The electronic version of this file/report should have the file name:

Type of document . Site Number . Year-Month . File *Year-Year* or Report name . pdf

letter.sp._____._____-01. File spillfile_____.pdf

example: *letter . Year-Month . File Year-Year . pdf*

~~report.~~ APPLICATION. ~~PERMIT~~. HW. 915012. 1986-05-09. PART 373_PERMIT ~~HW~~ _____.pdf

example: *report . Site Number . Year-Month . Report Name . pdf*

Project Site numbers will be proceeded by the following:

Municipal Brownfields - B
Superfund - HW
Spills - SP
ERP - E
VCP - V
BCP - C

915012.

buffalo
COLOR CORPORATION

p.o. box 7027 / buffalo, new york 14240
716-827-4500

RECEIVED
MAY 12 1986
ENVIRONMENTAL CONSERVATION
REGION 9

May 9, 1986

Mr. R. Baker
Regional Permit Administrator
New York State Department of
Environmental Conservation
Region 9
600 Delaware Avenue
Buffalo, New York 14202

Dear Mr. Baker:

Submitted herewith are five copies of Buffalo Color Corporation's Part 373 Application for the operation of its two surface impoundments, Lagoons #1 and #2.

This submittal is in response to Mr. P. Counterman's letter to Mr. T. Wlodarczak of February 28, 1986.

The application document has been revised to reflect the following changes:

1) Area F has been sold to Allied Signal Corporation and is no longer part of the facility.

2) Administration Building 100 has been built in Area B.

3) Drummed waste handling operations are being moved indoors to Building 324.

4) References to Federal Regulations have been changed to references to New York State Regulations.

5) Federal NOD references which were corrected in the March 11, 1985 document remain in the current submittal.

executive and sales offices
one garret mountain plaza
west paterson, new jersey 07424
201-881-1700
toll free 800-631-0171

This submittal can be considered either as Volume 6 to the Federal Part B Application or its contents may be substituted for the respective portions of the Federal document, leaving a five volume New York State document.

Volume 1	Contains Part A Application, Part B Application and Appendices A - O
Volume 2	Contains Appendix P
Volume 3	Contains Appendices Q - U
Volume 4	Contains Appendices V - Z
Volume 5	Contains Appendices AA - AK

This document contains Part 373 Application and revised appendices C, D, F, G, and M.

If there are any questions, please contact me at 716-827-4525.

Yours truly,

David E. Sauer
Manager, Environmental Affairs

DES:dt

cc: T. Wlodarczak
L. Franckowiak
F. Langone (USEPA - Region 2)
R. Pilar (NYDEC - Albany)

4.3.4.24

buffalo
COLOR CORPORATION
p.o. box 7027 / buffalo, new york 14240
716-827-4500

MAY 9, 1985

To Whom It May Concern:

I certify under penalty of law that I have personally examined and am familiar with the information submitted in this document and all attachments and that, based on my inquiry of those individuals immediately responsible for obtaining the information, I believe that the information is true, accurate and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment.

Yours truly,

L. J. Franckowiak
Vice President of
Operations

executive and sales offices
one garret mountain plaza
west paterson, new jersey 07424
201-881-1700
toll free 800-631-0171

PART A APPLICATION

(5TH SUBMITTAL)

BUFFALO COLOR CORPORATION

BUFFALO, NEW YORK

EPA I.D. NO. NYD080335052

09 MAY 1986

1ST SUBMITTAL	07 NOV 1980
2ND SUBMITTAL	11 OCT 1982
3RD SUBMITTAL	15 MAY 1984
4TH SUBMITTAL	11 MAR 1985

Please print or type in the unshaded areas only
(fill-in areas are spaced for elite type, i.e., 12 characters/inch).

Form Approved OMB No. 158-R0175

FORM 1 — U.S. ENVIRONMENTAL PROTECTION AGENCY

GENERAL INFORMATION

Consolidated Permits Program

(Read the "General Instructions" before starting.)

GENERAL

I. EPA I.D. NUMBER: F N Y D 0 8 0 3 3 5 0 5 2 (C)

GENERAL INSTRUCTIONS

If a preprinted label has been provided, affix it in the designated space. Review the information carefully; if any of it is incorrect, cross through it and enter the correct data in the appropriate fill-in area below. Also, if any of the preprinted data is absent (*the area to the left of the label space lists the information that should appear*), please provide it in the proper fill-in area(s) below. If the label is complete and correct, you need not complete Items I, III, V, and VI (*except VI-B which must be completed regardless*). Complete all items if no label has been provided. Refer to the instructions for detailed item descriptions and for the legal authorizations under which this data is collected.

LABEL ITEMS

I. EPA I.D. NUMBER

II. FACILITY NAME

III. FACILITY MAILING ADDRESS

IV. FACILITY LOCATION

PLEASE PLACE LABEL IN THIS SPACE

II. POLLUTANT CHARACTERISTICS

INSTRUCTIONS: Complete A through J to determine whether you need to submit any permit application forms to the EPA. If you answer "yes" to any questions, you must submit this form and the supplemental form listed in the parenthesis following the question. Mark "X" in the box in the third column if the supplemental form is attached. If you answer "no" to each question, you need not submit any of these forms. You may answer "no" if your activity is excluded from permit requirements; see Section C of the instructions. See also, Section D of the instructions for definitions of bold-faced terms.

SPECIFIC QUESTIONS	MARK 'X' YES	NO	FORM ATTACHED
A. Is this facility a publicly owned treatment works which results in a discharge to waters of the U.S.? (FORM 2A)		X	
B. Does or will this facility (*either existing or proposed*) include a concentrated animal feeding operation or aquatic animal production facility which results in a discharge to waters of the U.S.? (FORM 2B)		X	
C. Is this a facility which currently results in discharges to waters of the U.S. other than those described in A or B above? (FORM 2C)	X		
D. Is this a proposed facility (*other than those described in A or B above*) which will result in a discharge to waters of the U.S.? (FORM 2D)		X	
E. Does or will this facility treat, store, or dispose of hazardous wastes? (FORM 3)	X		X
F. Do you or will you inject at this facility industrial or municipal effluent below the lowermost stratum containing, within one quarter mile of the well bore, underground sources of drinking water? (FORM 4)		X	
G. Do you or will you inject at this facility any produced water or other fluids which are brought to the surface in connection with conventional oil or natural gas production, inject fