monitoring and sampling requirements specified in this order and such other additional terms, provisions, requirements or conditions that the Department may deem to be reasonably necessary to achieve the purposes of the Environmental Conservation Law, or rules and regulations adopted pursuant thereto.

b Samples and measurements taken to meet the monitoring requirements specified in this order shall be representative of the quantity and character of the monitored discharges. Composite samples shall be composed of a minimum of 8 grab samples, collected over the specified collection period, either at a constant sample volume for a constant flow interval or at a flow-proportioned sample volume for a constant time interval, unless otherwise specified in this order. For GC/MS Volatile Organic Analysis (VOA), aliquots must be combined in the laboratory immediately before analysis. At least 4 (rather than 8) aliquots or grab samples should be collected over the specified collection period. Grab sample means a single sample, taken over a period not exceeding 15 minutes.

c Accessable sampling locations must be provided, maintained and identified by the operator. New sampling locations shall be provided if proposed or existing locations are deemed unsuitable by the Department or its designated field agency.

d Actual measured values of all positive analytical results obtained above the Practical Quantitation Limit (PQL)[1] for all monitored parameters shall be recorded and reported, as required by this order; except, for parameters which are limited in this order to values below the PQL, actual measured values for all positive analytical results above the Method Detection Limit (MDL)[2] shall be reported.

e. The operator shall periodically calibrate and perform manufacturer's recommended maintenance procedures on all monitoring and analytical instrumentation to insure accuracy of measurements. Verification of maintenance shall be logged into the daily record book(s) of the facility. The operator shall notify the Department's regional office immediately if any required instrumentation becomes inoperable. In addition, the operator shall verify the accuracy of their measuring equipment to the Department's Regional Office annually.

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1 Practical Quantitation Limit (PQL) is the lowest level that can be measured within specified limits of precision and accuracy during routine laboratory operations on most effluent matrices.

2 Method Detection Limit (MDL) is the level at which the analytical procedure referenced is capable of determining with a 99% probability that the substance is present This value is determined in distilled water with no interfering substances present The precision at this level is +/- 100%

7.2 SIGNATORIES AND CERTIFICATION

a All reports required by this order shall be signed as follows:

(1) for a corporation: by a responsible corporate officer. For the purposes of this section, a responsible corporate officer means:

(i) a president, secretary, treasurer, or a vice president of the corporation in charge of a principal business function, or any other person who performs similar policy or decision-making function for the corporation, or

(ii) the manager of one or more manufacturing, production, or operating facilities employing more than 250 persons or having gross annual sales or expenditures exceeding $25 million (in second quarter 1980 dollars),if authority to sign documents has been assigned or delegated to the manager in accordance with corporate procedures.

(2) for a partnership or sole proprietorship: by a general partner or the proprietor, respectively; or

(3) for a municipality, state, federal, or other public agency: by either a principal or executive officer or ranking elected official. For purposes of this section, a principal executive officer of a federal agency includes: (i) the chief executive officer of the agency, or (ii) a senior executive officer having responsibility for the overall operations of a principal geographic unit of the agency; or

(4) a duly authorized representative of the person described in items (1), (2), or (3). A person is a duly authorized representative only if

(i) the authorization is made in writing by a person described in paragraph (a)(1), (2), or (3) of this section;

(ii) the authorization specifies either an individual or a position having responsibility for the overall operation of the regulated facility or activity·such as the position of plant manager, operator of a well or well field, superintendent, position of equivalent responsibility, or an individual or position having overall responsibility for environmental matters for the company. (A duly authorized representative may thus be either a named individual or any individual occupying a named position); and

(iii) the written authorization is submitted to the Department.

b. Changes to authorization: If an authorization under subparagraph (a)(4) of this section is no longer accurate because a different individual or position has responsibility for the overall operation of the facility, a new authorization satisfying the requirements of subparagrapph (a)(4) of this section must be submitted to the Department prior to or together with any reports, information, or applications to be signed by an authorized representative.

c. Certification: Any person signing a report shall make the following certification:

"I certify under penalty of law that this document and all attachments were prepared under my direction or supervision, in accordance with a system, designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the order or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information including the possibility of fine and imprisonment for knowing violations."

7.3 RECORDING OF MONITORING ACTIVITIES AND RESULTS

a. The operator shall retain records of all monitoring information, including all calibration and maintenance records and all original strip chart recordings for continuous monitoring instrumentation, copies of all reports required by this order, and records of all data used to complete the application for this order, for a period of at least 3 years from the date of the sample, measurement, report or application. This period may be extended by request of the Department at any time.

b. Records of monitoring information shall include.

(1) the date, exact place, and time of sampling or measurements;

(2) the individual(s) who performed the sampling or measurements;

(3) the date(s) analyses were performed;

(4) the individual(s) who performed the analyses;

(5) the analytical techniques or methods used; and

(6) the results of such analyses.

7.4 TEST AND ANALYTICAL PROCEDURES

a. Monitoring and analysis must be conducted using test procedures promulgated, pursuant to 40 CFR Part 136, except:

(1) should the Department require the use of a particular test procedure, such test procedure will be specified in this order.

(2) should the operator desire to use a test method not approved herein, prior Department approval is required, pursuant to paragraph (b) of this section.

b. Application for approval of test procedures shall be made to the Director of DEC's Division of Water, and shall contain:

(1) the name and address of the applicant or the responsible person making the discharge, identification of this particular order and the telephone number of applicant's contact person;

(2) the names of the pollutants or parameters for which an alternate testing procedure is being requested, and the monitoring location(s) at which each testing procedure will be utilized;

(3) justification for using test procedures, other than those approved in paragraph (a) of this section; and

(4) a detailed description of the alternate procedure, together with:

(i) references to published studies, if any, of the applicability of the alternate test procedure to the effluent in question;

(ii) information on known interferences, if any; and

(5) a comparability study, using both approved and proposed methods. The study shall consist of 8 replicates of 3 samples from a well mixed waste stream for each outfall if less than 5 outfalls are involved, or from 5 outfalls if 5 or more outfalls are involved. Four (4) replicates from each of the samples must be analyzed using a method approved in paragraph (a) of this section, and four replicates of each sample must be analyzed using the proposed method. This results in 24 analyses per outfall up to a maximum of 120 analyses. A statistical analysis of the data must be submitted that shall include, as a minimum:

(i) calculated statistical mean and standard deviation;

(ii) a test for outliers at the mean ± 3 standard deviations level. Where an outlier is detected, an additional sample must be collected and 8 replicates of the sample must be analyzed as specified above;

(iii) a plot distribution with frequency counts and histogram;

(iv) a test for equality among with-in sample standard deviation;

(v) a check for equality of pooled with-in sample variance with an F-Test;

(vi) a t-Test to determine equality of method means; and

copies of all data generated in the study

Additional information can be obtained by contacting the Bureau of Technical Services & Research (NYSDEC, 50 Wolf Road, Albany, New York 12233 - 3502).

8. DISPOSAL SYSTEM OPERATION AND QUALITY CONTROL

8.1 GENERAL

a. The disposal system shall not receive or be committed to receive wastes from unapproved sources, nor wastes beyond its design capacity as to volume and character of wastes treated, nor shall the system be materially altered as to: type, degree, or capacity of treatment provided; disposal of treated effluent; or treatment and disposal of separated scum, liquids, solids or combination thereof resulting from the treatment process without written approval of the Department of Environmental Conservation or its designated field office.

b. The operator shall, at all times, properly operate and maintain all facilities and systems of treatment and control (or related appurtenances) which are installed or used by the operator to achieve compliance with the conditions of this order. Proper operation and maintenance also includes as a minimum, the following: 1) A preventive/corrective maintenance program. 2) A site specific action orientated operation and maintenance manual for routine use, training new operators, adequate laboratory controls and appropriate quality assurance procedures. This provision requires the operation of installed backup or auxiliary facilities or similar systems only when the operation is necessary to achieve compliance with the conditions of the order.

c. The operator shall not discharge floating solids or visible foam.

8.2 BYPASS

a. Definitions:

(1) "Bypass" means the intentional or unintentional diversion of waste stream(s) around any portion of a treatment facility for the purpose or having the effect of reducing the degree of treatment intended for the bypassed portion of the treatment facility.

(2) "Severe property damage" means substantial damage to property, damage to the treatment facilities which causes them to become inoperable, or substantial and permanent loss of natural resources which would not reasonably be expected to occur in the absence of a bypass. Severe property damage does not mean economic loss caused by delays in production.

b. Bypass not exceeding limitations:

The operator may allow any bypass to occur which does not cause effluent limitations to be violated, but only if it also is for essential maintenance, repair or replacement to assure efficient and proper operation. These bypasses are not subject to the provisions of pargraph (c) and (d) of this section, provided that written notice is submitted prior to bypass (if anticipated) or as soon as possible after bypass (if unanticipated), and no public health hazard is created by the bypass.

c. Notice:

(1) Anticipated bypass - If the operator knows in advance of the need for a bypass, it shall submit prior written notice, at least forty five (45) days before the date of the bypass.

(2) Unanticipated bypass - The operator shall submit notice of an unanticipated bypass as required in Section 4, paragraph b. of this Part (24 hour notice).

d. Prohibition of bypass:

(1) Bypass is prohibited, and the Department may take enforcement action against a operator for bypass, unless:

(i) bypass was unavoidable to prevent loss of life, personal injury, public health hazard, or severe property damage;

(ii) there were no feasible alternatives to the bypass such as the use of auxiliary treatment facilities, retention of untreated wastes, or maintenance during normal period of equipment downtime. This condition is not satisfied if adequate backup equipment should have been installed in the exercise of reasonable engineering judgment to prevent a bypass which occurred during normal periods of equipment downtime or preventive maintenance or if designed and installed backup equipment which could have prevented or mitigated the impact of the bypass is not operating during the bypass; and

(iii) the operator submitted notices as required under paragraph (c) of this section and, excepting emergency conditions, the proposed bypass was accepted by the Department.

8.3 UPSET

a. Definition:

"Upset" means an exceptional incident in which there is unintentional and temporary noncompliance with order effluent limitations because of factors beyond the reasonable control of the operator. An upset does not include noncompliance to the extent caused by operational error, improperly designed treatment facilities, inadequate treatment facilities, lack of preventive maintenance, or careless or improper operation.

b. Effect of an upset

An upset constitutes an affirmative defense to an action brought for noncompliance with such order effluent limitations if the requirements of paragraph (c) of this section are met. No determination made during administrative review of claims that noncompliance was caused by upset, and before an action for noncompliance, is final administrative action subject to judicial review.

c. Conditions necessary for a demonstration of upset:

An operator who wishes to establish the affirmative defense of upset shall demonstrate, through properly signed, contemporaneous operation logs, or other relevant evidence that:

(1) an upset occurred and that the operator can identify the cause(s) of the upset;

(2) the facility was at the time being properly operated; and

(3) the operator submitted notice of the upset as required in Section 4, paragraph b of this part (24 hour notice).

(4) the operator complied with any remedial measures required under Section 4, paragraph d of this part.

d. Burden of proof:

In any enforcement proceeding the operator seeking to establish the occurrence of an upset has the burden of proof.

8.4 SPECIAL CONDITION - DISPOSAL SYSTEMS WITH SEPTIC TANKS

If a septic tank is installed as part of the disposal system, it shall be inspected by the operator or his agent for scum and sludge accumulation at intervals not to exceed one year's duration, and such accumulation will be removed before the depth of either exceeds one-fourth (1/4) of the liquid depth so that no settleable solids or scum will leave in the septic tank effluent. Such accumulation shall be disposed of in an approved manner.

8.5 SLUDGE DISPOSAL

The storage or disposal of collected screenings, sludges, other solids, or precipitates separated from the authorized discharges and/or intake or supply water by the operator shall be done in such a manner as to prevent creation of nuisance conditions or entry of such materials into classified waters or their tributaries, and in a manner approved by the Department. Any live fish, shellfish, or other animals collected or trapped as a result of intake water screening or treatment should be returned to their water body habitat. The operator shall maintain records of disposal on all effluent screenings, sludges and other solids associated with the discharge(s) herein described. The following data shall be compiled and reported to the Department or its designated field office upon request:

a. the sources of the materials to be disposed of;

b. the approximate volumes, weights, water content and (if other than sewage sludge) chemical composition;

c. the method by which they were removed and transported, including the name and permit number of the waste transporter; and

d. their final disposal locations.

DU PONT
CHEMICALS
P.O. Box 787
Buffalo Ave. & 26th Street
Niagara Falls, NY 14302-0787
(716) 278-5100

RJG/File 5215C
Scc: K. Hileman
DPS

September 2, 1992

Mr. Larry Stiller
New York State Department of
Environmental Conservation
270 Michigan Avenue
Buffalo, NY 14203-2999

Dear Mr. Stiller,

GILL CREEK REMEDIATION

As I discussed with you on the telephone today, we have received DEC approval for our Gill Creek Remediation Plans and Specifications. The approval is subject to four conditions. The third one directly addresses the two air strippers. This condition requires: "A monitoring plan indicating frequency of sampling and methodology used must be submitted to the Division of Air Resources Buffalo Regional Office for their review and approval." The intent of this letter is to propose such a monitoring plan.

The methodology we propose is a mass balance calculation of the influent and effluent to the air strippers using the results of the DEC-approved water quality sampling program. This sampling is detailed in our "Gill Creek Remediation Sampling and Analysis Plan" (SAP) of August 17, 1992, but we have attached the most relevant sections of the SAP for your use. The air stripper influent and effluent sample locations are referred to as GCWT7 and GCWT8, respectively. Note that all of the parameters with air discharge emission limits (except hexachloroethane, which will be added to the list) will be monitored in both the influent and effluent water samples three times a week during the two to three week start-up period. Following start-up, a select parameter list will be monitored in the water samples once every two weeks.

Also attached are revised Tables 1 and 2 from the DEC air permit application of June 26, 1992. These tables show the maximum groundlevel concentration for each compound expected in our influent as predicted by the SCREEN dispersion model for the upwind and downwind conditions. Also shown are the relevant SCGs. A review of the tables shows that the maximum groundlevel concentrations are at least one order of magnitude lower than the appropriate SGC, and in most cases at least two orders of magnitude lower. We therefore propose that following system start-up, only benzene and hexachlorobutadiene be monitored using our mass balance calculation. We would add other parameters to the post start-up sampling only if the start-up sampling demonstrates that they are present at a level at least one order of magnitude higher than the design basis (Table 5-3 of the Design Specifications).

We believe that our proposal has clear advantages over other alternatives, such as direct air emission sampling. These include method accuracy and safety (the stripper exhausts are 40 feet above ground level, with no easy access provided, and located near high tension wires). Since the air strippers form an integral part of our treatment system, we request your expeditious review of our proposal so that we can begin their use. If you should have questions, do not hesitate to contact me at (716) 278-5543 or Steve Constable at (302) 366-2375.

Sincerely,

Susan Dreyer /klf

Susan Dreyer
Engineer, Engineering and
Environmental Affairs

SED:klf
Attach.
20570

cc: Michael Hinton, NYSDEC - Div. of Hazardous Waste Remediation (Buffalo)*
NYSDEC - Division of Environmental Enforcement (Buffalo)*
NYSDEC - Division of Hazardous Waste Remediation (Albany)*
NYSDOH - Bureau of Environmental Exposure Investigation (Albany)*
James C. Brown - Olin
Steve Constable - Du Pont
James McClincy - Du Pont
Leslie Warner - Du Pont

* Two copies per order on consent

SAMPLING PROTOC - FOR START-UP

TABLE 5-1
(Continued)

Sample Location No.	Sample Location/Description	Frequency	Indicator Analytical Parameters[3]	Type of Sample
GCWT6-#	Lamella Clarifier (CL101B) Effluent	Daily	Turbidity[2]	Grab
		3 per week (M,W,F)	TSS	24 hr composite[1]
GCWT7-#	Sand filter Effluent	3 per week (M,W,F)	Volatile Organics	Grab
			Semivolatile Organics	24 hr composite[1]
			Pesticides/PCBs	24 hr composite[1]
			Total Phenols	Grab
			Total Metals	24 hr composite[1]
			TSS	24 hr composite[1]
			Total Alkalinity	Grab
			pH[2]	Grab
		Daily	Turbidity[2]	Grab
GCWT8-#	Air Stripper Effluent	3 per week (M,W,F)	Volatile Organics	Grab
			Semivolatile Organics	24 hr composite[1]
GCWT9A-# GCWT9B-# GCWT9C-#	Carbon Guard Bed Effluent	3 per week (M,W,F)	Volatile Organics	Grab
			Pesticides/PCBs	24 hr composite[1]
			Semivolatile Organics	24 hr composite[1]
GCWT10A-# GCWT10B-# GCWT10C-#	Lead Carbon Vessel Effluent	3 per week (M,W,F)	Volatile Organics	Grab
			Semivolatile Organics	24 hr composite[1]
			Pesticides/PCBs	24 hr composite[1]

SAMPLING PROTOCOL FOR NORMAL OPERATION

TABLE 5-2
(Continued)

Sample Location No.	Sample Location/Description	Frequency	Indicator Analytical Parameters[3]	Type of Sample
GCWT6-#	Lamella Clarifier (CL-101B) Effluent	Daily	Turbidity[2]	Grab
GCWT7-#	Sand Filter Effluent	1 every 2 weeks (M)	Volatile Organics	Grab
			Semivolatile Organics	24 hr composite[1]
			Pesticides/PCBs	24 hr composite[1]
			Total Metals	24 hr composite[1]
			TSS	24 hr composite[1]
		Daily	Total Alkalinity	Grab
			pH[2]	Grab
			Turbidity[2]	Grab
GCWT8-#	Air Stripper Effluent	3 per week (M,W,F)	Volatile Organics	Grab
			Semivolatile Organics	24 hr composite[1]
GCWT9A-# GCWT9B-# GCWT9C-#	Carbon Guard Bed Effluent	3 per week (M,W,F)	PCBs	24 hr composite[1]
GCWT10A-# GCWT10B-# GCWT10C-#	Lead Carbon Vessel Effluent	3 per week (M,W,F)	Volatile Organics	Grab
			Semivolatile Organics	24 hr composite[1]
			Pesticides/PCBs	24 hr composite[1]

DUPONT NIAGARA GILL CREEK PROJECT

TABLE 1

CONCENTRATIONS IN AIR CONSIDERING INPUTS
FROM THE EXISTING GROUNDWATER RECOVERY SYSTEM
AND THE PROPOSED GILL CREEK PROJECT SOURCES
EAST OF GILL CREEK PROJECT

Chemical Compound	Toxicity Table	SGC (ug/m3)	Odor Threshold (ug/m3)	Maximum Groundlevel Concentration from Combined Sources C1 (ug/m3)	C2 (ug/m3)	Peak Emission Rate From: 84" Stripper (pph)	54" Stripper (pph)
Vinyl Chloride	hi	1300	26000	21.27	18.64	0.71	0.35
1,1 Dichloroethene	mod	190000	5500000	1.03	0.85	0.04	0.02
Dichloromethane	mod	41000	4000	19.67	17.40	0.65	0.33
Chloroform	mod	980	20000	8.90	9.06	0.21	0.11
1,1,1 Trichloroethane	lo	450000	70000	2.05	1.72	0.07	0.04
Carbon Tetrachloride	hi	1300	10000	0.94	0.79	0.03	0.02
Trichloroethylene	mod	33000	2000	157.56	132.28	5.64	2.82
Tetrachloroethylene	mod	81000	400000	50.18	42.11	1.80	0.90
1,1,2,2 Tetrachloroethane	mod	1600	20000	27.79	31.66	1.00	0.68
Chlorobenzene	mod	11000	600	13.59	11.62	0.40	0.24
Hexachloroethane	N/A *	2310	150	0.76	0.64	0.03	0.01
1,4 Dichlorobenzene	mod	30000	90000	2.60	2.22	0.09	0.05
1,2 Dichlorobenzene	mod	30000	120	3.64	3.20	0.13	0.07
Hexachlorobutadiene	mod	50	N/A	2.40	2.07	0.09	0.04
Benzene	hi	30	516	3.51	2.98	0.12	0.06
1,2 Dichloroethylene	mod	190000	30000	40.50	35.27	1.37	0.69
Hexachlorobenzene	hi *	6	N/A	0.10	0.10	0.004	0.002
1,3 Dichlorobenzene	mod	30000	1100	1.17	1.00	0.04	0.02
1,2,4 Trichlorobenzene	hi	3700	10400	5.53	5.06	0.20	0.11
2 Methyl furan	hi	34	N/A	6.92	6.92	0.00	0.00

SGC - Short-Term Guideline Concentrations, ug/m3

Q1 - Steam Stripper Emission Rate, g/s
Q2 - Equalization Tank Emission Rate, g/s
Q3 - 84" Air Stripper Emission Rate, g/s
Q4 - 54" Air Stripper Emission Rate, g/s

C/Q - Concentration calculated using SCREEN with emission rate equal to 1 g/s, ug/m3
C1 - Combined 1-hr Impact from Q1, Q2, & Q3, ug/m3
C2 - Combined 1-hr Impact from Q1, Q2, & Q4, ug/m3

Steam Stripper - Existing Groundwater Stripper (Stack ht. - 110'; dia. - 2"; vel. - 0.8 fps)

Equal. Tank - Groundwater Holding Tank (Stack ht. - 24'; dia. - 4"; vel. - 0.1 fps)

Air Strip. 1 - 84" Dia. Air Stripper (Stack ht. - 40'; dia. - 30"; vel. - 22.7 fps)

Air Strip. 2 - 54" Dia. Air Stripper (Stack ht. - 40'; dia. - 30"; vel. - 10.4 fps)

Notes: 1. Only one of the air strippers will be operat at any give time
2. N/A = not available
3. * = interim SGC derived by TLV/4.2

::

file: gillcrk-east1.w20

DUPONT NIAGARA GILL CREEK PROJECT

TABLE 2

CONCENTRATIONS IN AIR CONSIDERING INPUTS
FROM THE EXISTING GROUNDWATER RECOVERY SYSTEM
AND THE PROPOSED GILL CREEK PROJECT SOURCES
WEST OF STEAM STRIPPER

Chemical Compound	Toxicity Table	SGC (ug/m3)	Odor Threshold (ug/m3)	Maximum Groundlevel Concentration From Combined Sources C1 (ug/m3)	C2 (ug/m3)	Peak Emission Rate From: 84" Strip (pph)	54" Stripper (pph)
Vinyl Chloride	hi	1300	26000	22.59	16.02	0.71	0.35
1,1 Dichloroethene	mod	190000	5500000	1.03	0.76	0.04	0.02
Dichloromethane	mod	41000	4000	20.76	15.63	0.65	0.33
Chloroform	mod	980	20000	11.41	9.59	0.21	0.11
1,1,1 Trichloroethane	lo	450000	70000	2.05	1.53	0.07	0.04
Carbon Tetrachloride	hi	1300	10000	0.94	0.71	0.03	0.02
Trichloroethylene	mod	33000	2000	159.14	119.22	5.64	2.82
Tetrachloroethylene	mod	81000	400000	51.26	38.53	1.80	0.90
1,1,2,2 Tetrachloroethane	mod	1600	20000	27.82	28.25	1.00	0.60
Chlorobenzene	mod	11000	600	14.40	11.10	0.48	0.24
Hexachloroethane	N/A *	2310	150	0.76	0.57	0.03	0.01
1,4 Dichlorobenzene	mod	30000	90000	2.60	1.90	0.09	0.05
1,2 Dichlorobenzene	mod	30000	120	3.64	2.86	0.13	0.07
Hexachlorobutadiene	mod	50	N/A	2.40	1.84	0.09	0.04
Benzene	hi	30	516	3.56	2.68	0.12	0.06
1,2 Dichloroethylene	mod	190000	30000	42.52	31.46	1.37	0.69
Hexachlorobenzene	hi *	6	N/A	0.10	0.09	0.004	0.002
1,3 Dichlorobenzene	mod	30000	1100	1.17	0.89	0.04	0.02
1,2,4 Trichlorobenzene	hi	3700	10400	5.93	4.51	0.20	0.11
2 Methyl furan	hi	34	N/A	6.92	6.92	0.00	0.00

SGC - Short-Term Guideline Concentrations, ug/m3

Q1 - Steam Stripper Emission Rate, g/s
Q2 - Equalization Tank Emission Rate, g/s
Q3 - 84" Air Stripper Emission Rate, g/s
Q4 - 54" Air Stripper Emission Rate, g/s

C/Q - Concentration calculated using SCREEN
with emission rate equal to 1 g/s, ug/m3
C1 - Combined 1-hr Impact from Q1, Q2, & Q3, ug/m3
C2 - Combined 1-hr Impact from Q1, Q2, & Q4, ug/m3

Steam Stripper - Existing Groundwater Stripper
(Stack ht. - 110'; dia. - 2"; vol. - 0.8 fps)

Equal. Tank - Groundwater Holding Tank
(Stack ht. - 24'; dia. - 4"; vol. - 0.1 fps)

Air Strip.1 - 84" Dia. Air Stripper
(Stack ht. - 40'; dia. - 30"; vol. - 22.7 fps)

Air Strip.2 - 54" Dia. Air Stripper
(Stack ht. - 40'; dia. - 30"; vol. - 10.4 fps)

Notes: 1. Only one of the air strippers will be operat
at any give time
2. N/A = not available
3. * = Interim SGC derived by TLV/4.2

I:

file: gillcrk-westl.w20

Kw: POTW perm

City of Niagara Falls, New York

cc J. Brown
DPS
RSS

September 3, 1992

Mrs. Leslie Warner
E. I. duPont de Nemours, Inc.
MPO Box 787
Niagara Falls NY 14302

Dear Mrs. Warmer:

Attached is a revised copy of the approval for the Gill Creek remediation wastestream.

After discussions with Mr. Henry Mazzucca of Region II USEPA and Mr. David Leemhuis of Region 9 NYSDEC, it was agreed that the changes were necessary to clarify the sampling frequency and reporting requirements.

If you have any questions please contact me at 286-4978.

Sincerely,

DEPARTMENT OF WASTEWATER FACILITIES

Albert C Zaepfel

Albert C. Zaepfel
Industrial Monitoring Coordinator

ACZ:mjl
cc: File 7A
D. Leemhuis DEC Region 9

City of Niagara Falls, New York

September 3, 1992

E. I. duPont de Nemours & Co. Inc. Significant Industrial User Permit No. 7 is hereby amended as follows:

Permission is hereby granted to discharge, to the City's combined sewer on Buffalo Avenue, pretreated wastewater generated from the remediation of Gill Creek, subject to the following conditions:

A) The approval is temporary and is granted only for the life of the creek remediation project.

B) Wastewater from infiltration, storm water runoff, dredged creek bed soil drainage, seepage from the diversion (dam) structures, etc. shall receive pretreatment via equalization, clarification, and sand filtration or its equivalent. Followed by either:
   1) an air stripper unit, followed by granular activated carbon[1], or
   2) GAC guard beds[2] followed by a steam stripper unit; or
   3) granular activated carbon only[3], prior to discharge to the City sewer via outfall 023 (MS #2).

C) Because this pretreated wastewater is expected to contain additional pollutant loads, the discharge limitations and monitoring requirements at 023 (MS #2) have been modified. The new (temporary) limits and monitoring frequencies are listed on the table entitled "Temporary Limitations at 023 Gill Creek Remediation." In addition, the sampling and analysis of the wastewater treated at the pretreatment system shall be conducted as outlined in sections 1 and 5 of the "Gill Creek Remediation Sampling and Analysis Plan" dated August 17, 1992. The results of this sampling and analysis shall be submitted to the City as soon as available and may be used to evaluate compliance with the above noted limits. Upon completion of project, discharge limitations, monitoring and reporting requirements shall revert to the original limits and requirements.

---

[1] The activated carbon treatment unit shall have three parallel lines of three beds each in series (nine Carbon beds). At least two lines (six carbon beds) shall be in service at all times of discharge.

[2] There shall be three guard beds available, and at least two guard beds shall be in service at all times.

[3] Same as footnote 1, above.

D) All monitoring results shall be reported in the company's Quarterly Self-Monitoring Report.

E) DuPont shall continuously monitor creek flow to the diversion sewer by use of a remote flow level sensor located in the sewer which detects high flow levels. In the event of high flow levels (storms), DuPont personnel shall act immediately to take all necessary actions to prevent a surcharged condition in the diversion sewer.

AZ:mjl

az196

TEMPORARY LIMITATIONS AT 023

GILL CREEK REMEDIATION

POLLUTANT MONITORING AT 023 (MS #2)	ANNUAL AVG	DAILY MAX	UNITS	MEASUREMT FREQUENCY	SAMPLE TYPE
Phosphorous	15.0	38.0	lbs/d	1/Qtr	3
Carbon Tetrachloride	0.44	1.10	lbs/d	1/Qtr	2
Dichlorobromomethane	0.144	0.36	lbs/d	1/Qtr	2
Tetrachloroethylenes	2.29	5.73	lbs/d	1/Qtr	2
Tetrachloroethane	2.13	5.33	lbs/d	1/Qtr	2
Hexachlorobutadiene	0.40	1.00	lbs/d	1/Qtr	2
PCB's	0.02	0.05	lbs/d	1/Qtr	3
T. Phenols	2.82	7.05	lbs/d	1/Qtr	3
*Chromium	1.0	2.0	lbs/d	1/mo	3
*Lead	10.0	19.5	lbs/d	1/mo	3
*Mercury	0.6	1.5	lbs/d	1/mo	3
*Zinc	25.0	30.0	lbs/d	1/mo	3
Residual Chlorine	300	750	lbs/d	2/shift	Grab
Hexachlorobenzene	1.00	2.50	lbs/d	1/Qtr	3
**Copper	13.0	18.0	lbs/d	1/mo	3
**Nickel	4.0	6.0	lbs/d	1/mo	3
**Trichlorobenzenes	1.5	3.0	lbs/d	1/mo	2
**Hexachlorocyclohexane	0.16	0.25	lbs/d	1/mo	3
**2-chlorophenol	0.1	0.2	lbs/d	1/mo	3

* Existing Pollutant Limitations modified for Gill Creek Project

**Pollutant Limitations added for Gill Creek Project

REV 11/90

DU PONT

CHEMICALS

P.O. Box 787
Buffalo Ave. & 26th Street
Niagara Falls, NY 14302-0787
(716) 278-5100

bcc: DMDarragh
MLeonard - WCC
REAustin - Legal, D7016-1
DEEllis - Chem, Bellevue
JHFrey - Chem, B12228
RWPorter/JEManning
RJGentilucci/File 52150
DPSpanfelner
kw: monthly report

September 8, 1992

Mr. Michael J. Hinton, P.E.
NYS Dept. of Environmental Conservation*
Division of Hazardous Waste Remediation
270 Michigan Avenue
Buffalo, NY 14203-2999

Dear Mr. Hinton:

MONTHLY PROGRESS REPORT - AUGUST 1992
DU PONT/OLIN GILL CREEK REMEDIATION PROJECT

In accordance with the conditions of the Order on Consent for this project, Du Pont and Olin are submitting the August monthly progress report for the Gill Creek remediation project.

Several construction activities have been initiated prior to receiving final DEC approval. DEC granted conditional approval to begin limited off-site and on-site construction in a letter dated June 30, 1992. On August 25 and 26, 1992, Mike Hinton and Leslie Warner discussed other construction activities and agreed that the following could proceed prior to DEC issuing the final approval:

- Construction of Diversion Structures 1, 3, and 3A
- Diversion of normal creek flow through the Buffalo Avenue Diversion Sewer
- Testing the water treatment system using potable water
- Installation of the final cells of the cofferdam

The following key construction activities occurred in August:

- Site preparation on Du Pont/Olin property: grading and installation of staging areas
- Temporary outfall relocation - discharge to the Niagara River
- Cofferdam installation

- Construction of Diversion Structure 1

- Creek flow diverted through the Buffalo Avenue diversion sewer

- Installation of the water treatment system.

Attached is a general construction schedule and approximate task completion information. This schedule will be updated monthly.

If you should have any questions, please contact me at (716) 278-5452.

Sincerely,

Leslie A. Warner

Leslie A. Warner
Senior Engineer, Engineering and Environmental Affairs

LAW:klf
Attach.
20634

cc: NYSDEC - Division of Environmental Enforcement (Buffalo)*
NYSDEC - Division of Hazardous Waste Remediation (Albany)*
NYSDOH - Bureau of Environmental Exposure Investigation (Albany)*
James C. Brown - Olin

* Two copies per order on consent

CONSTRUCTION PROGRESS REPORT
AUGUST 1992

CONSTRUCTION ELEMENT	EXPECTED START DATE	APPROX. % COMPLETE TO DATE (8/31)	EXPECTED COMPLETION DATE
CONSTRUCT STAGING AREAS	6/22	85	9/11
CONSTRUCT WATER TREATMENT SYSTEM	7/13	100	8/28
CONSTRUCT CELLULAR COFFERDAM	7/14	90	9/15
BUFFALO AVE DIVERSION SEWER INSTALL MONITORING SYSTEM	7/15	100	8/11
OUTFALL RELOCATION			
INSTALL PHASE II	7/22	100	7/31
DIVERT FLOW	8/7	100	8/7
CONSTRUCT DIVERSION NO. 1	8/19	100	8/28
CONSTRUCT DIVERSION NO. 3	9/4	--	9/10
CONSTRUCT DIVERSION NO. 3A	9/4	--	9/10
START-UP WATER TREATMENT SYSTEM	8/24	50	9/10
CREEK UNWATERING	9/3	--	9/15
OPERATE WATER TREATMENT SYSTEM	9/11	--	11/13
CONSTRUCT DIVERSION NO. 4	9/10	--	9/19
SEDIMENT REMOVAL			
AREA 3	9/8	--	9/15
AREA 2D	9/15	--	9/28
AREA 1	9/28	--	10/22
TRANSPORT SEDIMENT WASTE TO OFF-SITE LANDFILL	9/8	--	11/20
REMOVE DIVERSION NO. 3, 3A	9/28	--	9/30
REMOVE DIVERSION NO. 4	11/3	--	11/6
REMOVE CELLUAR COFFERDAM	11/7	--	12/1*
REMOVE DIVERSION NO. 1	11/7	--	11/8
REMOVE TEMPORARY OUTFALL (PHASE II)	11/19	--	11/21

*This completion date is tentative and meets the conditional schedule of the NYPA permit. We will be reviewing the estimated project completion date frequently and assessing options to meet this deadline.

REV 11/90

DU PONT

CHEMICALS

P.O. Box 787
Buffalo Ave. & 26th Street
Niagara Falls, NY 14302-0787
(716) 278-5100

September 9, 1992

Mr. Larry Stiller
New York State Department of
Environmental Conservation
270 Michigan Avenue
Buffalo, NY 14203-2999

Dear Mr. Stiller:

DU PONT/OLIN GILL CREEK REMEDIATION PROJECT AIR EMISSIONS

This letter is a documentation of our telephone conversation of September 3, 1992. We agreed the mass balance calculation was adequate methodology for the monitoring plan of the air strippers. The mass balance calculation will be based on the water quality sampling of the influent and effluent to the air strippers. The entire methodology was outlined in my letter dated September 2, 1992.

In addition, it was noted that the annual limits imposed by the DEC in a letter addressed to Du Pont and Olin dated August 31, 1992, omitted the exponential expressions. A corrected table is attached.

Sincerely,

Susan E. Dreyer

Susan E. Dreyer
Engineer, Engineering and
Environmental Affairs

SED:klf
Attach.
20655

cc: Michael Hinton, NYSDEC - Div. of Hazardous Waste Remediation (Buffalo)*
NYSDEC - Division of Environmental Enforcement (Buffalo)*
NYSDEC - Division of Hazardous Waste Remediation (Albany)*
NYSDOH - Bureau of Environmental Exposure Investigation (Albany)*
James C. Brown - Olin
Leslie A. Warner - Du Pont

* Two copies per order on consent

AIR DISCHARGE EMISSION LIMITS

Emission Point A: 84" Dia., 40' stack height

Emission Point B: 54" Dia., 40' stack height

	Max. Hourly Emissions (lbs/hour)		Max. Annual Emissions (lbs/year)	
Contaminant	Point A	Point B	Point A	Point B
Vinyl Chloride	0.707	0.354	2.038×10^3	1.018×10^3
1,1-Dichloroethene	0.037	0.018	1.064×10^2	0.531×10^2
Dichloromethane	0.655	0.329	1.887×10^3	0.947×10^3
Chloroform	0.214	0.107	6.159×10^2	3.08×10^2
1,1,1-Trichloroethane	0.074	0.037	2.126×10^2	1.06×10^2
Carbon Tetrachloride	0.034	0.017	97.77	48.81
Trichloroethylene	5.64	2.817	16.24×10^3	8.113×10^3
Tetrachloroethylene	1.797	0.897	5.175×10^3	2.583×10^3
1,1,2,2-Tetra-chloroethane	1.037	0.652	2.985×10^3	1.879×10^3
Chlorobenzene	0.483	0.243	1.391×10^3	0.689×10^3
Hexachloroethane	0.028	0.014	7.947×10^1	39.66
1,4-Dichlorobenzene	0.094	0.048	2.707×10^2	$.37 \times 10^2$
1,2-Dichlorobenzene	0.132	0.068	3.80×10^2	1.95×10^2
Benzene	0.127	0.068	3.65×10^2	0.196×10^3
Hexachlorobutadiene	0.089	0.045	2.56×10^2	1.28×10^2
1,2-Dichloroethene	1.370	0.685	3.94×10^3	1.973×10^3
Hexachlorobenzene	0.004	0.002	1.072×10^1	5.653
1,3-Dichlorobenzene	0.042	0.022	1.222×10^2	61.95
1,2,4-Trichlorobenzene	0.201	0.107	5.798×10^2	3.07×10^2

REV 11/90

bcc: DMDarragh
MLeonard - WCC
REAustin - Legal, D7016-1
DEEllis - Chem, Bellevue
JHFrey - Chem, B12228
RWPorter/JEManning
RJGentilucci/File 52150
DPSpanfelner

DU PONT
CHEMICALS
P.O. Box 787
Buffalo Ave. & 26th Street
Niagara Falls, NY 14302-0787
(716) 278-5100

September 9, 1992

Mr. Michael J. Hinton, P.E.
Environmental Engineer II
NYS Dept. of Environmental Conservation*
Division of Hazardous Waste Remediation
270 Michigan Avenue
Buffalo, NY 14203-2999

Dear Mr. Hinton:

DU PONT/OLIN GILL CREEK REMEDIATION PROJECT
FINAL APPROVAL OF CONSTRUCTION PLANS

Per the request in your letter of August 31, 1992, enclosed is a signed copy of NYSDEC's final approval of the construction plans for the Gill Creek project. This constitutes Du Pont's acceptance of the conditions outlined in your letter. Olin will submit their acceptance separately.

We understand that NYSDEC is aware of the need to correct the table entitled "Air Discharge Emission Limits," an attachment to the August 31 letter. Du Pont and Olin are submitting a corrected table in a separate letter confirming agreement on the air monitoring plan.

If you should have any questions, please contact me at (716) 278-5452.

Sincerely,

Leslie A. Warner

Leslie A. Warner
Senior Engineer, Engineering
and Environmental Affairs

LAW:klf
Attach.
20662

cc: NYSDEC - Division of Environmental Enforcement (Buffalo)*
NYSDEC - Division of Hazardous Waste Remediation (Albany)*
NYSDOH - Bureau of Environmental Exposure Investigation (Albany)*
James C. Brown - Olin

* Two copies per order on consent

New York State Department of Environmental Conservation

Thomas C. Jorling
Commissioner

August 31, 1992

CERTIFIED
RETURN RECEIPT REQUESTED

Ms. Leslie A. Warner
DuPont Chemicals
P.O. Box 787
Niagara Falls, NY 14320-0787

Mr. James Brown
Olin Corporation
Lower River Road
P.O. Box 248
Charleston, Tennessee 37310

Dear Ms. Warner:

Gill Creek Remediation Project
Site #932013

Please be advised that the construction plans developed under Order on Consent #B9-0206-90-01, titled "Gill Creek Remediation Plans and Specifications" dated April 1992 along with all revisions and addenda are hereby approved by this Department subject to acceptance of the following conditions by DuPont and Olin:

1. The discharge of water, impounded as a result of this project, to the Niagara River is subject to the requirements of the attached "Effluent Limitations and Monitoring Requirements" and Appendix A General Conditions. These conditions also apply to any storm event which causes the upstream creek flow to overtop the Buffalo Avenue Diversion structure. However, all water collected in the remediation area due to groundwater infiltration, seepage around or through diversion structures and miscellaneous storm runoff must be discharged through the on-site treatment system.

All diversion structures must remain throughout the creek remedial activities. These structures will enable the separating of unremediated and remediated portions of the creek. Gill Creek flows which overtop a diversion structure and enter previously remediated sections of the creek may be discharged directly to the Niagara River without monitoring.

2. The discharge of wastewater to the City of Niagara Falls POTW shall be in accordance with the Sewer Use Ordinance of the City of Niagara Falls, the Industrial User Permit issued by the City to DuPont (SIU #7), as well as State and Federal Pretreatment Regulations and Standards. The effluent limitations and monitoring requirements listed on the attached "TEMPORARY LIMITATIONS AT 023 - GILL CREEK REMEDIATION", shall apply at the DuPont SIU Outfall 023, as specified in the SIU Permit.

In addition, sampling and analysis of the wastewater treated at the pretreatment system shall be conducted as outlined in sections 1 and 5 of the "Gill Creek Remediation Sampling and Analysis Plan", dated August 17, 1992. The results of this sampling and analysis shall be made available to the City of Niagara Falls and the New York State Department of Environmental Conservation, and may be used to evaluate compliance with the SIU Permit limits at SIU outfall 023."

3. The 2 air stripper towers that are to be used as part of the pretreatment system are to be constructed and operated in accordance with the approved plans. The air discharge from these towers must be monitored to ensure compliance with the attached air discharge emission limits.

A monitoring plan indicating frequency of sampling and methodology used must be submitted to the Division of Air Resources Buffalo Regional Office for their review and approval. An adequate monitoring plan must be in place before air strippers are placed into service.

4. The limitations, conditions and operating requirements for the identified water discharge and air emissions shall be subject to the requirements and provisions set forth in Article 17 and 19 of the Environmental Conservation Law and all regulations promulgated pursuant thereto. Any changes, modifications or additions to the provisions stated herein without prior approval of the Department shall be a violation of the Order on Consent.

If you have any questions, please call me at at (716) 851-7220.

Please acknowledge and endorse below the acceptance of these conditions for approval.

By: RhPorter

Ms. Leslie Warner
Mr. James Brown
August 31, 1992

Please return a signed copy to this Department within 10 days of receipt.

Sincerely,

Michael J. Hinton

Michael J. Hinton, P.E.
Environmental Engineer II

MJH/ad

cc: Mr. Edward Belmore/Mr. Christopher Allen, DEC
Mr. Peter Buechi/Mr. E. Joseph Sciascia, DEC
Mr. V.J. Thakkar, DAR
Mr. Lawrence Stiller, Region 9, DEC
Mr. Glen Bailey, DEE, DEC
Mr. David Leemhuis, DEC, Region 9 DOW
Mr. Al Wakeman, DOH
Mr. Paul Dicky, NCHD
Mr. Frank Schieppeti, City of Niagara Falls
Mr. Michael Podd, DEC
Mr. Joseph Kelleher, DEC-DOW

AIR DISCHARGE EMISSION LIMITS

Emission Point A: 84" Dia., 40' stack height

Emission Point B: 54" Dia., 40' stack height

	Max. Hourly Emissions (lbs/hour)		Max. Annual Emissions (lbs/year)	
Contaminant	Point A	Point B	Point A	Point B
Vinyl Chloride	0.707	0.354	2.038	1.018
1,1-Dichloroethene	0.037	0.018	1.064	0.531
Dichloromethane	0.655	0.329	1.887	0.947
Chloroform	0.214	0.107	6.159	3.08
1,1,1-Trichloroethane	0.074	0.037	2.126	1.06
Carbon Tetrachloride	0.034	0.017	97.77	48.81
Trichloroethylene	5.64	2.817	16.24	8.113
Tetrachloroethylene	1.797	0.897	5.175	2.583
1,1,2,2-Tetra-chloroethane	1.037	0.652	2.985	1.879
Chlorobenzene	0.483	0.243	1.391	0.689
Hexachloroethane	0.028	0.014	7.947	3.966
1,4-Dichlorobenzene	0.094	0.048	2.707	1.37
1,2-Dichlorobenzene	0.132	0.068	3.80	1.95
Benzene	0.127	0.068	3.65	0.196
Hexachlorobutadiene	0.089	0.045	2.56	1.28
1,2-Dichloroethene	1.370	0.685	3.94	1.973
Hexachlorobenzene	0.004	0.002	1.072	0.565
1,3-Dichlorobenzene	0.042	0.022	1.222	0.619
1,2,4-Trichlorobenzene	0.201	0.107	5.798	3.07

TEMPORARY LIMITATIONS AT 023

GILL CREEK REMEDIATION

POLLUTANT MONITORING AT 023 (MS #2)	ANNUAL AVG	DAILY MAX	UNITS	MEASUREMT FREQUENCY	SAMPLE TYPE
Phosphorous	15.0	38.0	lbs/d	1/Qtr	3
Carbon Tetrachloride	0.44	1.10	lbs/d	1/Qtr	2
Dichlorobromomethane	0.144	0.36	lbs/d	1/Qtr	2
Tetrachloroethylenes	2.29	5.73	lbs/d	1/Qtr	2
Tetrachloroethane	2.13	5.33	lbs/d	1/Qtr	2
Hexachlorobutadiene	0.40	1.00	lbs/d	1/Qtr	2
PCB's	0.02	0.05	lbs/d	1/Qtr	3
T. Phenols	2.82	7.05	lbs/d	1/Qtr	3
*Chromium	1.0	2.0	lbs/d	1/mo	3
*Lead	10.0	19.5	lbs/d	1/mo	3
*Mercury	0.6	1.5	lbs/d	1/mo	3
*Zinc	25.0	30.0	lbs/d	1/mo	3
Residual Chlorine	300	750	lbs/d	2/shift	Grab
Hexachlorobenzene	1.00	2.50	lbs/d	1/Qtr	3
**Copper	13.0	18.0	lbs/d	1/mo	3
**Nickel	4.0	6.0	lbs/d	1/mo	3
**Trichlorobenzenes	1.5	3.0	lbs/d	1/mo	2
**Hexachlorocyclohexane	0.16	0.25	lbs/d	1/mo	3
**2-chlorophenol	0.1	0.2	lbs/d	1/mo	3

* Existing Pollutant Limitations modified for Gill Creek Project

**Pollutant Limitations added for Gill Creek Project

NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION

APPENDIX A

GENERAL CONDITIONS (Consent Orders)*

* This version of General Conditions is intended to be incorporated as Appendix A of all Consent Orders for site remediation projects where a State Pollutant Discharge Elimination System permit is not required but where the order authorizes the treatment and discharge of wastewaters to the surface or groundwaters of New York State.

1. GENERAL PROVISIONS

a. This order, or a true copy, shall be kept readily available for reference at the wastewater treatment facility.

b. A determination has been made on the basis of a submitted plans, or other available information, that compliance with the provisions specified in this order will reasonably protect classified water use and assure compliance with applicable water quality standards. Satisfaction of these provisions notwithstanding, if operation pursuant to the order causes or contributes to a condition in contravention of State water quality standards, or if the Department determines, on the basis of notice provided by the operator and any related investigation, inspection or sampling, that a modification of the order is necessary to prevent impairment of the best use of the waters or to assure maintenance of water quality standards or compliance with other provisions of ECL, the Department may require such a modification and may require abatement action to be taken by the operator and may also prohibit the noticed act until the order has been modified.

c. All discharges authorized by this order shall be consistent with the terms and conditions of this order. Facility expansion or other modifications, treatment and disposal system changes which will result in new or increased discharges of pollutants into the waters of the state must be reported by submission of a formal request for modification of this order. The discharge of any pollutant, not identified and authorized, or the discharge of any pollutant more frequently than, or at a level in excess of, that identified and authorized by this order shall constitute a violation of the terms and conditions of this order. Facility modifications which result in decreased discharges of pollutants must be reported by submission of written notice to the Department.

d. Where the operator becomes aware that he/she failed to submit any relevant facts or submitted incorrect information prior to or in pursuit of this order or in any report to the Department, the operator shall promptly submit such facts or information.

e. It shall not be a defense for an operator in an enforcement action that it would have been necessary to halt or reduce the authorized activity in order to maintain compliance with the conditions of this order, unless directed by the Department to continue the activity.

f. The filing of a request for a modification of this order, or a notification of planned changes or anticipated noncompliance, does not stay any condition of this order.

g. The operator shall furnish to the Department, within a reasonable time, any information which the Department may request to determine whether cause exists for modifying, suspending, or revoking this order, or to determine compliance with this order. The operator shall also furnish to the Department, upon request, copies of records required to be kept by this order.

2 SPECIAL REPORTING REQUIREMENTS

Dischargers must notify the Department as soon as they know or have reason to believe

a. That any activity has occurred or will occur which would result in the discharge, on a routine or frequent basis, of any toxic pollutant (USEPA Priority Pollutants plus phenols, total) which is not specifically controlled in the order, pursuant to General Provision 1 (c) herein. For the purposes of this section, recurrent accidental or unintentional spills or releases on a frequent basis shall be considered to be a discharge

b. That any activity has occurred or will occur which would result in any discharge, on a non-routine or infrequent basis, of a toxic pollutant which is not limited in the order, if that discharge will exceed five times the maximum concentration value reported for that pollutant in the information submitted prior to this order, or the level established by the Department

c. That they will begin to use any toxic pollutant which was not reported prior to this order and which is being or may be discharged to waters of the state.

3. EXCLUSIONS

a. The issuance of this order by the Department and the receipt thereof by the operator does not supersede, revoke or rescind an order or modification thereof on consent or determination by the Commissioner issued heretofore by the Department or any of the terms, conditions or requirements contained in such order or modification thereof unless specifically intended by said order.

b. The Issuance of this order does not convey any property rights In either real or personal property, or any exclusive privileges, nor does it authorize any injury to private property or any Invasion of personal rights, nor any Infringement of Federal, State or local laws or regulations; nor does It obviate the necessity of obtaining the assent of any other jurisdiction as required by law for the discharge authorized.

c. Unless specifically authorized In this order, the construction of any onshore or offshore physical structures or facilities or the undertaking of any work in any navigable waters is not approved

4. REPORTING NONCOMPLIANCE

a Anticipated noncompliance. The operator shall give advance notice to the Department of any planned changes in the authorized facility or activity which may result In noncompliance with this order as soon as the operator becomes aware that non-compliance will be unavoldable.

b Immediate and twenty-four hour reporting The operator shall report any noncompliance which may endanger health or the environment. Any unusual situation, caused by a deviation from normal operation or experience (e g upsets, bypasses, inoperative treatment process units, spills or illegal chemical discharges or releases to the collection system) which create a potentially hazardous condition shall be orally reported Immediately. Other Information shall be provided orally within 24 hours from the time he or she becomes aware of the circumstances. A written noncompliance report shall also be provided within five (5) days of the time the operator becomes aware of the circumstances. The written noncompliance report shall contain a description of the noncompliance and its cause; the period of noncompliance, including exact dates and times, and if the noncompliance has not been corrected, the anticipated time it Is expected to continue; and steps taken or planned to reduce, eliminate, and prevent the noncompliance and its reoccurrence.

(1) The following shall be Included as Information which must be reported within 24 hours under paragraph (b) above

(i) any unanticipated bypass which violates any effluent limitation in the order,

(ii) any upset which violates any effluent limitation In the order,

(iii) violation of a maximum daily discharge limitation for any of the pollutants listed by the Department in the order to be reported within 24 hours.

(2) The Department may waive, at their discretion, the written report on a case-by-case basis if the oral report has been received within 24 hours.

(3) Reports required by this section shall be filed with the Department's regional office having jurisdiction over the facility. During weekends and holidays, oral noncompliance reports, required by this paragraph, may be made at (518) 457-7362.

c. Duty to mitigate. The operator shall take all reasonable steps to minimize or prevent any discharge in violation of this order which has a reasonable likelihood of adversely affecting human health or the environment.

5. INSPECTION AND ENTRY

The operator shall allow the Commissioner of the Department, the New York State Department of Health, the County Health Department, or their authorized representatives, upon the presentation of credentials and other documents as may be required by law, to:

a. enter upon the operator's premises where a regulated facility or activity Is located or conducted, or where records must be kept under the conditions of this order;

b. have access to and copy, at reasonable times, any records that must be kept under the conditions of this order, including records maintained for purposes of operation and maintenance,

c. inspect at reasonable times any facilities, equipment (including monitoring and control equipment), practices, or operations regulated or required under this order, and

d. sample or monitor at reasonable times, for the purposes of assuring compliance with this order or as otherwise authorized by the Environmental Conservation Law, any substances or parameters at any location.

6. SPECIAL PROVISIONS - NEW OR MODIFIED DISPOSAL SYSTEMS

a. Prior to construction of any new or modified waste disposal system or modification of a facility generating wastewater which could alter the design volume of, or the method or effect of treatment or disposing of the wastes from an existing waste disposal system, the operator shall submit to the Department or its designated field office for review, an approvable engineering report, plans, and specifications which have been prepared by a person or firm licensed to practice Professional Engineering in the State of New York.

b. The construction of the above new or modified disposal system shall not start until the operator receives written approval of the system from the Department or its designated field office.

c. The construction of the above new or modified disposal system shall be under the general supervision of a person or firm licensed to practice Professional Engineering in New York State. Upon completion of construction, that person or firm shall certify to the Department or its designated field office that the system has been fully completed in accordance with the approved engineering report, plans and specifications and letter of approval; and the operator shall receive written acceptance of such certificate from the Department or designated field agency prior to commencing discharge

d. The Department and its designated field offices review wastewater disposal system reports, plans, and specifications for treatment process capability only, and approval by either office does not constitute approval of the system's structural integrity.

7. MONITORING, RECORDING, AND REPORTING

7.1 GENERAL

a. The operator shall comply with all recording, reporting, monitoring and sampling requirements specified in this order and such other additional terms, provisions, requirements or conditions that the Department may deem to be reasonably necessary to achieve the purposes of the Environmental Conservation Law, or rules and regulations adopted pursuant thereto.

b. Samples and measurements taken to meet the monitoring requirements specified in this order shall be representative of the quantity and character of the monitored discharges. Composite samples shall be composed of a minimum of 8 grab samples, collected over the specified collection period, either at a constant sample volume for a constant flow interval or at a flow-proportioned sample volume for a constant time interval, unless otherwise specified in this order. For GC/MS Volatile Organic Analysis (VOA), aliquots must be combined in the laboratory immediately before analysis. At least 4 (rather than 8) aliquots or grab samples should be collected over the specified collection period. Grab sample means a single sample, taken over a period not exceeding 15 minutes.

c. Accessable sampling locations must be provided, maintained and identified by the operator New sampling locations shall be provided if proposed or existing locations are deemed unsuitable by the Department or its designated field agency.

d. Actual measured values of all positive analytical results obtained above the Practical Quantitation Limit (PQL)[1] for all monitored parameters shall be recorded and reported, as required by this order; except, for parameters which are limited in this order to values below the PQL, actual measured values for all positive analytical results above the Method Detection Limit (MDL)[2] shall be reported.

e. The operator shall periodically calibrate and perform manufacturer's recommended maintenance procedures on all monitoring and analytical instrumentation to insure accuracy of measurements Verification of maintenance shall be logged into the daily record book(s) of the facility. The operator shall notify the Department's regional office immediately if any required instrumentation becomes inoperable In addition, the operator shall verify the accuracy of their measuring equipment to the Department's Regional Office annually.

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1 Practical Quantitation Limit (PQL) is the lowest level that can be measured within specified limits of precision and accuracy during routine laboratory operations on most effluent matrices

2 Method Detection Limit (MDL) is the level at which the analytical procedure referenced is capable of determining with a 99% probability that the substance is present This value is determined in distilled water with no interfering substances present. The precision at this level is +/- 100%

7.2 SIGNATORIES AND CERTIFICATION

a All reports required by this order shall be signed as follows:

(1) for a corporation: by a responsible corporate officer. For the purposes of this section, a responsible corporate officer means:

(i) a president, secretary, treasurer, or a vice president of the corporation in charge of a principal business function, or any other person who performs similar policy or decision-making function for the corporation, or

(ii) the manager of one or more manufacturing, production, or operating facilities employing more than 250 persons or having gross annual sales or expenditures exceeding $25 million (in second quarter 1980 dollars), if authority to sign documents has been assigned or delegated to the manager in accordance with corporate procedures.

(2) for a partnership or sole proprietorship: by a general partner or the proprietor, respectively, or

(3) for a municipality, state, federal, or other public agency: by either a principal or executive officer or ranking elected official. For purposes of this section, a principal executive officer of a federal agency includes: (i) the chief executive officer of the agency, or (ii) a senior executive officer having responsibility for the overall operations of a principal geographic unit of the agency, or

(4) a duly authorized representative of the person described in items (1), (2), or (3). A person is a duly authorized representative only if:

(i) the authorization is made in writing by a person described in paragraph (a)(1), (2), or (3) of this section;

(ii) the authorization specifies either an individual or a position having responsibility for the overall operation of the regulated facility or activity such as the position of plant manager, operator of a well or well field, superintendent, position of equivalent responsibility, or an individual or position having overall responsibility for environmental matters for the company (A duly authorized representative may thus be either a named individual or any individual occupying a named position); and

(iii) the written authorization is submitted to the Department.

b. Changes to authorization: If an authorization under subparagraph (a)(4) of this section is no longer accurate because a different individual or position has responsibility for the overall operation of the facility, a new authorization satisfying the requirements of subparagrapph (a)(4) of this section must be submitted to the Department prior to or together with any reports, information, or applications to be signed by an authorized representative.

c. Certification: Any person signing a report shall make the following certification.

"I certify under penalty of law that this document and all attachments were prepared under my direction or supervision, in accordance with a system, designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the order or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information including the possibility of fine and imprisonment for knowing violations."

7.3 RECORDING OF MONITORING ACTIVITIES AND RESULTS

a. The operator shall retain records of all monitoring information, including all calibration and maintenance records and all original strip chart recordings for continuous monitoring instrumentation, copies of all reports required by this order, and records of all data used to complete the application for this order, for a period of at least 3 years from the date of the sample, measurement, report or application. This period may be extended by request of the Department at any time.

b. Records of monitoring information shall include:

(1) the date, exact place, and time of sampling or measurements;

(2) the individual(s) who performed the sampling or measurements;

(3) the date(s) analyses were performed;

(4) the individual(s) who performed the analyses;

(5) the analytical techniques or methods used; and

(6) the results of such analyses.

7.4 TEST AND ANALYTICAL PROCEDURES

a. Monitoring and analysis must be conducted using test procedures promulgated, pursuant to 40 CFR Part 136, except:

(1) should the Department require the use of a particular test procedure, such test procedure will be specified in this order.

(2) should the operator desire to use a test method not approved herein, prior Department approval is required, pursuant to paragraph (b) of this section.

b. Application for approval of test procedures shall be made to the Director of DEC's Division of Water, and shall contain:

(1) the name and address of the applicant or the responsible person making the discharge, identification of this particular order and the telephone number of applicant's contact person;

(2) the names of the pollutants or parameters for which an alternate testing procedure is being requested, and the monitoring location(s) at which each testing procedure will be utilized.

(3) justification for using test procedures, other than those approved in paragraph (a) of this section; and

(4) a detailed description of the alternate procedure, together with:

(i) references to published studies, if any, of the applicability of the alternate test procedure to the effluent in question;

(ii) information on known interferences, if any; and

(5) a comparability study, using both approved and proposed methods. The study shall consist of 8 replicates of 3 samples from a well mixed waste stream for each outfall if less than 5 outfalls are involved, or from 5 outfalls if 5 or more outfalls are involved. Four (4) replicates from each of the samples must be analyzed using a method approved in paragraph (a) of this section, and four replicates of each sample must be analyzed using the proposed method. This results in 24 analyses per outfall up to a maximum of 120 analyses. A statistical analysis of the data must be submitted that shall include, as a minimum:

(i) calculated statistical mean and standard deviation;

(ii) a test for outliers at the mean ± 3 standard deviations level. Where an outlier is detected, an additional sample must be collected and 8 replicates of the sample must be analyzed as specified above;

(iii) a plot distribution with frequency counts and histogram;

(iv) a test for equality among with-in sample standard deviation;

(v) a check for equality of pooled with-in sample variance with an F-Test,

(vi) a t-Test to determine equality of method means; and

copies of all data generated in the study.

Additional information can be obtained by contacting the Bureau of Technical Services & Research (NYSDEC, 50 Wolf Road, Albany, New York 12233 - 3502).

8. DISPOSAL SYSTEM OPERATION AND QUALITY CONTROL

8.1 GENERAL

a. The disposal system shall not receive or be committed to receive wastes from unapproved sources, nor wastes beyond its design capacity as to volume and character of wastes treated, nor shall the system be materially altered as to: type, degree, or capacity of treatment provided, disposal of treated effluent, or treatment and disposal of separated scum, liquids, solids or combination thereof resulting from the treatment process without written approval of the Department of Environmental Conservation or its designated field office.

b. The operator shall, at all times, properly operate and maintain all facilities and systems of treatment and control (or related appurtenances) which are installed or used by the operator to achieve compliance with the conditions of this order. Proper operation and maintenance also includes as a minimum, the following: 1) A preventive/corrective maintenance program. 2) A site specific action orientated operation and maintenance manual for routine use, training new operators, adequate laboratory controls and appropriate quality assurance procedures. This provision requires the operation of installed backup or auxiliary facilities or similar systems only when the operation is necessary to achieve compliance with the conditions of the order.

c. The operator shall not discharge floating solids or visible foam

8.2 BYPASS

a. Definitions:

(1) "Bypass" means the intentional or unintentional diversion of waste stream(s) around any portion of a treatment facility for the purpose or having the effect of reducing the degree of treatment intended for the bypassed portion of the treatment facility.

(2) "Severe property damage" means substantial damage to property, damage to the treatment facilities which causes them to become inoperable, or substantial and permanent loss of natural resources which would not reasonably be expected to occur in the absence of a bypass Severe property damage does not mean economic loss caused by delays in production

b. Bypass not exceeding limitations:

The operator may allow any bypass to occur which does not cause effluent limitations to be violated, but only if it also is for essential maintenance, repair or replacement to assure efficient and proper operation. These bypasses are not subject to the provisions of pargraph (c) and (d) of this section, provided that written notice is submitted prior to bypass (if anticipated) or as soon as possible after bypass (if unanticipated), and no public health hazard is created by the bypass

c. Notice:

(1) Anticipated bypass - If the operator knows in advance of the need for a bypass, it shall submit prior written notice, at least forty five (45) days before the date of the bypass

(2) Unanticipated bypass - The operator shall submit notice of an unanticipated bypass as required in Section 4, paragraph b. of this Part (24 hour notice).

d. Prohibition of bypass:

(1) Bypass is prohibited, and the Department may take enforcement action against a operator for bypass, unless:

(i) bypass was unavoidable to prevent loss of life, personal injury, public health hazard, or severe property damage;

(ii) there were no feasible alternatives to the bypass such as the use of auxiliary treatment facilities, retention of untreated wastes, or maintenance during normal period of equipment downtime. This condition is not satisfied if adequate backup equipment should have been installed in the exercise of reasonable engineering judgment to prevent a bypass which occurred during normal periods of equipment downtime or preventive maintenance or if designed and installed backup equipment which could have prevented or mitigated the impact of the bypass is not operating during the bypass; and

(iii) the operator submitted notices as required under paragraph (c) of this section and, excepting emergency conditions, the proposed bypass was accepted by the Department

8.3 UPSET

a. Definition:

"Upset" means an exceptional incident in which there is unintentional and temporary noncompliance with order effluent limitations because of factors beyond the reasonable control of the operator. An upset does not include noncompliance to the extent caused by operational error, improperly designed treatment facilities, inadequate treatment facilities, lack of preventive maintenance, or careless or improper operation.

b. Effect of an upset:

An upset constitutes an affirmative defense to an action brought for noncompliance with such order effluent limitations if the requirements of paragraph (c) of this section are met. No determination made during administrative review of claims that noncompliance was caused by upset, and before an action for noncompliance, is final administrative action subject to judicial review.

c. Conditions necessary for a demonstration of upset:

An operator who wishes to establish the affirmative defense of upset shall demonstrate, through properly signed, contemporaneous operation logs, or other relevant evidence that:

(1) an upset occurred and that the operator can identify the cause(s) of the upset,

(2) the facility was at the time being properly operated; and

(3) the operator submitted notice of the upset as required in Section 4, paragraph b of this part (24 hour notice).

(4) the operator complied with any remedial measures required under Section 4, paragraph d of this part.

d. Burden of proof:

In any enforcement proceeding the operator seeking to establish the occurrence of an upset has the burden of proof.

8.4 SPECIAL CONDITION - DISPOSAL SYSTEMS WITH SEPTIC TANKS

If a septic tank is installed as part of the disposal system, it shall be inspected by the operator or his agent for scum and sludge accumulation at intervals not to exceed one year's duration, and such accumulation will be removed before the depth of either exceeds one-fourth (1/4) of the liquid depth so that no settleable solids or scum will leave in the septic tank effluent. Such accumulation shall be disposed of in an approved manner.

8.5 SLUDGE DISPOSAL

The storage or disposal of collected screenings, sludges, other solids, or precipitates separated from the authorized discharges and/or intake or supply water by the operator shall be done in such a manner as to prevent creation of nuisance conditions or entry of such materials into classified waters or their tributaries, and in a manner approved by the Department. Any live fish, shellfish, or other animals collected or trapped as a result of intake water screening or treatment should be returned to their water body habitat. The operator shall maintain records of disposal on all effluent screenings, sludges and other solids associated with the discharge(s) herein described. The following data shall be compiled and reported to the Department or its designated field office upon request:

a. the sources of the materials to be disposed of;

b. the approximate volumes, weights, water content and (if other than sewage sludge) chemical composition;

c. the method by which they were removed and transported, including the name and permit number of the waste transporter; and

d. their final disposal locations.

Olin CHEMICALS
LOWER RIVER RD., P.O. BOX 248, CHARLESTON, TN 37310

September 9, 1992

Mr. Michael J. Hinton, P.E.
Environmental Engineer II
New York State Department of Environmental Conservation
Division of Hazardous Waste Remediation
270 Michigan Avenue
Buffalo, NY 14203-2999

Re: Final Approval of Construction Plans
Gill Creek Remediation Project
Site #932013

Dear Mr. Hinton:

Per the request in your letter of August 31, 1992, enclosed is a signed copy of NYSDEC's final approval of the construction plans for the Gill Creek project. This constitutes Olin's acceptance of the conditions outlined in your letter. Du Pont will submit their acceptance separately.

We understand that NYSDEC is aware of the need to correct the table entitled "Air Discharge Emission Limits," an attachment to the August 31 letter. Du Pont and Olin will submit a corrected table later.

Please let me know if you need additional information. My telephone number is 615-336-4308.

Sincerely,

OLIN CORPORATION

J. C. Brown

J. C. Brown
Manager, Environmental Technology

\jcb\151

cc J. W. Humphries (w/o attach.)
L. A. Warner (w/o attach.)

New York State Department of Environmental Conservation

Thomas C. Jorling
Commissioner

September 10, 1992

cc Jim Brown
RJG/File 52150
MP Crewe
KW · Breech elevation approval

Ms. Leslie Warner
DuPont Chemicals
P.O. Box 787
Niagara Falls, NY 14302-0787

Dear Ms. Warner:

Site #932013
Gill Creek Remediation
Cofferdam Breach Elevation

Your request to raise the breach elevation on the cofferdam has been reviewed by the Division of Water Flood protection staff. This request has been found to be acceptable to the Department under the condition that DuPont and Olin accept all responsibility for damage that may result from flooding due to this change.

If you have any questions please call me at 851-7220.

Sincerely,

Michael J. Hinton

Michael J. Hinton, P.E.
Environmental Engineer II

MJH/ad

cc: Mr. E. Joseph Sciascia
Ms. Rebecca Anderson - Div. of Water

New York State Department of Environmental Conservation
270 Michigan Avenue, Buffalo, NY 14203

Thomas C. Jorling
Commissioner

September 10, 1992

Ms. Leslie Warner
DuPont Chemicals
P.O. Box 787
Niagara Falls, NY 14302-0787

Dear Mr. Warner:

Site #932013
Gill Creek Remediation
Air Stripper Monitoring

As a condition of the Department's approval of the Gill Creek Remediation project we requested that a monitoring plan be developed that would ensure compliance of air discharge limits for the two air stripper towers.

This plan was developed and submitted to the Division of Air Resources to the attention of Mr. Lawrence Stiller on September 2, 1992 by Ms. Susan Dreyer of DuPont.

Please be advised that monitoring plan as outlined in the September 2, 1992 letter is acceptable to this Department. Operations of the air stripper can proceed as planned.

If you have any questions, please call me at 851-7200.

Sincerely,

Michael J. Hinton

Michael J. Hinton, P.E.
Environmental Engineer II

MJH/ad

cc: Mr. E. Joseph Sciascia
Mr. Lawrence Stiller

New York State Department of Environmental Conservation
270 Michigan Avenue, Buffalo, NY 14203

Thomas C. Jorling
Commissioner

September 14, 1992

Ms. Leslie A. Warner
DuPont Chemicals
P.O. Box 787
Niagara Falls, NY 14320-0787

Mr. James Brown
Olin Corporation
Lower River Road
P.O. Box 248
Charleston, TN 37310

Dear Ms. Warner/Mr. Brown:

Gill Creek Remediation
Site #932013

Attached for your use is a revised Air Discharge Emission Limits for the above referenced project.

This Emission Limit table is to be included in the project approval letter dated August 31, 1992.

If you have any questions please call me at 851-7220.

Sincerely,

Michael J Hinton

Michael J Hinton, P.E.
Environmental Engineer II

MJH/ad

cc: Mr. E. Joseph Sciascia
Mr. V.J. Thakkar
Mr. Lawrence Stiller

AIR DISCHARGE EMISSION LIMITS

Emission Point A: 84" Dia., 40' stack height
Emission Point B: 54" Dia., 40' stack height

	Max. Hourly Emissions (lbs/hour)		Max. Annual Emissions (lbs/year)	
Contaminant	Point A	Point B	Point A*	Point B*
Vinyl Chloride	0.707	0.354	2.038×10^3	1.018×10^3
1,1-Dichloroethene	0.037	0.018	1.064×10^2	0.531×10^2
Dichloromethane	0.655	0.329	1.887×10^3	0.947×10^3
Chloroform	0.214	0.107	6.159×10^2	3.08×10^2
1,1,1-Trichloroethane	0.074	0.037	2.126×10^2	1.06×10^2
Carbon Tetrachloride	0.034	0.017	97.77	48.81
Trichloroethylene	5.64	2.817	16.24×10^3	8.113×10^3
Tetrachloroethylene	1.797	0.897	5.175×10^3	2.583×10^3
1,1,2,2-Tetra-chloroethane	1.037	0.652	2.985×10^3	1.879×10^3
Chlorobenzene	0.483	0.243	1.391×10^3	0.689×10^3
Hexachloroethane	0.028	0.014	79.47	39.66
1,4-Dichlorobenzene	0.094	0.048	2.707×10^2	1.37×10^2
1,2-Dichlorobenzene	0.132	0.068	3.80×10^2	1.95×10^2
Benzene	0.127	0.068	3.65×10^2	0.196×10^3
Hexachlorobutadiene	0.089	0.045	2.56×10^2	1.28×10^2
1,2-Dichloroethene	1.370	0.685	3.94×10^3	1.973×10^3
Hexachlorobenzene	0.004	0.002	10.72	5.653
1,3-Dichlorobenzene	0.042	0.022	1.222×10^2	0.619×10^2
1,2,4-Trichlorobenzene	0.201	0.107	5.798×10^2	3.07×10^2

* Revised 9/14/92

bcc: DMDarragh
MLeonard - WCC
REAustin - Legal, D7016-1
SWConstable - Engg, L33E34
DEEllis - Chem, Bellevue
JHFrey - Chem, B12228
RWPorter/JEManning
RJGentilucci/File 52150
AKMasse
MPCrowe
JMcClincy

REV 11/90

DU PONT
CHEMICALS
P.O. Box 787
Buffalo Ave. & 26th Street
Niagara Falls, NY 14302-0787
(716) 278-5100

September 24, 1992

Mr. Michael J. Hinton, P.E.
NYS Dept. of Environmental Conservation*
Division of Hazardous Waste Remediation
270 Michigan Avenue
Buffalo, NY 14203-2999

Dear Mr. Hinton:

DU PONT/OLIN GILL CREEK REMEDIATION PROJECT
APPROVED DISCHARGE TO THE NIAGARA RIVER

For the duration of this remediation project, Du Pont and Olin have received approval to discharge initial drawdown water and certain storm waters to the Niagara River, subject to a turbidity limit of 17 NTU's. The initial drawdown of Area 1 near the cofferdam has not been completed. Recent rain events added water to the project area and have increased the background turbidity in the area of the cofferdam above 17 NTU's.

In order to complete the drawdown expeditiously, Du Pont and Olin have proposed to filter the water before discharge to the river in order to meet the approved turbidity limit. In separate telephone conversations I have presented this concept to DEC representatives David Leemhuis, Mike Hinton, and Robert Wither. All have agreed that filtration prior to discharge to achieve the turbidity limit is acceptable. Mr. Wither agreed that proper filtration can produce a discharge that will meet the stated criterion based on suspended solids.

This letter serves to document these conversations and the approval by DEC of this addition to the construction plans. If you should have any questions, please contact me at (716) 278-5452.

Sincerely,

Leslie A. Warner

Leslie A. Warner, Senior Engineer
Engineering and Environmental Affairs

LAW:klf

20126
cc: NYSDEC - Division of Environmental Enforcement (Buffalo)*
NYSDEC - Division of Hazardous Waste Remediation (Albany)*
NYSDOH - Bureau of Environmental Exposure Investigation (Albany)*
James C. Brown - Olin
Robert Wither - DEC Division of Water - Albany
David Leemhuis - DEC Division of Water - Buffalo

* Two copies per order on consent

DU PONT
CHEMICALS
P.O. Box 787
Buffalo Ave. & 26th Street
Niagara Falls, NY 14302-0787
(716) 278-5100

September 28, 1992

Mr. Michael J. Hinton, P.E.
NYS Dept. of Environmental Conservation*
Division of Hazardous Waste Remediation
270 Michigan Avenue
Buffalo, NY 14203-2999

Dear Mr. Hinton:

DU PONT/OLIN GILL CREEK REMEDIATION PROJECT
NOTIFICATION OF A CHANGE IN DESIGNATED ADDRESSEES

Per Order on Consent No. B9-0206-90-01 and in accordance with Section 6(XX)(D), Du Pont is notifying you of a change in the designated addressees. Please be advised that effective October 1, 1992, Ann K. Masse will be the principal contact for this project. Ann can be contacted at the address listed below or by telephone at 278-5317. Her role as Project Leader will be supported by the following members of the Environmental staff at Du Pont Niagara Falls: David Spanfelner (278-5597) and Marit Crowe (278-5420).

The amended list of Respondents [Section 6(XX)(C)] is as follows:

Daniel M. Darragh, Esq.
Eckert, Seamans, Cherin & Mellott
42nd Floor
600 Grant Street
Pittsburgh, PA 15219

Ann K. Masse, Ph.D.
Du Pont Chemicals
Buffalo Avenue and 26th Street
Niagara Falls, NY 14302

James C. Brown
Olin Corporation
Lower River Road
PO Box 248
Charleston, TN 37310

DNI 6035972

In early October I will be moving to Wilmington, Delaware, to begin my new assignment with Du Pont. If you should have any questions after October 1, please contact Ann at (716) 278-5317.

Sincerely,

Leslie A. Warner

Leslie A. Warner
Senior Engineer, Engineering
and Environmental Affairs

LAW:klf
20997

cc: NYSDEC - Division of Environmental Enforcement (Buffalo)*
NYSDEC - Division of Hazardous Waste Remediation (Albany)*
NYSDOH - Bureau of Environmental Exposure Investigation (Albany)*
James C. Brown - Olin
Ann K. Masse - Du Pont

* Two copies per order on consent

REV 11/90

DU PONT

CHEMICALS

P.O. Box 787
Buffalo Ave. & 26th Street
Niagara Falls, NY 14302-0787
(716) 278-5100

bcc: DMDarragh
MLeonard - WCC
REAustin - Legal, D7016-1
DEEllis - Chem, Bellevue
JHFrey - Chem, B12228
RWPorter/JEManning
RJ~~Gentilu~~cci/File 52150
JFMcClincy
AKMasse
MPCrowe
DPSpanfelner

September 29, 1992

Mr. Michael J. Hinton, P.E.
NYS Dept. of Environmental Conservation*
Division of Hazardous Waste Remediation
270 Michigan Avenue
Buffalo, NY 14203-2999

Dear Mr. Hinton:

DU PONT/OLIN GILL CREEK REMEDIATION PROJECT
REPORT OF DEVIATION FROM APPROVED PLANS AND SPECIFICATIONS

The final approved construction plans for the Gill Creek Remediation Project specify the construction of diversion structures to isolate work areas and the pumping of water from the construction areas. In addition, Du Pont and Olin have obtained approval from your office to construct additional sandbag diversion structures to further isolate work areas and to facilitate water management. This letter serves to document a deviation from those approvals and to notify you of the corrective measure that has been implemented.

On September 17 several Du Pont employees noticed a deviation from the approved pumping sequence. North of Adams Avenue is the area identified as 2U, remediated by Olin in 1981 and not subject to further remediation activities under this Order. Diversion Structure 3A has been built in this area as has an additional sandbag structure approximately 15 feet upstream of 3A (see Figure 1). Immediately downstream of 3A is a small trench (approximately 2 to 6 inches deep by 8 inches wide by 55 feet long) separated from the work area north of and under the Adams Avenue bridge by a gravel and dirt berm. The intent of constructing the sandbag structure is to reduce inflows of water from Area 2U into the work area by isolating the inflows north of 3A and pumping the water back upstream. This plan has been relatively effective but some water from 2U continues to seep past the upstream sandbag structure and then past 3A.

On September 17 a 2-inch electric submersible pump was installed in the trench immediately downstream of 3A. The water in the trench was approximately 4 inches deep. Contrary to instruction, the discharge was located north of the sandbag structure in Area 2U. At the time the discharge was noticed, the water depth in the trench was 1 to 2 inches. It is estimated that the pump was running for approximately 30 minutes. Due to pump design and incomplete submersion, the

DNI 6010788

pump was generating little flow. The volume of water discharged was conservatively estimated to be no more than 50 gallons and probably much less.

Although the source of the water in the trench was most likely from Area 2U, a corrective measure was implemented the following day. Beginning at approximately 11 a.m. the water in 2U was pumped to the remediation water treatment plant for treatment. At 2:30 p.m., when the water in the area had been removed, the pumping and treatment ceased. Approximately 40,000 gallons were treated. There was no precipitation from the time of the incident to the time implementation of the corrective measure began.

In reviewing this incident we have taken the following measures to prevent such incidents in the future:

1. We will review with the work force the remediation area limits and site restrictions.

2. A site supervisor will personally inspect any pumping operation prior to it being placed in service to ensure compliance with the limits and restrictions.

On September 18 we showed DEC inspectors Brian Adler and Bill Roblee the site of the incident and explained the event and the corrective measure being implemented. In addition I spoke with Mike Hinton late that morning to notify his office. This letter is being sent at Mr. Hinton's request.

If you should have any questions, please contact me at (716) 278-5452.

Sincerely,

Leslie A. Warner

Leslie A. Warner
Senior Engineer, Engineering
and Environmental Affairs

LAW:klf
Attach.
21041

cc: NYSDEC - Division of Environmental Enforcement (Buffalo)*
NYSDEC - Division of Hazardous Waste Remediation (Albany)*
NYSDOH - Bureau of Environmental Exposure Investigation (Albany)*
James C. Brown - Olin
Michael Lock - Sevenson Environmental Services

* Two copies per order on consent

FIGURE 1

GILL CREEK REMEDIATION PROJECT
WORK AREA NORTH OF ADAMS AVENUE

*[

#3A Trench Gravel Berm

*Sandbag Diversion Structure

Photos taken September 18, 1992

<---- North (upstream, to Buffalo Avenue)

Post-it™ brand fax transmittal memo 7671 | # of pages ▸ 5

To Michael Hinton	From Leslie Warner
Co. DEC	Co. Du Pont
Dept. Haz Waste Rem.	Phone # 278-5452
Fax # 851-7008	Fax # 278-5195

cc. AKM
MPC
~~RJG~~/File 52150
rw: Toe Drain Revision

September 30, 1992

— By FAX

TO: Mike Hinton, DEC
Div. of Hazardous Waste Remediation

FROM: Leslie Warner, DuPont

RE: Gill Creek Remediation - Proposed changes to Plans

Attached are sketches of the changes we are proposing which are:

1. To install a clay "plug" between the two cobblebar structures, so that the upstream water will not enter the toe area of the cofferdam (see "Plan View 1").

2. To extend the toe drain in one area so that the water that is upwelling from the riverbed is collected by the toe drain and returned to the river along with the seepage water collected by the toe drain (see "Plan View 2" Sections A-A and B-B). Two minor design changes are noted on the Section sketches.

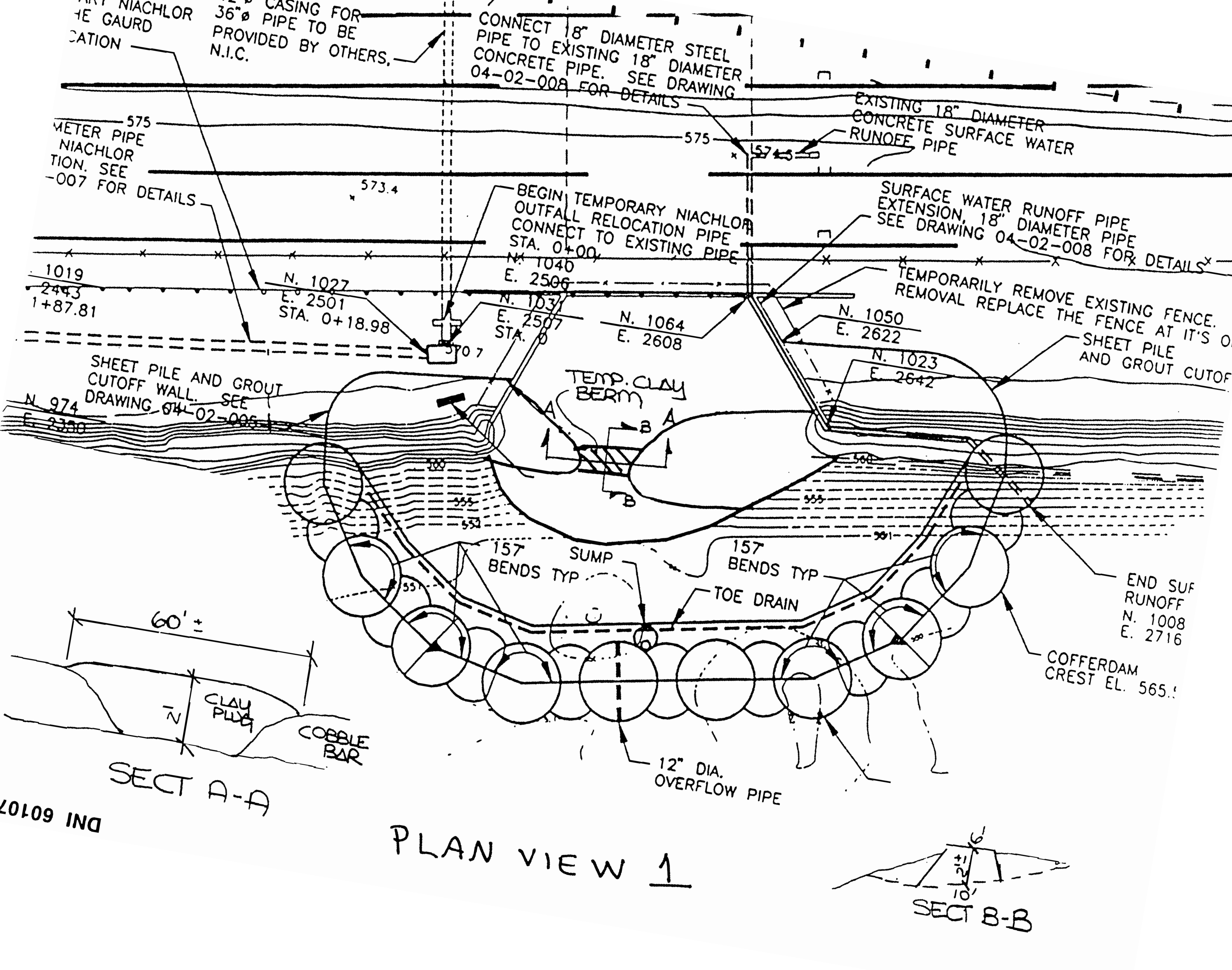
Earlier today I reviewed these proposed changes with Bill Roblee. Please review and respond as soon as possible. Call me, Marit Crowe (278-5420) or Jim Brown (615-336-4308). Thank-you.

To recap the situation:

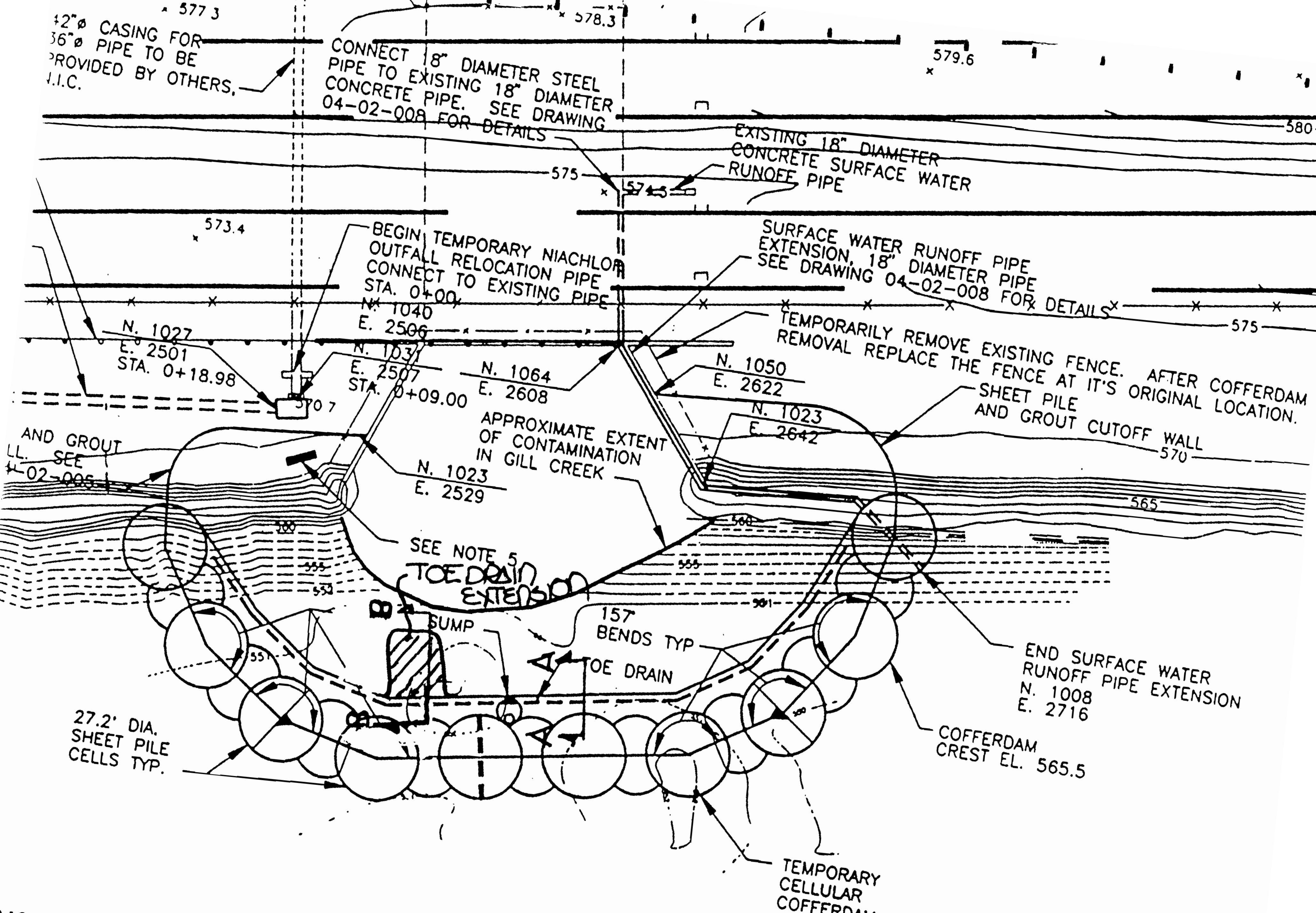
On 9/28 we drew the water level down to 3-4 feet deep at the toe of the cofferdam. The cobblebar was completely exposed. There are actually two cobblebar structures which extend from both the east & west wingwalls, nearly meeting in the middle of the creek. Water from upstream in Area 1 is draining into the area south of the cobblebar. There is also an upwelling of water from the riverbed south of the western cobblebar.

We propose to leave the cobblebars in place for now, and add a "plug" of clay to extend and complete the barrier across the mouth of the creek. The cobblebars appear to be impermeable at the bases. The clay plug will be about 80 cu. yds and 2 feet tall. The intent of the cobblebar-plug barrier is to isolate the area north of the cobblebars so that the contaminated sediments north of them are contained and excavation can begin, and to enhance water management. Once the plug is installed we will be able to proceed with sediment removal north of the cobblebars and we will also be able to proceed with installation of the toe drain.

Because of the upwelling from the riverbed there is more inflowing water than expected. Additional grouting will probably not be adequate to reduce the inflows to a more manageable level. We are proposing that we extend the toe drain to surround the upwelling, and return the upwelling water to the river along with the rest of the toe drain water.

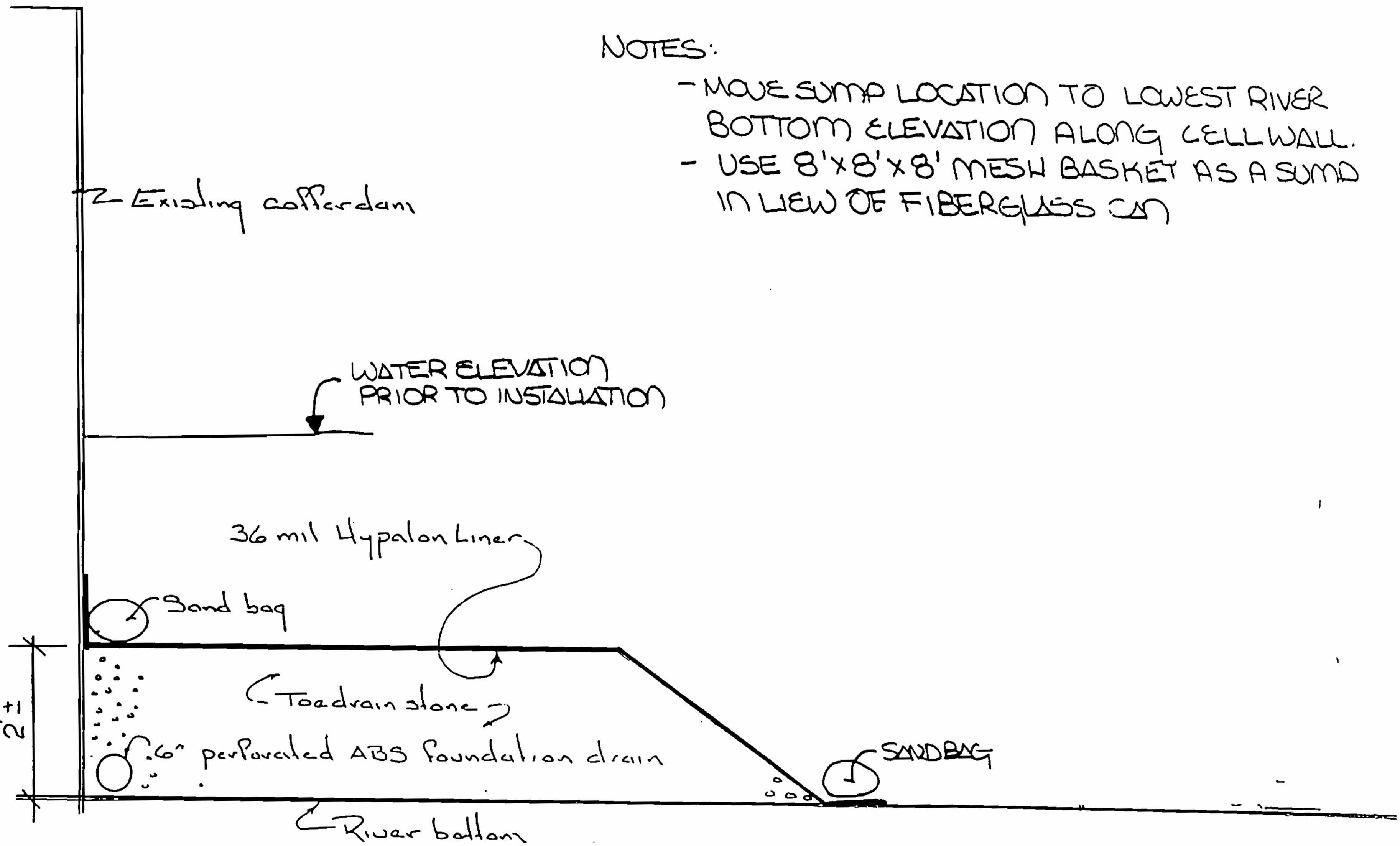


36"ø CASING FOR 36"ø PIPE TO BE PROVIDED BY OTHERS. N.I.C.
CONNECT 18" DIAMETER STEEL PIPE TO EXISTING 18" DIAMETER CONCRETE PIPE. SEE DRAWING 04-02-008 FOR DETAILS
EXISTING 18" DIAMETER CONCRETE SURFACE WATER RUNOFF PIPE
575
575
573.4
-007 FOR DETAILS
BEGIN TEMPORARY NIACHLOR OUTFALL RELOCATION PIPE CONNECT TO EXISTING PIPE STA. 0+00
N. 1040
E. 2506
SURFACE WATER RUNOFF PIPE EXTENSION, 18" DIAMETER PIPE SEE DRAWING 04-02-008 FOR DETAILS
TEMPORARILY REMOVE EXISTING FENCE. REMOVAL REPLACE THE FENCE AT IT'S
N. 1019
E. 2443
1+87.81
N. 1027
E. 2501
STA. 0+18.98
N. 1031
E. 2507
STA. 0
N. 1064
E. 2608
N. 1050
E. 2622
N. 1023
E. 2642
SHEET PILE AND GROUT CUTOFF
570.7
SHEET PILE AND GROUT CUTOFF WALL. SEE DRAWING 04-02-006
N. 974
E. 2390
TEMP. CLAY BERM
A
A
B
B
157 BENDS TYP
SUMP
157 BENDS TYP
TOE DRAIN
END SURFACE RUNOFF
N. 1008
E. 2716
COFFERDAM CREST EL. 565.5
12" DIA. OVERFLOW PIPE
60' ±
CLAY PLUG
2' ±
COBBLE BAR
SECT A-A
DNI 60107
PLAN VIEW 1
6'
±1
2
10'
SECT B-B


12"ø CASING FOR 36"ø PIPE TO BE PROVIDED BY OTHERS, N.I.C.
577.3
578.3
579.6
580
CONNECT 18" DIAMETER STEEL PIPE TO EXISTING 18" DIAMETER CONCRETE PIPE. SEE DRAWING 04-02-008 FOR DETAILS
EXISTING 18" DIAMETER CONCRETE SURFACE WATER RUNOFF PIPE
575
573.4
BEGIN TEMPORARY NIACHLOR OUTFALL RELOCATION PIPE CONNECT TO EXISTING PIPE STA. 0+00 N. 1040 E. 2506
SURFACE WATER RUNOFF PIPE EXTENSION, 18" DIAMETER PIPE SEE DRAWING 04-02-008 FOR DETAILS
N. 1027 E. 2501 STA. 0+18.98
N. 1037 E. 2507 STA. 0+09.00
N. 1064 E. 2608
N. 1050 E. 2622
TEMPORARILY REMOVE EXISTING FENCE. AFTER COFFERDAM REMOVAL REPLACE THE FENCE AT IT'S ORIGINAL LOCATION.
SHEET PILE AND GROUT CUTOFF WALL
N. 1023 E. 2642
570
APPROXIMATE EXTENT OF CONTAMINATION IN GILL CREEK
N. 1023 E. 2529
565
SEE NOTE 5
TOE DRAIN EXTENSION
SUMP
157° BENDS TYP
TOE DRAIN
END SURFACE WATER RUNOFF PIPE EXTENSION N. 1008 E. 2716
27.2' DIA. SHEET PILE CELLS TYP.
COFFERDAM CREST EL. 565.5
TEMPORARY CELLULAR COFFERDAM

PLAN VIEW 2

NOTES:
- MOVE SUMP LOCATION TO LOWEST RIVER BOTTOM ELEVATION ALONG CELLWALL.
- USE 8'x8'x8' MESH BASKET AS A SUMP IN LIEU OF FIBERGLASS CAN

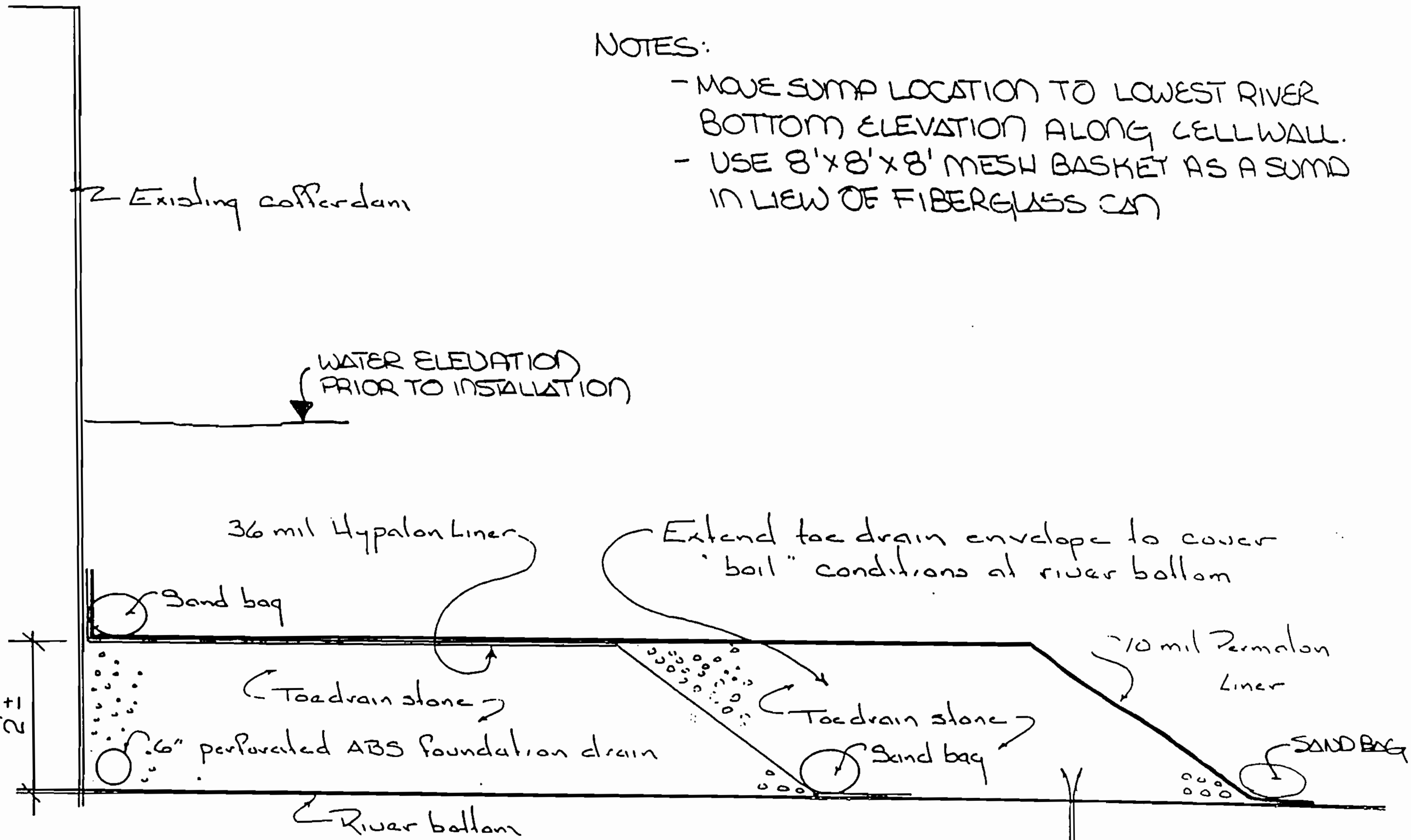


SECT A-A

TOE DRAIN MODIFICATION	GILL CREEK REMEDIATION E.I. DUPONT CORP SEVENSON ENVIRONMENTAL SERVICES	DRAWING TD-1	DATE: 9/29/92 SCALE: none DRAWN BY: RR

DNI 6010786

NOTES:
- MOVE SUMP LOCATION TO LOWEST RIVER BOTTOM ELEVATION ALONG CELLWALL.
- USE 8'x8'x8' MESH BASKET AS A SUMP IN LIEU OF FIBERGLASS CAN



SECT B-B

TOE DRAIN MODIFICATION	GILL CREEK REMEDIATION E.I. DUPONT CORP SEVENSON ENVIRONMENTAL SERVICES	DRAWING TD-1A	DATE: 9/29/92 SCALE: none DRAWN BY: RR

DNI 6010787

RJG/ file
1x AKP
1x J McClin
1x MPC
1x JCBrow

New York State Department of Environmental Conservation
270 Michigan Avenue, Buffalo, New York, 14203-2999

Thomas C. Jorling
Commissioner

October 6, 1992

Ms. Ann K. Masse, PhD
DuPont Chemicals
P.O. Box 787
Niagara Falls, NY 14302

Dear Ms. Masse:

Gill Creek Remediation
Site No. 932013

On September 30, 1992, I met with Ms. Leslie Warner at your facility regarding the Gill Creek Remediation Project. The following items were discussed and agreed upon:

1. The water that is to be pumped from the cofferdam toe drain is considered Niagara River water and is not subject to the condition of the approval letter dated August 31, 1992. However, if the Gill Creek remediation water enters or possibly entered the toe drain system than the discharge from the toe drain pump must be handled as remediation water.

2. Temporarily sealing the gap in the cobblebar with clay to enhance your water management activities is acceptable. It is understood that this clay seal and cobblebar will be removed at the completion of the project to ensure the complete removal of all contaminated sediment.

3. The extension of the toe drain filter stone to handled an area of water infiltration from the Niagara River is acceptable.

If you have any questions please call me at 851-7220.

Sincerely,

Michael J. Hinton

Michael J. Hinton, P.E.
Environmental Engineer II

MJH/ad

cc: Mr. E. Joseph Sciascia
Mr. David Leehmius
Mr. William Roblee

Ann Masse

bcc: DMDarragh
MLeonard - WCC
REAustin - Legal, D7016-1
DEEllis - Chem, Bellevue
JHFrey - Chem, B12224
RWPorter/JEManning
RJGentilucci/File 52150
DPSpanfelner
MPCrowe
LAJewell
kw: monthly report

REV 11/90

DUPONT

CHEMICALS

P.O. Box 787
Buffalo Ave. & 26th Street
Niagara Falls, NY 14302-0787
(716) 278-5100

October 12, 1992

Mr. Michael J. Hinton, P.E.
NYS Dept. of Environmental Conservation*
Division of Hazardous Waste Remediation
270 Michigan Avenue
Buffalo, NY 14203-2999

Dear Mr. Hinton:

MONTHLY PROGRESS REPORT - SEPTEMBER 1992
DU PONT/OLIN GILL CREEK REMEDIATION PROJECT

In accordance with the conditions of the Order on Consent for this project, Du Pont and Olin are submitting the September monthly progress report for the Gill Creek remediation project.

The following key construction activities occurred in September and early October:

- Site preparation on Du Pont/Olin property: grading and installation of staging areas have been completed.
- Diversion Structure 2 (Cofferdam) and associated grouting complete.
- Toe drain for Cofferdam complete (10/10/92).
- Initial drawdown in Area 1 complete (10/10/92).
- Diversion Structures 1, 3, 3A, and 4 complete.
- Removal of sediments from Areas 2D and 3 complete. Twenty-one roll-off containers were filled with materials from Area 3. Four of these containers have been determined to contain Lindane at concentrations above the 0.4 mg/L EPTox gamma-BHC regulatory limit.
- Start-up of the Water Treatment Facility was on September 17, 1992.

DNI 603595

<u>Variations in Construction Activities</u>

- The filtering of drawdown water from Area 1 prior to discharge to the Niagara River was approved by NYSDEC. In accordance with the approval, the filtered water from Area 1 is checked for turbidity and pumped to the Niagara River if the turbidity is reduced to less than 17 NTUs. A letter dated September 24, 1992, from L. A. Warner (Du Pont) to M. J. Hinton (NYSDEC) provides documentation of this approved activity.

- Heavy rains on September 18, September 21, and September 22, 1992, resulted in the overtopping of Diversion Structures 1, 3A, and 4 (partially complete at the time). The cofferdam was not breached; water and sediments from Area 3 did not overtop into any other creek bed areas. The overtopping of diversion structures was described to David Leemhuis of the Region 9 NYSDEC when he inspected the site on September 25, 1992; no further follow-up was requested.

- During the post-remediation inspection of Area 3 on September 30, 1992, two "seeps" were discovered on the west bank between the Adams Avenue bridge and Diversion Structure 3. These seeps have been sampled; Woodward-Clyde Consultants are developing a report to summarize our options for addressing these seeps prior to restoration of Area 3. The NYSDEC Region 9 office was advised of this finding.

- The installation of a clay "plug" between the two cobblebar structures in Area 1, so that the upstream water will not enter the toe area of the cofferdam, was reviewed with the NYSDEC and approved. A memo dated September 30, 1992, faxed from L. A. Warner to M. J. Hinton documents details of this approved activity. The clay "plug" has been installed.

- A hydrocyclone and cartridge filter have been installed between Gill Creek and the horizontal clarifier (TK-101A) to reduce solids loading to the treatment facility. Bag filters were also added between the sand filters and air strippers to further enhance solids removal capabilities.

Estimated Air Emissions

Estimated emission levels for the 54-inch diameter air stripper were exceeded on September 17, 1992, for the following constituents: 1,1,2,2-tetrachloroethane, 1,2-dichlorobenzene, 1,4-dichlorobenzene, and 1,2,4-trichlorobenzene. The New York State Short-term Guideline Concentrations (SGCs) for these constituents were not exceeded. Exceedance was a result of greater than estimated influent concentration and lower than estimated stripper removal efficiency (see Attachment A). S. E. Dreyer provided this information to M. J. Hinton in an October 2, 1992, telephone conversation.

Attachment B is a general construction schedule and approximate task completion information. This schedule will be updated monthly. If you should have any questions, please contact me at (716) 278-5317.

Sincerely,

Ann K. Masse

Ann K. Masse, Ph.D.
Area Engineer, Engineering and Environmental Affairs

AKM:klf
Attach.
20217

cc: NYSDEC - Division of Environmental Enforcement (Buffalo)*
NYSDEC - Division of Hazardous Waste Remediation (Albany)*
NYSDOH - Bureau of Environmental Exposure Investigation (Albany)*
James C. Brown - Olin

* Two copies per order on consent

ATTACHMENT A

GILL CREEK REMEDIATION WATER TREATMENT FACILITY
INFLUENT CONCENTRATIONS/AIR EMISSIONS

Constituent	Influent Conc.* (Actual)	Influent Conc.* (Estimated)	Actual Emission (lbs/hr)	Estimated Emission (lbs/hr)
1,1,2,2-Tetra-chloroethane	15000	7076	0.9380	0.6520
1,2-Dichloro-benzene	1500	558	0.0938	0.0680
1,4-Dichloro-benzene	1200	387	0.0751	0.0480
1,2,4-Trichloro-benzene	1800	894	0.1112	0.1070

*Concentration in parts per billion (ppb).

ATTACHMENT B

CONSTRUCTION PROGRESS REPORT
SEPTEMBER 1992

CONSTRUCTION ELEMENT	EXPECTED START DATE	APPROX. % COMPLETE TO DATE (8/31)	EXPECTED COMPLETION DATE
CONSTRUCT STAGING AREAS	6/22	100	9/11
CONSTRUCT WATER TREATMENT SYSTEM	7/13	100	8/28
CONSTRUCT CELLULAR COFFERDAM	7/14	100	9/15
BUFFALO AVE DIVERSION SEWER INSTALL MONITORING SYSTEM	7/15	100	8/11
OUTFALL RELOCATION			
INSTALL PHASE II	7/22	100	7/31
DIVERT FLOW	8/7	100	8/7
CONSTRUCT DIVERSION NO. 1	8/19	100	8/28
CONSTRUCT DIVERSION NO. 3	9/4	100	9/10
CONSTRUCT DIVERSION NO. 3A	9/4	100	9/10
START-UP WATER TREATMENT SYSTEM	8/24	100	9/10
CREEK UNWATERING	9/31	100	9/15
OPERATE WATER TREATMENT SYSTEM	9/11	50	11/13
CONSTRUCT DIVERSION NO. 4	9/10	100	9/19
SEDIMENT REMOVAL			
AREA 3	9/8	100	9/15
AREA 2D	9/15	100	9/28
AREA 1	9/28	5	10/22
TRANSPORT SEDIMENT WASTE TO OFF-SITE LANDFILL	9/8	5	11/20
REMOVE DIVERSION NO. 3, 3A	9/28	--	9/30
REMOVE DIVERSION NO. 4	11/3	--	11/6
REMOVE CELLUAR COFFERDAM	11/7	--	12/1*
REMOVE DIVERSION NO. 1	11/7	--	11/8
REMOVE TEMPORARY OUTFALL (PHASE II)	11/19	--	11/21

*This completion date is tentative and meets the conditional schedule of the NYPA permit. We will be reviewing the estimated project completion date frequently and assessing options to meet this deadline.

DNI 6035962

REV 11/90

DU PONT

CHEMICALS

P.O. Box 787
Buffalo Ave. & 26th Street
Niagara Falls, NY 14302-0787
(716) 278-5100

bcc: RJGiraud - Engg, L3379
TAKittleman - Engg, L3370
DEEllis - Chem, Bellevue
RJGentilucci/File 52150
AKMasse

kw: Air, requirements, corrections

October 16, 1992

Mr. Michael J. Hinton, P.E.
NYS Dept. of Environmental Conservation
Division of Hazardous Waste Remediation
270 Michigan Avenue
Buffalo, NY 14203-2999

Dear Mr. Hinton:

DU PONT/OLIN GILL CREEK REMEDIATION PROJECT

The Gill Creek Remediation Project air modeling was submitted on June 26, 1992, to your office. This information was prepared during the design process. Since that time the project has been constructed and actual remediation in the field has begun. The original air modeling package was found to have minor inconsistencies when compared with the actual field construction. The enclosed package has been updated to incorporate any changes that came about since the first package was submitted.

The changes are small; however, we feel it necessary to bring them to your attention. Specific changes are:

- Velocity on Tables 1 and 2 are given with the corrected numbers.

- The air stripper modeling run by Woodward-Clyde Consultants was re-run. The change made in the new run was that the flow rate of air to the stripper was corrected. The original was run with 3,300 cfm for the 54-inch stripper and was corrected to 3,100 cfm. The original 84-inch stripper model run was compiled with 7,200 cfm and corrected to 6,700 cfm. These changes corresponded to only minor changes in the output. For comparison, page 7 of 7 for the 54-inch stripper shows air emissions for vinyl chloride to be 8.48510 pounds per day, whereas the corrected version shows 8.49086 pounds per day.

DNI 6035945

If you have any questions regarding the information provided, please feel free to call me at (716) 278-5543.

Sincerely,

Susan E. Dreyer

Susan E. Dreyer
Engineer, Engineering
and Environmental Affairs

SED:klf
Enc.
21282

cc: NYSDEC - Division of Hazardous Waste Remediation (Buffalo)
NYSDEC - Division of Environmental Enforcement (Buffalo)*
NYSDEC - Division of Air (Buffalo)
NYSDEC - Division of Hazardous Waste Remediation (Albany)*
NYSDEC - Division of Air (Albany)
NYSDOH - Bureau of Environmental Exposure Investigation (Albany)*
Jim Brown - Olin
Max Vermersch - Woodward-Clyde Consultants
Steve Constable - Du Pont

* Two copies per order on consent

CONCENTRATIONS IN AIR CONSIDERING INPUTS
FROM THE EXISTING GROUNDWATER RECOVERY SYSTEM
AND THE PROPOSED GILL CREEK PROJECT SOURCES
EAST OF GILL CREEK PROJECT

Chemical Compound	Toxicity Table	SGC (ug/m3)	Odor Threshold (ug/m3)	Maximum Groundlevel Concentration from Combined Sources C1 (ug/m3)	C2 (ug/m3)	Peak Emission Rate From: 84" Stripper (pph)	54" Stripper (pph)
Vinyl Chloride	hi	1300	26000	21.27	18.64	0.71	0.35
1,1 Dichloroethene	mod	190000	5500000	1.03	0.85	0.04	0.02
Dichloromethane	mod	41000	4000	19.67	17.40	0.65	0.33
Chloroform	mod	980	20000	8.90	9.06	0.21	0.11
1,1,1 Trichloroethane	lo	450000	70000	2.05	1.72	0.07	0.04
Carbon Tetrachloride	hi	1300	10000	0.94	0.79	0.03	0.02
Trichloroethylene	mod	33000	2000	157.56	132.28	5.64	2.82
Tetrachloroethylene	mod	81000	480000	50.18	42.11	1.80	0.90
1,1,2,2 Tetrachloroethane	mod	1600	20000	27.79	31.66	1.00	0.68
Chlorobenzene	mod	11000	600	13.59	11.62	0.48	0.24
Hexachloroethane	N/A *	2310	150	0.76	0.64	0.03	0.01
1,4 Dichlorobenzene	mod	30000	90000	2.60	2.22	0.09	0.05
1,2 Dichlorobenzene	mod	30000	120	3.64	3.20	0.13	0.07
Hexachlorobutadiene	mod	50	N/A	2.48	2.07	0.09	0.04
Benzene	hi	30	516	3.51	2.98	0.12	0.06
1,2 Dichloroethylene	mod	190000	30000	40.50	35.27	1.37	0.69
Hexachlorobenzene	hi *	6	N/A	0.10	0.10	0.004	0.002
1,3 Dichlorobenzene	mod	30000	1100	1.17	1.00	0.04	0.02
1,2,4 Trichlorobenzene	hi	3700	10400	5.53	5.06	0.20	0.11
2 Methyl furan	hi	34	N/A	6.92	6.92	0.00	0.00

SGC - Short-Term Guideline Concentrations, ug/m3

Q1 - Steam Stripper Emission Rate, g/s
Q2 - Equalization Tank Emission Rate, g/s
Q3 - 84" Air Stripper Emission Rate, g/s
Q4 - 54" Air Stripper Emission Rate, g/s

C/Q - Concentration calculated using SCREEN with emission rate equal to 1 g/s, ug/m3
C1 - Combined 1-hr Impact from Q1, Q2, & Q3, ug/m3
C2 - Combined 1-hr Impact from Q1, Q2, & Q4, ug/m3

Steam Stripper - Existing Groundwater Stripper (Stack ht. - 110'; dia. - 2"; vel. - 0.8 fps)

Equal. Tank - Groundwater Holding Tank (Stack ht. - 24'; dia. - 4"; vel. - 0.1 fps)

Air Strip. 1 - 84" Dia. Air Stripper (Stack ht. - 40'; dia. - 30"; vel. - 22.7 fps)

Air Strip. 2 - 54" Dia. Air Stripper (Stack ht. - 40'; dia. - 30"; vel. - 10.4 fps)

Notes: 1. Only one of the air strippers will be operat at any give time
2. N/A = not available
3. * = interim SGC derived by TLV/4.2

::

file: gillcrk-east1.w20

DNI 6035947

CONCENTRATIONS IN AIR CONSIDERING INPUTS
FROM THE EXISTING GROUNDWATER RECOVERY SYSTEM
AND THE PROPOSED GILL CREEK PROJECT SOURCES
WEST OF STEAM STRIPPER

Chemical Compound	Toxicity Table	SGC (ug/m3)	Odor Threshold (ug/m3)	Maximum Groundlevel Concentration From Combined Sources C1 (ug/m3)	C2 (ug/m3)	Peak Emission Rate From: 84" Strip (pph)	54" Stripper (pph)
Vinyl Chloride	hi	1300	26000	22.59	16.82	0.71	0.35
1,1 Dichloroethene	mod	190000	5500000	1.03	0.76	0.04	0.02
Dichloromethane	mod	41000	4000	20.76	15.63	0.65	0.33
Chloroform	mod	980	20000	11.41	9.59	0.21	0.11
1,1,1 Trichloroethane	lo	450000	70000	2.05	1.53	0.07	0.04
Carbon Tetrachloride	hi	1300	10000	0.94	0.71	0.03	0.02
Trichloroethylene	mod	33000	2000	159.14	119.22	5.64	2.82
Tetrachloroethylene	mod	81000	480000	51.26	38.53	1.80	0.90
1,1,2,2 Tetrachloroethane	mod	1600	20000	27.82	28.25	1.00	0.68
Chlorobenzene	mod	11000	600	14.40	11.10	0.48	0.24
Hexachloroethane	N/A *	2310	150	0.76	0.57	0.03	0.01
1,4 Dichlorobenzene	mod	30000	90000	2.60	1.98	0.09	0.05
1,2 Dichlorobenzene	mod	30000	120	3.64	2.86	0.13	0.07
Hexachlorobutadiene	mod	50	N/A	2.48	1.84	0.09	0.04
Benzene	hi	30	516	3.56	2.68	0.12	0.06
1,2 Dichloroethylene	mod	190000	30000	42.52	31.46	1.37	0.69
Hexachlorobenzene	hi *	6	N/A	0.10	0.09	0.004	0.002
1,3 Dichlorobenzene	mod	30000	1100	1.17	0.89	0.04	0.02
1,2,4 Trichlorobenzene	hi	3700	10400	5.53	4.51	0.20	0.11
2 Methyl furan	hi	34	N/A	6.92	6.92	0.00	0.00

SGC – Short-Term Guideline Concentrations, ug/m3

Q1 – Steam Stripper Emission Rate, g/s
Q2 – Equalization Tank Emission Rate, g/s
Q3 – 84" Air Stripper Emission Rate, g/s
Q4 – 54" Air Stripper Emission Rate, g/s

C/Q – Concentration calculated using SCREEN
with emission rate equal to 1 g/s, ug/m3
C1 – Combined 1-hr Impact from Q1, Q2, & Q3, ug/m3
C2 – Combined 1-hr Impact from Q1, Q2, & Q4, ug/m3

Steam Str – Existing Groundwater Stripper
(Stack ht. – 110'; dia. – 2"; vel. – 0.8 fps)

Equal. Ta – Groundwater Holding Tank
(Stack ht. – 24'; dia. – 4"; vel. – 0.1 fps)

Air Strip – 84" Dia. Air Stripper
(Stack ht. – 40'; dia. – 30"; vel. – 22.7 fps)

Air Strip – 54" Dia. Air Stripper
(Stack ht. – 40'; dia. – 30"; vel. – 10.4 fps)

Notes: 1. Only one of the air strippers will be operat
at any give time
2. N/A = not available
3. * = Interim SGC derived by TLV/4.2

::

file: gillcrk-west1.w20

DNI 6035948

REV 11/90

DU PONT

CHEMICALS

P.O. Box 787
Buffalo Ave. & 26th Street
Niagara Falls, NY 14302-0787
(716) 278-5100

bcc: DMDarragh
MLeonard - WCC
REAustin - Legal, D7016-.
DEEllis - Chem, Bellevue
JHFrey - Chem, B12224
RWPorter/JEManning
RJGentilucci/File 52150
JFMcClincy
JDClark
AFrith
DPSpanfelner
MPCrowe

October 21, 1992

kw: air monitoring

Mr. Michael J. Hinton, P.E.
NYS Dept. of Environmental Conservation*
Division of Hazardous Waste Remediation
270 Michigan Avenue
Buffalo, NY 14203-2999

Dear Mr. Hinton:

DU PONT/OLIN GILL CREEK REMEDIATION PROJECT
REPORT OF DEVIATION FROM APPROVED PLANS AND SPECIFICATIONS

Per your request in your October 13, 1992, telephone conversation with M. P. Crowe, this letter summarizes the justification for alternate procedures to be followed in the event of an OVA/PID reading of 5 ppm or greater lasting 15 minutes or more at the Exclusion Zone (EZ) boundary (Safety and Health Plan, Section X, Contingency Plan for Remediation Air Emissions). Details of the alternate procedures follow. We are confident that these procedures do not compromise the safety of project personnel, plant employees, or the community.

Justifications for Alternate Procedures

As written, the contingency plan calls for an on-site GC for immediate analysis of specific compounds in the event of an OVA/PID reading of 5 ppm or greater at the EZ boundary. At this time there is not an on-site GC. Instead we have developed and implemented alternate procedures and propose to keep the alternate procedures in place for the duration of the project for the following reasons:

- Since the start of excavation and sediment handling activities in Area 1, instantaneous OVA and PID readings at the EZ boundary have not approached 5 ppm. Most readings have been less than 1 ppm.

- There were no significant PID/OVA readings at the EZ boundary during sediment removal activities in Area 3; Area 3 sediments were known to be heavily contaminated with volatile organics.

- Cool temperatures and the saturated nature of sediments make significant volatile emissions unlikely.

- Considering the rate of project execution, the procurement of the GC and completing the training required would not be completed before the majority of excavation activities have been completed.

DNI 6035941

Alternate Procedures

- In the event of an OVA/PID reading of 5 ppm or greater for 15 minutes at the EZ boundary, response levels, emission suppression activities, and changes in work activities will remain as outlined in the contingency plan.

- Air samples will be collected as specified in the contingency plan. The air samples will be analyzed at an off-site laboratory (Waste Stream Technologies) with a guaranteed 8-hour turnaround time. Consistent with the original contingency plan, responses which would serve to protect the workers and community would be triggered by the OVA/PID concentration of the emission.

- A procedure has been developed and reviewed with construction personnel and Du Pont environmental staff who have 24-hour emergency notification responsibilities to ensure that a release quantity is calculated based on the emission information collected in the field (OVA/PID).

  Since the actual contaminant emitted would not yet be known, calculations will be based on the assumption that benzene is emitted. Benzene is the most likely compound to be emitted because of its low molecular weight and high volatility.

  This initial calculation of a release quantity would be used to determine if immediate agency notifications of a potential exceedance of a regulatory release quantity would be necessary. Analytical results would be used to verify and further substantiate the initial report.

- These alternate procedures have been incorporated into Section X of the Safety and Health Plan, Contingency Plan for Remediation Air Emissions, and have been reviewed with all personnel involved.

If you should have any questions, please contact me at (716) 278-5317.

Sincerely,

A K Masse

Ann K. Masse, Ph.D.
Area Engineer, Engineering
and Environmental Affairs

AKM/MPC:klf
21321

cc: NYSDEC - Division of Environmental Enforcement (Buffalo)*
NYSDEC - Division of Hazardous Waste Remediation (Albany)*
NYSDOH - Bureau of Environmental Exposure Investigation (Albany)*
James C. Brown - Olin
Al Wakeman - NCHD

* Two copies per order on consent

REV 11/90

CHEMICALS
P.O. Box 787
Buffalo Ave. & 26th Street
Niagara Falls, NY 14302-0787
(716) 278-5100

bcc: JCBrown - Olin
DMDarragh
MLeonard - WCC
REAustin - Legal, D7016-1
DEEllis - Chem, Bellevue
JHFrey - Chem, B12224
RWPorter/JEManning
RJGentilucci/File 52150
DPSpanfelner
MPCrowe
RSSanderson

November 4, 1992

Mr. Michael J. Hinton, P.E.
NYS Dept. of Environmental Conservation*
Division of Hazardous Waste Remediation
270 Michigan Avenue
Buffalo, NY 14203-2999

Dear Mr. Hinton:

AREA 2D SEEP TEST
DU PONT/OLIN GILL CREEK REMEDIATION PROJECT

In Area 2D on the west bank of Gill Creek south of the railroad bridge, there is a significant seep of groundwater into the creek bed. Approximately 15 feet to the west of the seep is a groundwater recovery well (PW-35), which is part of the Du Pont Niagara Plant Groundwater Remediation program. Water level in the well has been approximately 3 to 6 feet higher than normal during the month of October. It is believed that the high water level may be caused by a restriction in the header line to the treatment system.

To determine whether maintaining a low water level in the well would reduce the flow from the seep, it was proposed that the water from PW-35 be pumped directly from the well to the Gill Creek Remediation Water Treatment Plant. The most recent analytical results from PW-35 indicate that the levels of organics in the groundwater are within the specifications of the Gill Creek Remediation Water Treatment Plant. In separate telephone conversations this test was presented to Mike Hinton, Dave Leemhuis, and Al Zaepfel. Verbal approval to conduct the test was received from all.

By pumping to the Gill Creek Remediation Water Treatment Plant, low water levels have been maintained in the well since November 1; however, there has been little change in the flow rate of the seep. We will continue to pump to the Gill Creek Remediation Water Treatment Plant for the next few days.

DNI 6035939

This letter serves to document the test and the DEC and City of Niagara Falls Wastewater Treatment Plant approvals. If you should have any questions, please contact me at (716) 278-5317.

Sincerely,

A K Masse

Ann K. Masse, Ph.D.
Area Engineer, Engineering
and Environmental Affairs

AKM:klf
21601

cc: NYSDEC - Division of Environmental Enforcement (Buffalo)*
NYSDEC - Division of Hazardous Waste Remediation (Albany)*
NYSDOH - Bureau of Environmental Exposure Investigation (Albany)*
Al Zaepfel - WWTP
Dave Leemhuis - NYSDEC (Buffalo)
Tamara Dutch - Du Pont

* Two copies per order on consent

REV 1/90

DU PONT

CHEMICALS

P.O. Box 787
Buffalo Ave. & 26th Street
Niagara Falls, NY 14302-0787
(716) 278-5100

bcc: DMDarragh
MLeonard - WCC
REAustin - Legal, D7016-1
DEEllis - Chem, Bellevue
JHFrey - Chem, B12224*
RWPorter/JEManning*
RJGentilucci/File 52150
DPSpanfelner*
MPCrowe*
TADutch*

*Cover letter and map only

November 5, 1992

Mr. Michael J. Hinton, P.E.
NYS Dept. of Environmental Conservation*
Division of Hazardous Waste Remediation
270 Michigan Avenue
Buffalo, NY 14203-2999

Dear Mr. Hinton:

AREA 2D AND AREA 3 SEEPS
DU PONT/OLIN GILL CREEK REMEDIATION PROJECT

Various seeps have been observed in Areas 2D and 3 during the Gill Creek Remediation project. The attached table and map summarize the seep locations, characteristics of the seeps, and the sample identification code used. Also attached are the analytical reports for the samples collected from the seeps.

Area 2D Seeps

The analytical results for the seeps in Area 2D are similar in both constituents and concentration to Du Pont Niagara Plant groundwater, with the exception that the concentrations of metals, particularly iron and aluminum, are a factor of ten higher than typical plant groundwater concentrations. Seeps 2DS-1 and 2DS-2 are located below the natural water level of Gill Creek.

The 2DS-1 and 2DS-2 seeps are currently isolated. The 2DS-1 seep, located in the middle of the creek bed, has an open ended salvage drum around it. The water level in the drum is less than a foot deep. The 2DS-2 seep, located at the base of the northeast wing wall of the railroad bridge, has been packed with clay and a layer of gravel has been placed over it.

Clay will be packed into the 2DS-1 seep prior to reflooding of the creek. It is believed once Gill Creek is returned to its normal water level, the hydrostatic pressure of the water in the creek will prevent these seeps from breaking through the clay barrier and entering the creek.

The seeps in Area 2D near the brine tank are above the water line of Gill Creek. The constituents of the seep water are similar to groundwater in a nearby well (PW-35), but the concentrations of organics are a factor of ten lower. Since the sampling event, the flow has been concentrated into two distinct seeps by packing the other seeps with clay. The flow from the two seeps ranges from 7 to 30 gallons per minute. We are currently investigating the source of this flow and methods to contain the seep and send the water directly to the plant Groundwater Remediation System.

Area 3 Seeps

Two seeps were first seen on September 30 and sampled on October 1. These seeps are no longer flowing. One seep, denoted NORTH, had a significant concentration of non-aqueous phase liquid (NAPL). Analytical results showed the NAPL sample to be predominately chlorobenzenes. The seep was located below the southwest wing wall of the Adams Avenue bridge. The second seep, denoted SOUTH, was aqueous and turbid. This seep contained approximately 50 ppm volatiles and 10 ppm chlorobenzenes.

A second inspection of the area under the Adams Avenue bridge was conducted on October 12. The NORTH and SOUTH seeps were no longer flowing; however, a steady flow of approximately 2 gallons per minute was flowing from under the west bay of the bridge. The location of the seep or seeps could not be determined, so a sample of the standing water in a depression under the bridge was gathered. This sample contained approximately 100 ppm volatiles and about 0.5 ppm chlorobenzenes, indicating a different source from the NAPL seep.

To identify the source of the NAPL, the soil between the southwest wing wall of the Adams Avenue bridge and the exposed bedrock at the creek bed was excavated by hand. The soil appeared to be wet with organic liquid. No NAPL seeps were observed while excavating the soil. Based on these observations it is not likely that the source of the NAPL was from behind the creek bank; however, it may be that soil became saturated from some past disposals into the creek. (Based on the predominance of chlorobenzenes, it seems likely that the NAPL originated from the Solvent Chemical outfall, located on the east bank of Gill Creek to the north of Adams Avenue.)

To remediate this area and minimize the potential to recontaminate the creek the following steps will be taken:

- Soil between the bedrock and the Adams Avenue bridge wing walls on the south side of the bridge will be excavated to the extent possible. The material will be drained in the creek bed. When the material passes the Paint Filter Liquid Test (PFLT), it will be transferred by 55 gallon drums to the roll-offs containing Area 3 sediments slated for incineration. (Complete 10/29/92.)

DNI 6035834

- A Low Density Polyethylene (LDPE) liner will be used to line the west bank of Area 3 from the Adams Avenue bridge to the southern extent of Area 3. The LDPE liner will also be placed over all the exposed bedrock in Area 3. Clay will be packed on top of the liner in the creek bed north and south of the Adams Avenue bridge.

- Concrete will be used to cover the LDPE liner under the Adams Avenue bridge. Concrete will also be used to line the west bank of Area 3 from Adams Avenue bridge to the southern extent of Area 3.

- Olin has installed three wells north of Adams Avenue. Two wells are groundwater monitoring wells. One is located adjacent to the east bank of the creek and the other is located adjacent to the west bank of the creek. The third well was installed to investigate whether NAPL may be present in the lower overburden and top-of-rock zone on the west bank of Gill Creek north of Adams Avenue, i.e., to test the hypothesis that NAPL observed as the southwest wing wall of the bridge seeped into the bank from the creek, rather than migrated from the bank into the creek. All wells were drilled 2 feet into bedrock. These wells will be monitored to evaluate the effectiveness of the remediation in Area 3 and determine whether additional work is needed to prevent seepage into the creek. (Installation complete 11/4/92.)

The seep remediation work is expected to be complete by November 10. We believe the liner and cover material will effectively mitigate all Area 3 seeps. The sources of Area 2D and Area 3 seeps continue to be investigated as described above. If you have any questions, please call me at 278-5317.

Sincerely,

A K Masse

Ann K. Masse, Ph.D.
Area Engineer, Engineering
and Environmental Affairs

AKM:klf
Attach.
21612
cc: NYSDEC - Division of Environmental Enforcement (Buffalo)*
NYSDEC - Division of Hazardous Waste Remediation (Albany)*
NYSDOH - Bureau of Environmental Exposure Investigation (Albany)*
James C. Brown - Olin

*Two copies per order on consent

REV 11-80

DU PONT

CHEMICALS

P.O. Box 787
Buffalo Ave. & 26th Street
Niagara Falls, NY 14302-0787
(716) 278-5100

bcc: DMDarragh
MLeonard - WCC
REAustin - Legal, D7016-1
DEEllis - Chem, Bellevue
JHFrey - Chem, B12224
RWPorter/JEManning
RJGentilucci/File 52150
DPSpanfelner*
MPCrowe
JFMcClincy*

*Analytical data not included

November 9, 1992

Mr. Michael J. Hinton, P.E.
NYS Dept. of Environmental Conservation
Division of Hazardous Waste Remediation
270 Michigan Avenue
Buffalo, NY 14203-2999

Dear Mr. Hinton:

GILL CREEK REMEDIATION/COBBLEBAR REMOVAL

This letter serves to confirm our telephone conversation at 11 a.m. on Friday, October 30, on the removal of the cobblebar.

Gill Creek sediments in Area 1 have been removed to bedrock from Diversion Structure No. 4 to the northern extent of the cobblebar. The cobblebar material was removed to bedrock (550 feet) at the northern extent of the cobblebar and to an elevation of 555.5 feet at the southern extent (Figure 1). The remaining material serves to prevent excessive infiltration of Niagara River water through the underlying bedrock. Clay was packed along the northern face of the remaining material to minimize infiltration (Figure 1).

To the west of the mouth of Gill Creek, the riverbank was excavated for the installation of a bulkhead, which will be part of the future 008 outfall for the Du Pont Niagara Plant (Figure 2). To the east of the mouth, the riverbank was left relatively in place because the material is uncontaminated based on the results of the Gill Creek Sediment Study (Woodward-Clyde, 1989).

The riverbank is predominantly large rock and soil. Two soil samples were collected from the riverbank east of the mouth. One sample (GCCB-1) was collected from the depth of 0 to 2 feet, and another sample (GCCB-2) was collected from the depth of 2 to 4 feet. Samples were analyzed as specified for cobblebar material in the Gill Creek Remediation Sampling and Analysis Plan (August 1992). Preliminary results are attached.

PCBs were detected at 28 ppm in the upper sample and 15 ppm in the lower sample. The east riverbank was removed to the extent practical. The area excavated was reviewed by the DEC in the field on November 6. The DEC considered the extent of excavation acceptable. Based on these actions we do not believe that the remaining material poses a significant risk to human health or the environment.

If you have any questions, please feel free to call me at (716) 278-5317.

Sincerely,

A K Masse

Ann K. Masse, Ph.D.
Area Engineer, Engineering
and Environmental Affairs

AKM:klf
Attach.
21614

cc: NYSDEC - Division of Environmental Enforcement (Buffalo)*
NYSDEC - Division of Hazardous Waste Remediation (Albany)*
NYSDOH - Bureau of Environmental Exposure Investigation (Albany)*
James C. Brown - Olin

* Two copies per order on consent

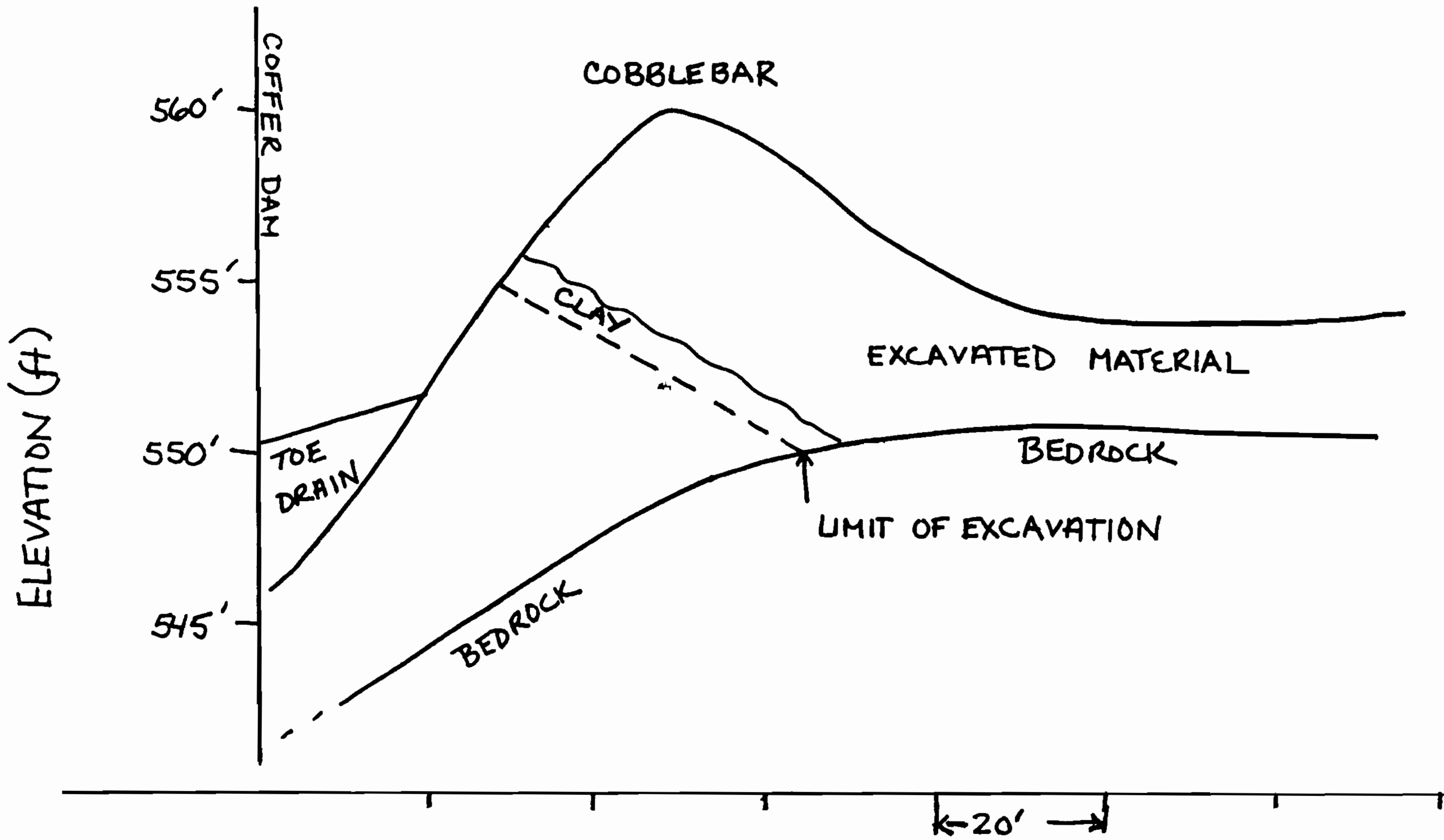


fig. 1 – Gill Creek Area 1 cross-section

DNI 6035817

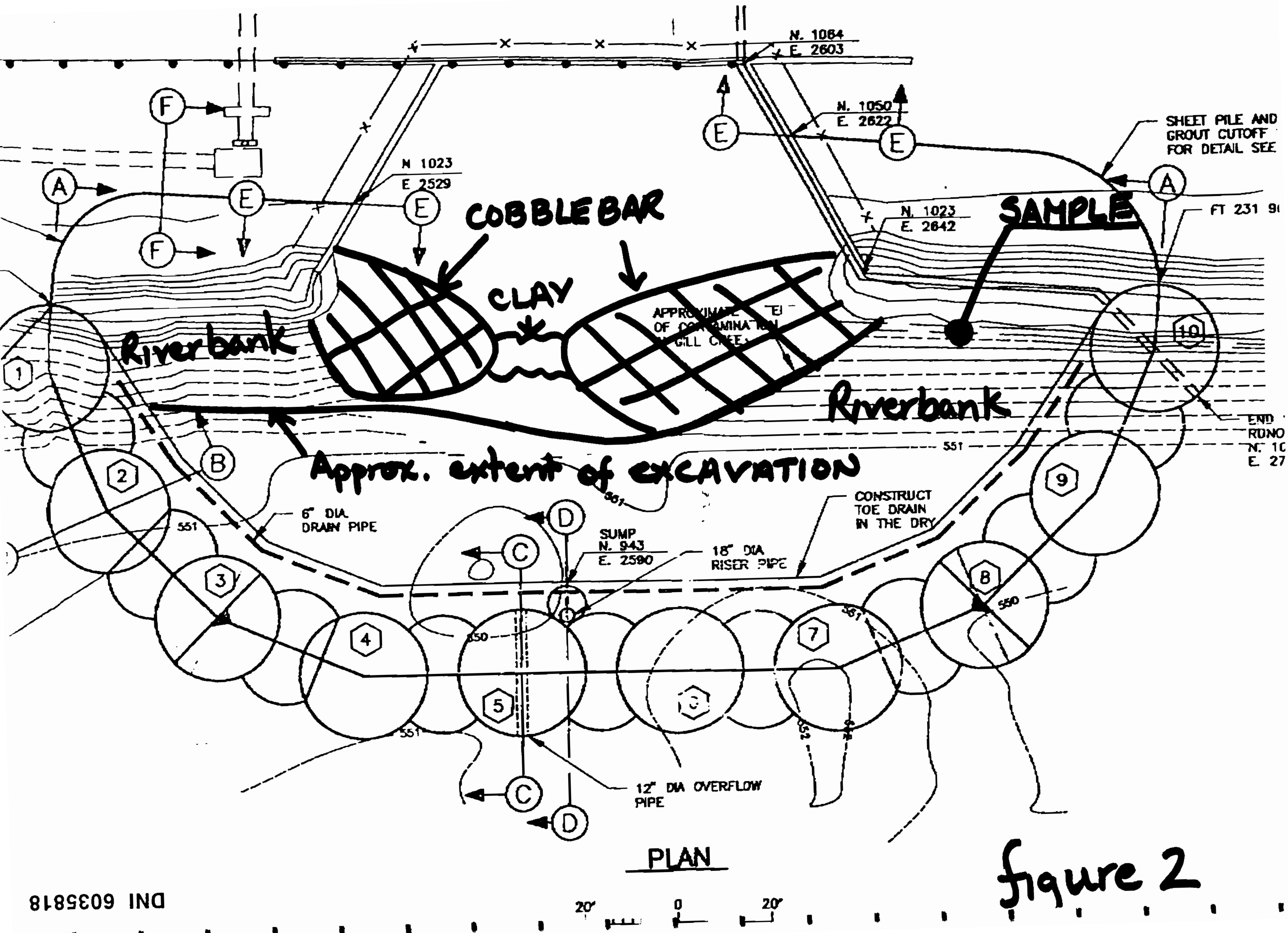


figure 2

DNI 6035818

E I DUPONT DE NEMOURS

METHOD 8240 - VOLATILE ORGANICS

Laboratory:	Recra Environmental, Inc. - RECNY	Matrix:	Sediment
Lab Job No:	A92-3321	Dilution Factor:	5
Lab Sample ID:	AS020153	Sample Date:	10/23/92
Client Sample ID:	GCCB-1	Analysis Date:	10/26/92
	UPPER SAMPLE		

Parameter Units = UG/KG	Result	Q
Tetrachloroethene	270	
Trichloroethene	88	

DNI 6035820

E I DUPONT DE NEMOURS

METHOD 8240 - VOLATILE ORGANICS

Laboratory: Recra Environmental, Inc. - RECNY
Lab Job No: A92-3321
Lab Sample ID: AS020153MD
Client Sample ID: GCCB-1 F. DUPLICATE
UPPER SAMPLE

Matrix: Sediment
Dilution Factor: 5
Sample Date: 10/23/92
Analysis Date: 10/26/92

Parameter Units = UG/KG	Result	Q
Tetrachloroethene	270	
Trichloroethene	100	

DNI 6035821

E I DUPONT DE NEMOURS

METHOD 8240 - VOLATILE ORGANICS

Laboratory: Recra Environmental, Inc. - RECNY
Lab Job No: A92-3321
Lab Sample ID: AS020154
Client Sample ID: GCCB-2
LOWER SAMPLE

Matrix: Sediment
Dilution Factor: 5
Sample Date: 10/23/92
Analysis Date: 10/26/92

Parameter Units = UG/KG	Result	Q
Tetrachloroethene	240	
Trichloroethene	87	

DNI 6035822

E I DUPONT DE NEMOURS

METHOD 8080 - POLYCHLORINATED BIPHENYLS

Laboratory:	Recra Environmental, Inc. - RECNY	Matrix:	Sediment
Lab Job No:	A92-3321	Dilution Factor:	100
Lab Sample ID:	AS020153	Sample Date:	10/23/92
Client Sample ID:	GCCB-1	Analysis Date:	10/30/92
	UPPER SAMPLE	Extraction Date:	10/28/92

Parameter Units = UG/KG	Result	Q
Aroclor 1016	4800	U
Aroclor 1221	9600	U
Aroclor 1232	4800	U
Aroclor 1242	4800	U
Aroclor 1248	28000	
Aroclor 1254	4800	U
Aroclor 1260	4800	U

E I DUPONT DE NEMOURS

METHOD 8080 - POLYCHLORINATED BIPHENYLS

Laboratory: Recra Environmental, Inc. - RECNY
Lab Job No: A92-3321
Lab Sample ID: AS020153MD
Client Sample ID: GCCB-1 F. DUPLICATE
UPPER SAMPLE

Matrix: Sediment
Dilution Factor: 100
Sample Date: 10/23/92
Analysis Date: 10/30/92
Extraction Date: 10/28/92

Parameter Units = UG/KG	Result	Q
Aroclor 1016	4500	U
Aroclor 1221	8900	U
Aroclor 1232	4500	U
Aroclor 1242	4500	U
Aroclor 1248	7400	
Aroclor 1254	4500	U
Aroclor 1260	4500	U

E I DUPONT DE NEMOURS

METHOD 8080 - POLYCHLORINATED BIPHENYLS

Laboratory: Recra Environmental, Inc. - RECNY
Lab Job No: A92-3321
Lab Sample ID: AS020154
Client Sample ID: GCCB-2
LOWER SAMPLE

Matrix: Sediment
Dilution Factor: 100
Sample Date: 10/23/92
Analysis Date: 10/29/92
Extraction Date: 10/28/92

Parameter Units = UG/KG	Result	Q
Aroclor 1016	4300	U
Aroclor 1221	8600	U
Aroclor 1232	4300	U
Aroclor 1242	4300	U
Aroclor 1248	15000	
Aroclor 1254	4300	U
Aroclor 1260	4300	U

DNI 6035825

E I DUPONT DE NEMOURS

METHOD 8080 - GAMMA-BHC

Laboratory: Recra Environmental, Inc. - RECNY
Lab Job No: A92-3321
Lab Sample ID: AS020153
Client Sample ID: GCCB-1
UPPER SAMPLE

Matrix: Sediment
Dilution Factor: 100
Sample Date: 10/23/92
Analysis Date: 10/30/92
Extraction Date: 10/28/92
% Dry Weight: 83.60

Parameter Units = UG/KG	Result	Q
gamma-BHC (Lindane)	240	U

DNI 6035826

E I DUPONT DE NEMOURS

METHOD 8080 - GAMMA-BHC

Laboratory: Recra Environmental, Inc. - RECNY
Lab Job No: A92-3321
Lab Sample ID: AS020153MD
Client Sample ID: GCCB-1 F. DUPLICATE
UPPERSAMPLE

Matrix: Sediment
Dilution Factor: 100
Sample Date: 10/23/92
Analysis Date: 10/30/92
Extraction Date: 10/28/92
% Dry Weight: 89.50

Parameter Units = UG/KG	Result	Q
gamma-BHC (Lindane)	210	U

DNI 6035827

E I DUPONT DE NEMOURS

METHOD 8080 - GAMMA-BHC

Laboratory:	Recra Environmental, Inc. - RECNY	Matrix:	Sediment
Lab Job No:	A92-3321	Dilution Factor:	100
Lab Sample ID:	AS020154	Sample Date:	10/23/92
Client Sample ID:	GCCB-2	Analysis Date:	10/29/92
	LOWER SAMPLE	Extraction Date:	10/28/92
		% Dry Weight:	92.80

Parameter Units = UG/KG	Result	Q
gamma-BHC (Lindane)	190	U

DNI 6035828

E I DUPONT DE NEMOURS

METHOD 8080 ____ GAMMA-BHC

Laboratory:	Recra Environmental, Inc. - RECNY	Matrix:	Sediment
Lab Job No:	A92-3321	Dilution Factor:	1
Lab Sample ID:	AS020153	Sample Date:	10/23/92
Client Sample ID:	GCCB-1	Analysis Date:	10/31/92
	UPPER SAMPLE	Extraction Date:	10/30/92

Parameter Units = MG/L	Result	Q
gamma-BHC (Lindane)	0.0010	U

DNI 6035829

E I DUPONT DE NEMOURS

METHOD 8080 GAMMA-BHC

Laboratory: Recra Environmental, Inc. - RECNY
Lab Job No: A92-3321
Lab Sample ID: AS020153MD
Client Sample ID: GCCB-1 F. DUPLICATE
UPPER SAMPLE

Matrix: Sediment
Dilution Factor: 1
Sample Date: 10/23/92
Analysis Date: 10/31/92
Extraction Date: 10/30/92

Parameter Units = MG/L	Result	Q
gamma-BHC (Lindane)	0.0010	U

DNI 6035830

E I DUPONT DE NEMOURS

METHOD 8080 GAMMA-BHC

Laboratory: Recra Environmental, Inc. - RECNY
Lab Job No: A92-3321
Lab Sample ID: AS020154
Client Sample ID: GCCB-2
LOWER SAMPLE

Matrix: Sediment
Dilution Factor: 1
Sample Date: 10/23/92
Analysis Date: 10/31/92
Extraction Date: 10/30/92

Parameter Units = MG/L	Result	Q
gamma-BHC (Lindane)	0.0010	U

DNI 6035831

E I DUPONT DE NEMOURS

TOTAL MERCURY

Laboratory: Recra Environmental, Inc. - RECNY

Lab Job No: A92-3321

Units: MG/KG

Client Sample ID	Lab Sample ID	Method	Matrix	Sample Date	Digestion Date	Analysis Date	Result	Q
GCCB-1 UPPER	AS020153	7471	Sediment	10/23/92	10/28/92	10/28/92	0.28	
GCCB-1 F. DUPLICATE	AS020153MD	7471	Sediment	10/23/92	10/28/92	10/28/92	0.45	
GCCB-2 LOWER	AS020154	7471	Sediment	10/23/92	10/28/92	10/28/92	0.47	

RJG / File 52150 →

City of Niagara Falls, New York

Environmental Services

November 9, 1992

Ms. Anne Masse, Ph.D.
Area Engineer
Engineering and Environmental Affairs
Dupont Chemicals
PO Box 787
Buffalo Avenue & 26th Street
Niagara Falls NY 14302-0787

Dear Ms. Masse;

Enclosed please find the authorized Floodplain Development Permit Application and Certificate of Compliance.

Please feel free to contact my office with any questions.

Sincerely,

Frank J Schieppati

Frank Schieppati, Ph.D.
Director, Environmental Services

Anne Masse

1x MPC (?) 03 RJ6 / 52150

KW: Floodplain city diversion structures

RECEIVED
JUL 23 1992
DEPARTMENT OF ENVIRONMENTAL SERVICES

APPLICATION # ___
PAGE 1 of 3

FLOODPLAIN DEVELOPMENT PERMIT APPLICATION

This form is to be filled out in duplicate.

SECTION 1: GENERAL PROVISIONS (APPLICANT to read and sign):

1. No work may start until a permit is issued.
2. The permit may be revoked if any false statements are made herein.
3. If revoked, all work must cease until permit is re-issued.
4. Development shall not be used or occupied until a Certificate of Compliance is issued.
5. The permit will expire if no work is commenced within six months of issuance.
6. Applicant is hereby informed that other permits may be required to fulfill local, state and federal regulatory requirements.
7. Applicant hereby gives consent to the Local Administrator or his/her representative to make reasonable inspections required to verify compliance.
8. I, THE APPLICANT, CERTIFY THAT ALL STATEMENTS HEREIN AND IN ATTACHMENTS TO THIS APPLICATION ARE, TO THE BEST OF MY KNOWLEDGE, TRUE AND ACCURATE.

(APPLICANT'S SIGNATURE) J.C. Brown L.A. Warner DATE 7/16/92
J.C. BROWN OLIN CORP. L.A. WARNER DUPONT

SECTION 2: PROPOSED DEVELOPMENT (To be completed by APPLICANT) (Information provided on attached sheet.)

	NAME	ADDRESS	TELEPHONE
APPLICANT	E.I. du Pont de Nemours and Co., Inc. and Olin Corporation		
BUILDER	Sevenson Environmental Services, Inc.		
ENGINEER	Woodward-Clyde Consultants		

PROJECT LOCATION:

To avoid delay in processing the application, please provide enough information to easily identify the project location. Provide the street address, lot number or legal description (attach) and, outside urban areas, the distance to the nearest intersecting road or well-known landmark. A sketch attached to this application showing the project location would be helpful.

Refer to Attachments A and B.

DESCRIPTION OF WORK (Check all applicable boxes):

A. STRUCTURAL DEVELOPMENT

ACTIVITY	STRUCTURE TYPE	
☒ New Structure (temp.)	☐ Residential (1-4 Family)	☒ Temporary diversion structures and cofferdam
☐ Addition	☐ Residential (More than 4 Family)	
☐ Alteration	☐ Non-residential (Floodproofing? ☐ Yes)	
☐ Relocation	☐ Combined Use (Residential & Commercial)	
☐ Demolition	☐ Manufactured (Mobile) Home (In Manufactured Home Park? ☐ Yes)	
☐ Replacement		

ESTIMATED COST OF PROJECT $ 15 million (cost includes entire remediation project, including disposal of sediments)

CO-APPLICANTS:

E.I. du Pont de Nemours and Company, Inc. (Du Pont)
26th Street and Buffalo Avenue
P.O. Box 787
Niagara Falls, NY 14302

Contact: Leslie A. Warner, Senior Engineer, 716-278-5452

Olin Corporation
Lower River Road
P.O. Box 248
Charleston, TN 37310

Contact: James C. Brown, Manager, Environmental Technology, 615-336-4308

BUILDER:

Sevenson Environmental Services, Inc.
2749 Lockport Road
Niagara Falls, NY 14302

Contact: Frank A. Francassi, General Superintendent, 716-284-0431

ENGINEER:

Woodward-Clyde Consultants
Stanford Place 3, Suite 1000
4582 South Ulster Street
Denver, CO 80237

Contact: Max Vermersch, Project Manager, 303-740-3852

B. OTHER DEVELOPMENT ACTIVITIES:

☒ Fill ☐ Mining ☐ Drilling ☐ Grading
☒ Excavation (Except for Structural Development Checked Above)
☐ Watercourse Alteration (Including Dredging and Channel Modifications)
☐ Drainage Improvements (Including Culvert Work)
☐ Road, Street or Bridge Construction
☐ Subdivision (New or Expansion)
☐ Individual Water or Sewer System
☒ Other (Please Specify) construction of temporary diversion structures and excavation of contaminated sediments in Gill Creek

After completing SECTION 2, APPLICANT should submit form to Local Administrator for review.

SECTION 3: FLOODPLAIN DETERMINATION (To be completed by LOCAL ADMINISTRATOR)

The proposed development is located on FIRM Panel No. 28, Dated March 16, 1983.

The Proposed Development:

☐ Is NOT located in a Special Flood Hazard Area (Notify the applicant that the application review is complete and NO FLOODPLAIN DEVELOPMENT PERMIT IS REQUIRED).

☒ Is located in a Special Flood Hazard Area.
FIRM zone designation is A5.
100-Year flood elevation at the site is: 569.6 Ft. NGVD (MSL)
☐ Unavailable

☐ The proposed development is located in a floodway.
FBFM Panel No.________ Dated________

☐ See Section 4 for additional instructions.

JP X SIGNED Joseph Pahillo Jr. DATE 11-9-92

SECTION 4: ADDITIONAL INFORMATION REQUIRED (To be completed by LOCAL ADMINISTRATOR)

The applicant must submit the documents checked below before the application can be processed:

☒ A site plan showing the location of all existing structures, water bodies, adjacent roads, lot dimensions and proposed development.

☒ Development plans, drawn to scale, and specifications, including where applicable: details for anchoring structures, proposed elevation of lowest floor (including basement), types of water resistant materials used below the first floor, details of floodproofing of utilities located below the first floor and details of enclosures below the first floor.
Also,________

☐ Subdivision or other development plans (If the subdivision or other development exceeds 50 lots or 5 acres, whichever is the lesser, the applicant must provide 100-year flood elevations if they are not otherwise available).

☒ Plans showing the extent of watercourse relocation and/or landform alterations.

☒ Top of new fill elevation ________ Ft. NGVD (MSL).

☐ Floodproofing protection level (non-residential only) ________ Ft. NGVD (MSL). For floodproofed structures, applicant must attach certification from registered engineer or architect.

☐ Certification from a registered engineer that the proposed activity in a regulatory floodway will not result in any increase in the height of the 100-year flood. A copy of all data and calculations supporting this finding must also be submitted.

☐ Other:________

SECTION 5: PERMIT DETERMINATION (To be completed by LOCAL ADMINISTRATOR)

I have determined that the proposed activity: A. ☒ Is
B. ☐ Is not
in conformance with provisions of Local Law # 141, 19__. The permit is issued subject to the conditions attached to and made part of this permit.

SIGNED Joseph Palillo Jr., DATE 8-6-92

If BOX A is checked, the Local Administrator may issue a Development Permit upon payment of designated fee.
If BOX B is checked, the Local Administrator will provide a written summary of deficiencies. Applicant may revise and resubmit an application to the Local Administrator or may request a hearing from the Board of Appeals.

APPEALS: Appealed to Board of Appeals? ☐ Yes ☐ No
Hearing date:____________
Appeals Board Decision --- Approved? ☐ Yes ☐ No

Conditions____________

SECTION 6: AS-BUILT ELEVATIONS (To be submitted by APPLICANT before Certificate of Compliance is issued) ATTACHED 10/21/92 LETTER FROM ANN MASSE

The following information must be provided for project structures. This section must be completed by a registered professional engineer or a licensed land surveyor (or attach a certification to this application). Complete 1 or 2 below.

1. Actual (As-Built) Elevation of the top of the lowest floor, including basement (in Coastal High Hazard Areas, bottom of lowest structural member of the lowest floor, excluding piling and columns) is: ________FT. NGVD (MSL).

2. Actual (As-Built) Elevation of floodproofing protection is ________ FT. NGVD (MSL).

NOTE: Any work performed prior to submittal of the above information is at the risk of the Applicant.

SECTION 7: COMPLIANCE ACTION (To be completed by LOCAL ADMINISTRATOR)

The LOCAL ADMINISTRATOR will complete this section as applicable based on inspection of the project to ensure compliance with the community's local law for flood damage prevention.

INSPECTIONS: DATE 10/29/92 BY [signature] DEFICIENCIES? ☐ YES ☒ NO
DATE________BY________DEFICIENCIES? ☐ YES ☐ NO
DATE________BY________DEFICIENCIES? ☐ YES ☐ NO

SECTION 8: CERTIFICATE OF COMPLIANCE (To be completed by LOCAL ADMINISTRATOR)

JP Certificate of Compliance issued: DATE: 11-9-92 BY: Joseph Palillo, Jr.

REV. 11/90

DU PONT

CHEMICALS

P.O. Box 787
Buffalo Ave. & 26th Street
Niagara Falls, NY 14302-0787
(716) 278-5100

DEPARTMENT OF ENVIRONMENTAL SERVICES

October 21, 1992

Mr. Frank Schieppati, Ph.D.
Environmental Services Director
City of Niagara Falls
745 Main Street
Niagara Falls, NY 14302

Dear Dr. Schieppati:

DU PONT/OLIN GILL CREEK REMEDIATION PROJECT
FLOODPLAIN MANAGEMENT PERMIT

This letter serves to document your October 16, 1992, telephone conversation with M. Crowe regarding "as-built" elevations of diversion structures within the Gill Creek project area. The as-built elevations are as follows (see Figure 1 for location of diversion structures):

	Diversion Structure	As-Built Elevations (feet)
1	North of Buffalo Avenue	562.8
3	South of Adams Avenue	562.9
3A	North of Adams Avenue	562.7
4	South of Staub Road	562.9
2	Cofferdam at mouth	
	Cell No. 2	564.9
	Cell No. 4	563.1
	Cell No. 6	563.0
	Cell No. 9	565.1
	Gravel Bag Crest	564.9

Please note that one layer of sandbags was added to Diversion Structure No. 1 during a rain event in September; these sandbags have since been removed.

If you plan to send an inspector to the project site, please contact Marit Crowe at 278-5420. Thank you for your assistance in this matter.

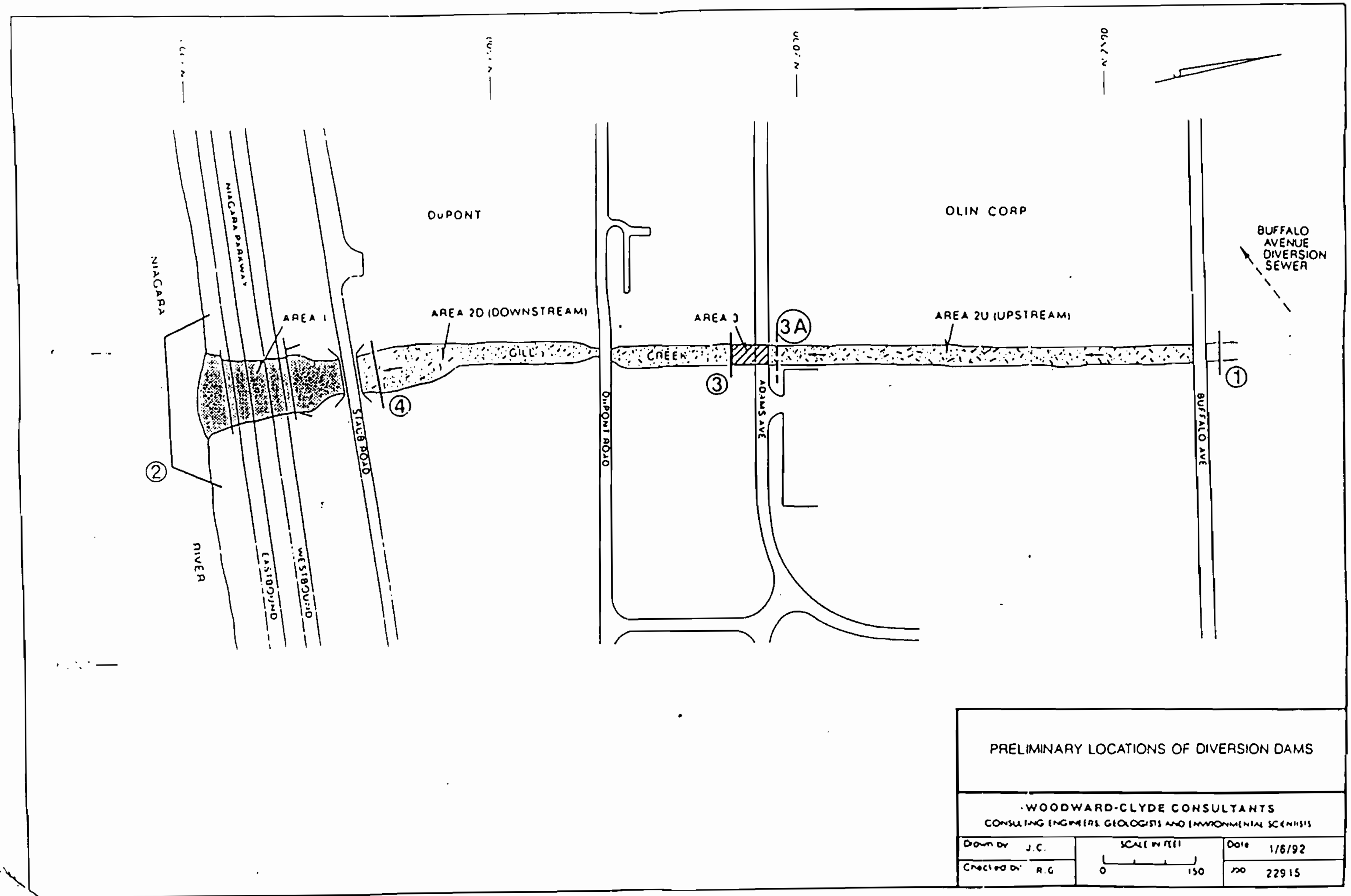
Sincerely,

Ann K. Masse, Ph.D.
Area Engineer, Engineering
and Environmental Affairs

AKM/MPC:klf
Attach.
21345

Better Things for Better Living

Figure 1: Locations of Diversion Structures



Attachment B

SAMPLE
CERTIFICATE OF COMPLIANCE

for Development in a Special Flood Hazard Area

CERTIFICATE OF COMPLIANCE
(Owner Must Retain This Certificate)

Premises located at: Gill Creek

Permit No. N/A
Permit Date N/A

Owner:
Address:

Check One:
__New Building
__Existing Building
__Vacant Land
✓ Other

The Local Administrator is to complete a. or b. below:

a. Compliance is hereby certified with the requirements of Local Law # 1191, ~~19__~~.
Signed: Joseph Palillo Jr. Dated: 8-6-92

b. Compliance is hereby certified with the requirements of Local Law #_____, 19__,
as modified by variance #_________, dated_____________.
Signed:__________________________ Dated:________________

REV 11/90

DU PONT

CHEMICALS

P.O. Box 787
Buffalo Ave. & 26th Street
Niagara Falls, NY 14302-0787
(716) 278-5100

bcc: DMDarragh
MLeonard - WCC
REAustin - Legal, D7016-1
DEEllis - Chem, Bellevue
JHFrey - Chem, B12224
RWPorter/JEManning
RJGentilucci/File 52150
DPSpanfelner
MPCrowe

kw: monthly report

November 10, 1992

Mr. Michael J. Hinton, P.E.
NYS Dept. of Environmental Conservation*
Division of Hazardous Waste Remediation
270 Michigan Avenue
Buffalo, NY 14203-2999

Dear Mr. Hinton:

MONTHLY PROGRESS REPORT - OCTOBER 1992
DU PONT/OLIN GILL CREEK REMEDIATION PROJECT

In accordance with the conditions of the Order on Consent for this project, Du Pont and Olin are submitting the October monthly progress report for the Gill Creek remediation project.

The following key construction activities occurred in October and early November since the previous progress report was submitted on October 12, 1992:

- Removal of sediments from Areas 1, 2D, and 3 is complete. The cobblebar and the clay plug at the mouth of Gill Creek have been removed. The riverbank to the east and west of the mouth of Gill Creek has been excavated.

- Twenty-two roll-off containers were filled with material from Area 3. Four of these containers have been determined to contain gamma-BHC at concentrations above the 0.4 mg/L EPTox gamma-BHC regulatory level.

- With the exception of the four roll-off containers above, all sediments from Areas 1, 2D, and 3 have been transported off-site to be landfilled.

- Restoration of the creek bed in Areas 1, 2D, and 3 is complete.

- The water treatment plant was shut down on November 7, and decontamination of the plant and the sediment staging pad has begun.

Variations in Construction Activities

On the morning of November 2, Diversion Structures 1 and 3A were overtopped. A few hours later, Diversion Structure 3 was overtopped. At the time of the overtoppping event, all areas had been remediated. Restoration was 90 percent complete in Areas 1 and 2D and had been started in Area 3. The flood water contained between the diversion structures was pumped directly to the Niagara River. Turbidity measurements were taken. Turbidity did not exceed 17 NTUs and averaged around 8 NTUs. Rainfall data for the event will be presented in the November monthly report.

Management of Sediments

Area 3 - Paint Filter testing was conducted on sediments prior to placement in roll-off containers. Approximately 240 cubic yards of material were removed and placed in 22 roll-off containers. EPTox gamma-BHC testing has been completed and the material is being managed as follows:

Amount	Characterization	Disposal Method
180 yds^3	NF-225	Landfill
50 yds^3	NF-225A	Incineration

An application to incinerate the NF-225A material has been submitted to Westinghouse Environmental Systems and Services. In the interim, the four roll-off containers are being stored at Olin in accordance with RCRA and TSCA requirements.

Areas 1 and 2D - A total of 6,900 cubic yards of material was removed from the creek and placed on the sediment staging pad to drain. Approximately 240 cubic yards of this material were from Area 2D. Paint filter testing was conducted, and the material was sent off-site as NF-225 to be landfilled.

Cobblebar - Approximately 600 cubic yards of cobblebar and west riverbank material were removed at the mouth of Gill Creek. The cobblebar and west riverbank material was drained on the sediment staging pad. Paint filter testing was conducted, and the material has been shipped off-site as NF-225 to be landfilled.

The riverbank material to the east of the mouth of Gill Creek was sampled. Based on the results of these samples, approximately 150 cubic yards of this material were removed and characterized as NF-108C. Additional information on the cobblebar removal is provided in a separate letter dated November 9, 1992.

Creek Bed Restoration

Area 1 - The exposed bedrock of the creek bed and walls of the Robert Moses Parkway bridge have been scraped and powerwashed. Approximately 4,000 tons of stone have been placed over the creek bed. The banks of the creek have been packed with clay and covered with gravel.

Area 2D - Two to six inches of clay has been compacted along the bed and banks of the creek in Area 2D. A layer of gravel has been placed along the banks.

Area 3 - Restoration began November 5 and was completed November 6. The details of the Area 3 restoration are provided in a letter dated November 5, 1992.

Water Treatment System Operation

The hydrocyclone, filter screen, and roll-off being used as a central collection point in the creek bed (Area 2D) were removed October 30, 1992, due to observed reductions in solids loading to the treatment system.

Two compounds, methylene chloride and tetrachloroethylene, exceeded the estimated emission levels for the 54-inch and 84-inch diameter air strippers during the month of October 1992. All exceedences were the result of greater-than-estimated influent concentrations. In all cases, New York State Short-term Guideline Concentrations (SGC's) for these constituents were not exceeded. The exceedences are summarized in Attachment A.

Attachment B contains a general construction schedule and approximate task completion information. This schedule will be updated monthly. If you should have any questions, please contact me at (716) 278-5317.

Sincerely,

A K Masse

Ann K. Masse, Ph.D.
Area Engineer, Engineering
and Environmental Affairs

AKM:klf
Attach.
21701
cc: NYSDEC - Division of Environmental Enforcement (Buffalo)*
NYSDEC - Division of Hazardous Waste Remediation (Albany)*
NYSDOH - Bureau of Env. Exposure Investigation (Albany)*
James C. Brown - Olin

* Two copies per order on consent

ATTACHMENT A

GILL CREEK REMEDIATION WATER TREATMENT SYSTEM
AIR EMISSIONS SUMMARY

OCTOBER 1992

Constituent/Date	Actual Influent Conc. (ppb)	Actual Emission (lbs/hr)	Estimated Emission (lbs/hr)
10/5/92			
Methylene Chloride*	8600	0.4601	0.3290
10/12/92			
Tetrachloroethylene*	32000	2.7800	1.7970
10/17/92			
Tetrachloroethylene	21000	2.5749	1.7970
10/19/92			
Methylene Chloride	11000	1.3182	0.6550
Tetrachloroethylene	15000	1.7981	1.7970
10/21/92			
Methylene Chloride	4900	0.6637	0.6550
10/23/92			
Tetrachloroethylene	39000	3.4402	1.7970
10/26/92			
Tetrachloroethylene	25000	2.9091	1.7970
10/30/92			
Tetrachloroethylene	16000	1.8652	1.7970

*Estimated influent concentrations for Methylene Chloride and Tetrachloroethylene were 2,649 ppb and 7,205 ppb, respectively.

21701

DNI 6035813

REV 11/90

DU PONT

CHEMICALS

P.O. Box 787
Buffalo Ave. & 26th Street
Niagara Falls, NY 14302-0787
(716) 278-5100

bcc: DMDarragh
MLeonard - WCC
REAustin - Legal, D7016-1
DEEllis - Chem, Bellevue
JHFrey - Chem, B12224
RWPorter/JEManning
RJGentilucci/File 52150
DPSpanfelner
MPCrowe

kw: seeps, Area 2D, Area 3

November 13, 1992

Mr. Michael J. Hinton, P.E.
NYS Dept. of Environmental Conservation*
Division of Hazardous Waste Remediation
270 Michigan Avenue
Buffalo, NY 14203-2999

Dear Mr. Hinton:

AREA 2D SEEPS
DU PONT/OLIN GILL CREEK REMEDIATION PROJECT

This letter serves to confirm our conversation on Friday, November 6, and document a deviation from the approved plans and specifications. A seep has been observed in Area 2D in the center of the creek south of Du Pont Road. This seep was discussed in the November 3, 1992, letter on seeps in Areas 2D and 3. The seep was contained by placing an open-ended barrel around it. The water level in the barrel rose to a level approximately one foot above the creek bed. This appeared to control the seep for some time.

Recently, seepage was observed around the outside edges of the barrel. Du Pont proposed to remove the barrel, cover the creekbed around the seep with a 40 mil low density polyethylene liner, and cover the liner with a layer of gravel to hold the liner in place. The purpose of the liner is to provide additional protection against seepage of groundwater into the dewatered creekbed. It is believed that once the water is restored to the creek, the hydrostatic pressure of the water in the creek will prevent the groundwater from seeping through both the clay barrier and the liner. The DEC agreed with the proposed mitigation plan.

The liner and gravel were installed on November 7. The liner was placed across the creek width (25 feet) and from 15 feet upstream of the seep area to 45 feet below. The approximate total area covered was 1,500 square feet. The location of the lined area is sketched in the attached figure.

DNI 6035803

ATTACHMENT B

CONSTRUCTION PROGRESS REPORT
OCTOBER 1992

CONSTRUCTION ELEMENT	EXPECTED START DATE	APPROX. % COMPLETE TO DATE (8/31)	EXPECTED COMPLETION DATE
CONSTRUCT STAGING AREAS	6/22	100	9/11
CONSTRUCT WATER TREATMENT SYSTEM	7/13	100	8/28
CONSTRUCT CELLULAR COFFERDAM	7/14	100	9/15
BUFFALO AVE DIVERSION SEWER INSTALL MONITORING SYSTEM	7/15	100	8/11
OUTFALL RELOCATION			
INSTALL PHASE II	7/22	100	7/31
DIVERT FLOW	8/7	100	8/7
CONSTRUCT DIVERSION NO. 1	8/19	100	8/28
CONSTRUCT DIVERSION NO. 3	9/4	100	9/10
CONSTRUCT DIVERSION NO. 3A	9/4	100	9/10
START-UP WATER TREATMENT SYSTEM	8/24	100	9/10
CREEK UNWATERING	9/31	100	9/15
OPERATE WATER TREATMENT SYSTEM	9/11	100	11/13
CONSTRUCT DIVERSION NO. 4	9/10	100	9/19
SEDIMENT REMOVAL			
AREA 3	9/8	100	9/15
AREA 2D	9/15	100	9/28
AREA 1	9/28	100	10/22
TRANSPORT SEDIMENT WASTE TO OFF-SITE LANDFILL	9/8	100	11/20
REMOVE DIVERSION NO. 3, 3A	11/7	90	11/10
REMOVE DIVERSION NO. 4	11/7	90	11/10
REMOVE CELLUAR COFFERDAM	11/16	--	12/1*
REMOVE DIVERSION NO. 1	11/7	--	11/10
REMOVE TEMPORARY OUTFALL (PHASE II)	11/19	--	11/21

*This completion date is tentative and meets the conditional schedule of the NYPA permit. We will be reviewing the estimated project completion date frequently and assessing options to meet this deadline.

We believe the clay and the liner in Area 2D will effectively mitigate the seep in the creekbed of Area 2D. If you have any questions, please call me at 278-5317.

Sincerely,

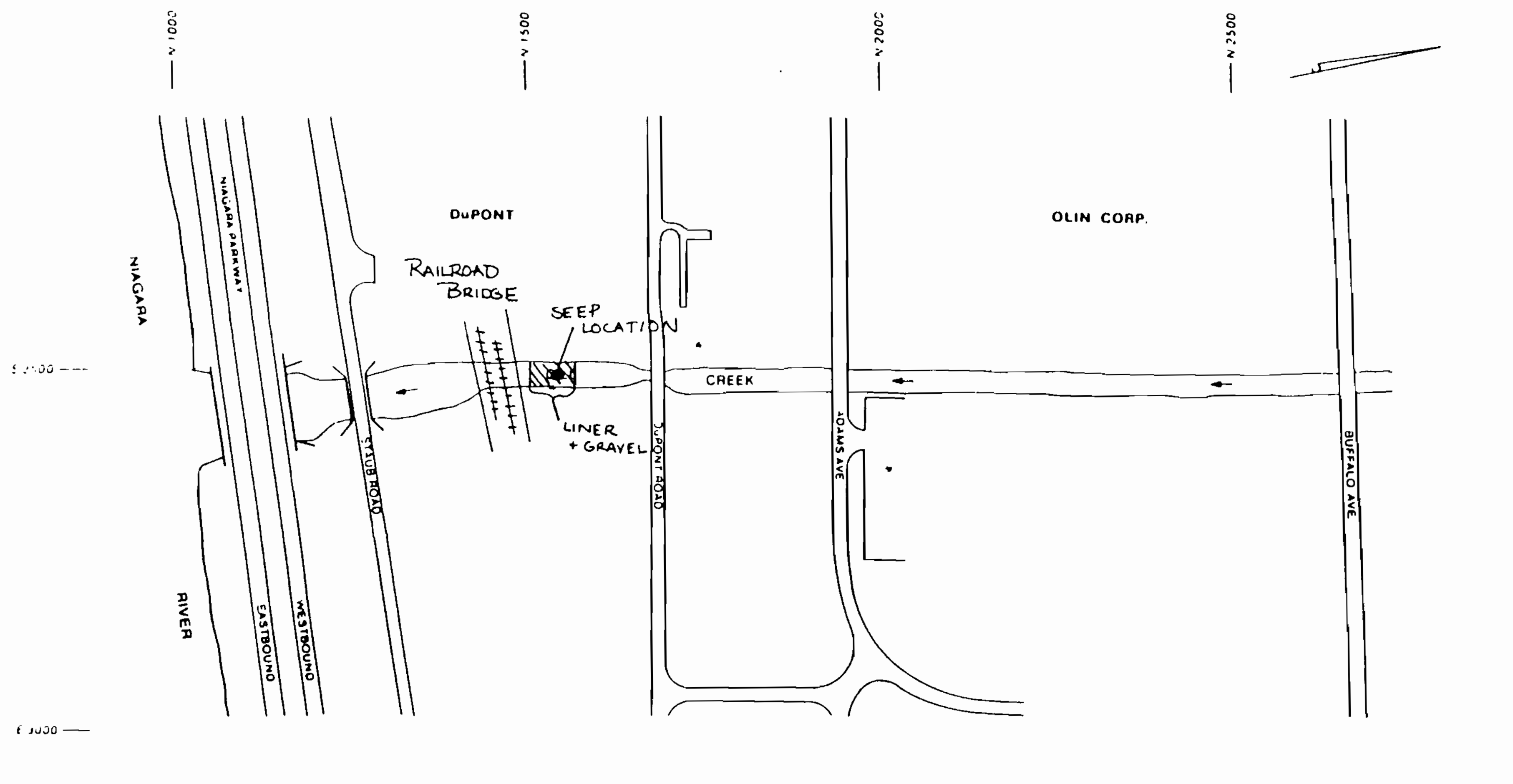
A K Masse

Ann K. Masse, Ph.D.
Area Engineer, Engineering
and Environmental Affairs

AKM:klf
Attach.
21752

cc: NYSDEC - Division of Environmental Enforcement (Buffalo)*
NYSDEC - Division of Hazardous Waste Remediation (Albany)*
NYSDOH - Bureau of Environmental Exposure Investigation (Albany)*
James C. Brown - Olin

* Two copies per order on consent



LOCATION PLAN
GILL CREEK STUDY
NIAGARA FALLS, NEW YORK

WOODWARD-CLYDE CONSULTANTS
CONSULTING ENGINEERS GEOLOGISTS AND ENVIRONMENTAL SCIENTISTS

Drawn by	SCALE IN FEET	Date
Checked by	0 150	Job 88P2056

FIGURE 1-1

DNI 6035805

OxyChem
Special Environmental Programs

MEMO

RECEIVED
DEC 7 1992
D. L. CUMMINGS

FILE COPY

To: ~~D.L. Cummings~~

Date: December 2, 1992

From: A. F. Weston

Subject: **102nd Street Fill Placement Cell, Fill Material from the Gill Creek Project.**

cc: R. Ganguly, A.L. Young, M.B. Wasser, J.A. Mack, J. Kay, D. Kiesling, R Horn, K. Rubin

Occidental has accepted 4,000 cu. yds. of fill material from the Olin/DuPont Gill Creek project at its 102nd Street Landfill, Fill Placement Cell. Occidental accepted the material based on our November 20 agreement that Olin would accept the same quantity of fill material from Occidental for placement at the Olin 102nd Street Landfill site, at a future date.

Alan F Weston

Alan F. Weston, Ph.D.
Manager, Analytical Services
Special Environmental Programs

AFW21:rn

cc. to JCB
JWH
CWN
RDM
R Horn

REV. 11/90

DU PONT

CHEMICALS

P.O. Box 787
Buffalo Ave. & 26th Street
Niagara Falls, NY 14302-0787
(716) 278-5100

bcc: DMDarragh
MLeonard - WCC
REAustin - Legal, D7016-1
DEEllis - Chem, Bellevue
JHFrey - Chem, B12224
RWPorter/JEManning
RJGentilucci/File 52150
DPSpanfelner
MPCrowe

kw: monthly report

December 14, 1992

Mr. Michael J. Hinton, P.E.
NYS Dept. of Environmental Conservation*
Division of Hazardous Waste Remediation
270 Michigan Avenue
Buffalo, NY 14203-2999

Dear Mr. Hinton:

MONTHLY PROGRESS REPORT - NOVEMBER 1992
DU PONT/OLIN GILL CREEK REMEDIATION PROJECT

In accordance with the conditions of the Order on Consent for this project, Du Pont and Olin are submitting the November monthly progress report for the Gill Creek remediation project.

The following key construction activities occurred in November and early December since the previous progress report was submitted on November 10, 1992:

- Four containers of materials from Area 3 determined to contain gamma-BHC at concentrations above the 0.4 mg/L EPTox gamma-BHC regulatory level are currently being stored at the Olin facility in compliance with the requirements of TSCA and RCRA. An application to incinerate this material has been submitted to Westinghouse Environmental Systems and Services.

- Decommissioning of the water treatment plant began November 9. Decontamination of the treatment plant, the water treatment plant pad, and the sediment staging pad was complete the week of November 16.

- Diversion Structures 3, 3A, and 4, and associated temporary sandbag structures were removed by November 12.

- Cofferdam (Diversion Structure 2) demolition began with the removal of cell fill material on November 16, 1992. The cofferdam was completely removed by December 2, 1992.

- Diversion Structure 1 was removed November 25.

DNI 6035797

- Sandbag and cofferdam fill materials were tested and determined to be non-hazardous. These materials were shipped off-site and landfilled at Occidental Chemical's 102nd Street Landfill.

- Normal creek flow which had been diverted to the Buffalo Avenue Diversion Sewer was returned to Gill Creek on November 30.

- NIACHLOR non-contact cooling water discharges were returned to their permitted discharge locations in Gill Creek on December 4.

The Gill Creek Remediation project is in the final stages. The construction activities are complete, equipment and fencing around the work area south of the Robert Moses parkway are being removed, and normal traffic flow will be restored the week of December 14. The Du Pont/Olin project team are working on summarizing the remediation activities into a final report. In accordance with the Order on Consent for the project, Du Pont and Olin are preparing final engineering drawings and construction certification.

Since the construction portion of the creek remediation project is complete, this will be the final monthly report. The final report being prepared by Du Pont and Olin will address the few outstanding items remaining. The material stored at Olin will be covered in separate communications. The final construction schedule is attached. If you should have any questions, please contact me at (716) 278-5317.

Sincerely,

A K Masse

Ann K. Masse, Ph.D.
Area Engineer, Engineering
and Environmental Affairs

AKM:klf
Attach.
22215

cc: NYSDEC - Division of Environmental Enforcement (Buffalo)*
NYSDEC - Division of Hazardous Waste Remediation (Albany)*
NYSDOH - Bureau of Env. Exposure Investigation (Albany)*
James C. Brown - Olin

* Two copies per order on consent

DNI 6035798

CONSTRUCTION PROGRESS REPORT
SEPTEMBER 1992

CONSTRUCTION ELEMENT	START DATE	APPROX. % COMPLETE TO DATE (8/31)	COMPLETION DATE
CONSTRUCT STAGING AREAS	6/22	100	9/11
CONSTRUCT WATER TREATMENT SYSTEM	7/20	100	8/28
CONSTRUCT CELLULAR COFFERDAM	7/27	100	9/15
BUFFALO AVE DIVERSION SEWER INSTALL MONITORING SYSTEM	7/15	100	8/11
OUTFALL RELOCATION			
INSTALL PHASE II	7/22	100	7/31
DIVERT FLOW	8/7	100	8/10
CONSTRUCT DIVERSION NO. 1	8/26	100	9/2
CONSTRUCT DIVERSION NO. 3	9/5	100	9/7
CONSTRUCT DIVERSION NO. 3A	9/5	100	9/7
PERFORMANCE TEST WATER TREATMENT SYSTEM	9/8	100	9/13
CREEK UNWATERING	9/7	100	9/15
OPERATE WATER TREATMENT SYSTEM	9/7	100	11/8
CONSTRUCT DIVERSION NO. 4	9/19	100	9/27
SEDIMENT REMOVAL			
AREA 3	9/8	100	9/15
AREA 2D	9/15	100	9/30
AREA 1	9/28	100	10/22
TRANSPORT SEDIMENT WASTE TO OFF-SITE LANDFILL	9/8	100	11/20
REMOVE DIVERSION NO. 3, 3A	11/7	100	11/12
REMOVE DIVERSION NO. 4	11/7	100	11/12
REMOVE CELLULAR COFFERDAM	11/16	100	12/2
REMOVE DIVERSION NO. 1	11/25	100	11/25
REMOVE TEMPORARY OUTFALL (PHASE II)	12/7	100	12/9

REV. 11/90

DUPONT

CHEMICALS

P.O. Box 787
Buffalo Ave. & 26th Street
Niagara Falls, NY 14302-0787
(716) 278-5100

March 17, 1993

Mr. Michael J. Hinton, P.E.
Environmental Engineer II
NYS Dept. of Environmental Conservation
Division of Hazardous Waste Remediation*
270 Michigan Avenue
Buffalo, NY 14203-2999

Dear Mr. Hinton:

DUPONT/OLIN GILL CREEK REMEDIATION
CONSTRUCTION CERTIFICATION

Attached are the certifications as required by Section VI and Section VII of the Order on Consent (Index #B9-0206-90-01). The certifications are as follows:

1. A certification letter stating that the construction was supervised by a qualified full-time representative of DuPont and Olin as required by Section VI. DuPont and Olin used the DuPont Niagara Engineering Organization (NEO) to provide oversight and construction management services. James F. McClincy from NEO was the senior project manager for the construction of the Gill Creek Remediation Project.

2. A certification letter stating that the construction was completed in accordance with the "Approved Proposal" as required by Section VII. DuPont and Olin retained the services of Woodward-Clyde Consultants (WCC) to review and advise on the construction phase of the project and conduct inspections as portions of the project were completed. Both Martin S. Leonard and Kelly R. McIntosh of WCC are certified professional engineers licensed to practice in the state of New York.

3. The Final Engineering drawings as required by Section VII. These drawings are updated versions of the set sent to the NYSDEC as part of the Plans and Specifications showing approved changes to the design. Each drawing has been certified by a professional engineer.

Should you have any questions on this submittal, please contact me at (716) 278-5317.

Sincerely,

Ann K. Masse

Ann K. Masse, Ph.D.
Area Engineer, Engineering
and Environmental Affairs

AKM:klf
Enc.
23325

cc: NYSDEC - Division of Environmental Enforcement (Buffalo)*
NYSDEC - Division of Hazardous Waste Remediation (Albany)*
NYSDOH - Bureau of Environmental Exposure Investigation (Albany)*

* Two copies per order on consent

Rćd 5/24/93

1x AKM
1x RJG/File 52150
1x J Grow
1x TAD

New York State Department of Environmental Conservation
70 Michigan Avenue, Buffalo, New York, 14203-2999

1x RWP/JEM
1x MLeo Ferry

Thomas C. Jorling
Commissioner

May 21, 1993

Ms. Ann K. Masse, PhD
DuPont Chemicals
P.O. Box 787
Niagara Falls, NY 14302-0787

Dear Ms. Masse:

DuPont/Olin Gill Creek Remediation
Construction Certification/
Post Remediation Monitoring Plan
Site #932013

I have reviewed your submittal of March 17, 1993 of the Construction Certification for the Gill Creek Remediation Project.

The Construction Certification for this project will be acceptable when the following conditions are met:

1. The as-built construction plans must provide further detail on the seep control measures used in Areas 3 and 2d (mid stream). A section/detail of the inplace seep control measures should be adequate.

2. The Post Remediation Monitoring plan must be approved by this department.

3. The trench drain design drawings must be approved for the collection of the groundwater seep found on the west bank in area 2D.

In regards to the Post Remediation Monitoring Plan your letter of April 14, 1993 that is in response to our comment letter of February 26 and March 11, 1993 is acceptable to this department. Please incorporate these changes into the Post Remediation Monitoring Plan and resubmit the revised workplan.

If you have any questions please call me at 851-7220.

Sincerely,

Michael J. Hinton

Michael J. Hinton, P.E.
Environmental Engineer II

MJH/ad
cc: Mr. Joseph Sciascia
Mr. Glenn Bailey
Mr. James Moras, DEC Albany
Mr. Al Wakeman, DOH Albany

DNI 6035773

JUL 30 1993

REV 11/90

DU PONT
CHEMICALS
P.O. Box 787
Buffalo Ave. & 26th Street
Niagara Falls, NY 14302-0787
(716) 278-5100

bcc: JFRoetzer/MLeonard - WCC**
REAustin - Legal, D7016-1
JHFrey - Chem, B12224
RWPorter/JEManning**
RJGentilucci/File 55150

July 29, 1993

Mr. Michael J. Hinton, P.E.
NYS Department of Environmental Conservation*
270 Michigan Avenue
Buffalo, NY 14203-2999

Dear Mr. Hinton:

SEEP REMEDIATION PLANS (PW-36)
Ref. Letter M. J. Hinton to A. K. Masse dated 2/26/93
Ref. Letter M. J. Hinton to A. K. Masse dated 3/11/93
Ref. Letter A. K. Masse to M. J. Hinton dated 4/14/93

Enclosed are two copies of the Post-Remediation Monitoring Plan. The Plan incorporates modifications discussed in the April 14, 1993, letter from A. K. Masse to M. J. Hinton. The modifications were made in response to comments outlined in two letters dated March 11, 1993, and February 26, 1993, from M. J. Hinton.

Should you have any questions, please call me at (716) 278-5317.

Sincerely,

A K Masse
Ann K. Masse, Ph.D.
Area Engineer, Engineering
and Environmental Affairs

AKM:klf
Enc.
24753

cc: A. Wakeman - NYSDOH, Albany
A. English - NYSDEC, Albany
M. Podd - NYSDEC, Buffalo
J. Brown - Olin**

*Two copies per letter from M. Hinton dated May 20, 1993
**Cover letter only

AUG 1 0 1993

1o RJG/File 52150
1x J Brown - Olin
1x AKM
1x MLeonard
1x RonBuchanan
1x S Constable

New York State Department of Environmental Conservation
270 Michigan Avenue, Buffalo, New York, 14203-2999

Thomas C. Jorling
Commissioner

August 6, 1993

Rcd 8/9/93

Ann K. Masse Ph.D.
DuPont Chemicals
P.O. Box 787
Niagara Falls, New York 14302-0787

Dear Dr. Masse:

DuPont Plant Site #932013
Gill Creek Post Remediation
Monitoring Plan

I have reviewed your Post Remediation Monitoring Plan dated July 1993 and have found it to be in accordance with our February 26 and March 11, 1993 comment letters and the discussions that took place during our March 31, 1993 meeting.

The plan is acceptable to this Department. Please provide this office with a minimum 5 business day notification prior to the placement of the initial sediment trap.

If you have any questions, please call me at 851-7220.

Sincerely,

Michael J. Hinton

Michael J. Hinton, P.E.
Environmental Engineer II

MJH:vam

cc: Mr. E. Joseph Sciascia
Mr. Michael Podd
Mr. Glen Bailey
Mr. Edward Belmore
Mr. Al Wakeman

REV 11/90

DU PONT

P.O. Box 787
Buffalo Ave. & 26th Street
Niagara Falls, NY 14302-0787
(716) 278-5100

bcc: JFRoetzer/MLeonard - WCC*
REAustin - Legal, D7016-1
JHFrey - Chem, B12224
RWPorter/JEManning*
RJGentilucci/File ~~55150~~ 52150
TADutch

*Cover letter only

September 2, 1993

Mr. Michael J. Hinton, P.E.
NYS Department of Environmental Conservation
270 Michigan Avenue
Buffalo, NY 14203-2999

Dear Mr. Hinton:

GILL CREEK REMEDIATION
ADDENDUM TO CONSTRUCTION CERTIFICATION
Ref. Letter M. J. Hinton to A. K. Masse Dated 5/21/93

As requested in your letter to DuPont dated May 21, 1993, enclosed are two as-built construction plans showing the detail of the seep control measures used in Area 2D and Area 3. Figure 1 is the plan view and Figure 2 is the cross-sectional view for both seep areas. These figures are to be considered an addendum to the Gill Creek certification package submitted to NYSDEC on March 17, 1993.

Should you have any questions, please call me at (716) 278-5317.

Sincerely,

A K Masse

Ann K. Masse, Ph.D.
Area Engineer, Engineering
and Environmental Affairs

AKM:klf
Enc.
25228

cc: A. Wakeman - NYSDOH, Albany
A. English - NYSDEC, Albany
M. Podd - NYSDEC, Buffalo
J. Brown - Olin

3571 Niagara Falls Boulevard
North Tonawanda
New York 14120
(716) 692-7172
Fax (716) 692-1512

Woodward-Clyde Consultants

May 19, 1993
92C2255-6

Dr. Ann Masse
E.I. du Pont de Nemours & Company
26th Street and Buffalo Avenue
Niagara Falls, New York 14302

Mr. James Brown
Olin Corporation
Lower River Road
Charleston, Tennessee 37310

Re: Gill Creek Certification Package - Supplemental Figures Detailing Seep Remediation

Dear Dr. Masse and M. Brown:

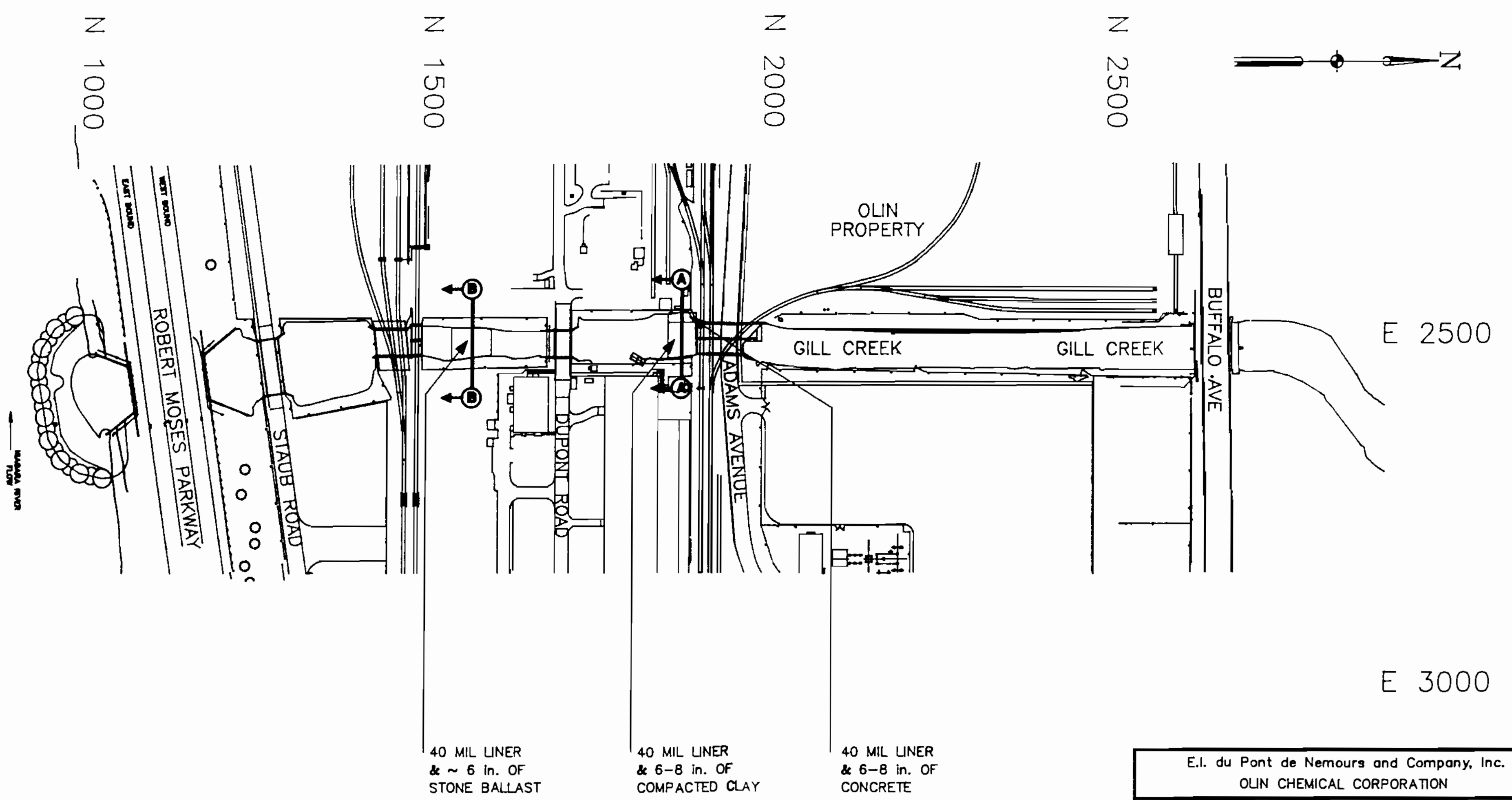
As requested, we have prepared the attached Figures 1 & 2, detailing measures taken to address groundwater seeps which were discovered during the Gill Creek Remediation Project. These figures supplement the "Final Engineering Drawings", which were submitted to NYSDEC on March 17, 1993.

We appreciate this opportunity to be of service to DuPont and Olin. Please advise if you have questions or comments regarding these figures.

Very truly yours,

Martin S. Leonard, P.E.
Senior Project Engineer

Kelly R. McIntosh, P.E., P.HGW.
Associate

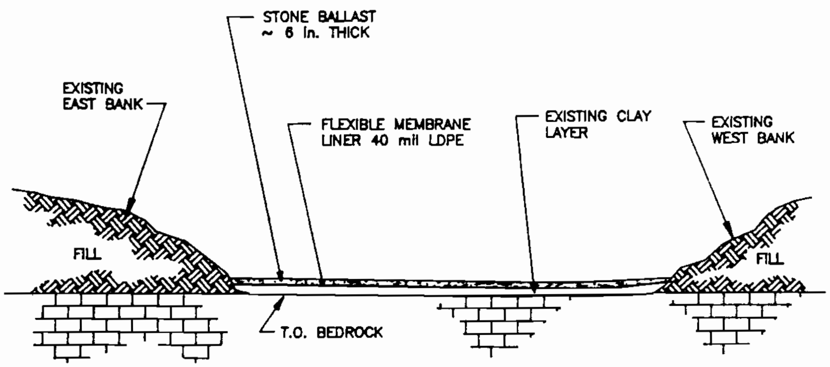


E.I. du Pont de Nemours and Company, Inc.
OLIN CHEMICAL CORPORATION

WOODWARD-CLYDE CONSULTANTS
Consulting Engineers, Geologists and Environmental Scientists

GILL CREEK REMEDIATION PROJECT
GROUNDWATER SEEP REMEDIATION LOCATIONS

Job No.: 92C2255	Drawn by: WSM	Date: 17MAY93
Checked by:	Rev. No.:	Figure 1
Scale: AS NOTED		



SECTION B – B

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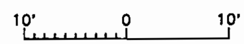
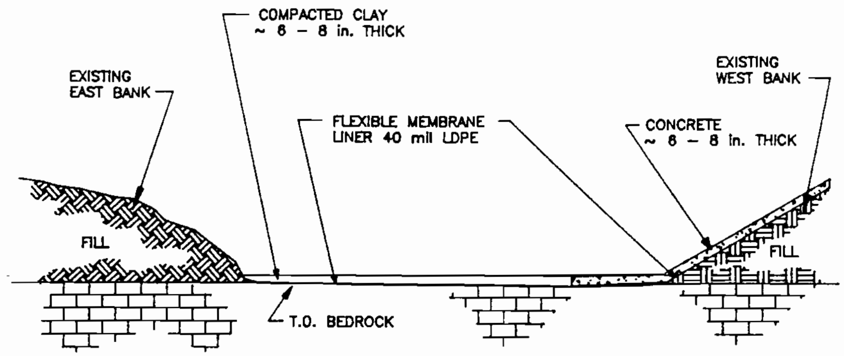
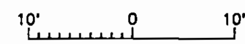




SECTION A – A

CREEK BED



E.I. du Pont de Nemours and Company, Inc.
OLIN CHEMICAL CORPORATION

WOODWARD-CLYDE CONSULTANTS
Consulting Engineers, Geologists and Environmental Scientists

GILL CREEK REMEDIATION PROJECT
GROUNDWATER SEEP REMEDIATION DETAILS

Job No.: 92C2255	Drawn by: WSM	Date: 17MAY93
Checked by:	Rev. No.:	Figure 2
Scale: AS NOTED		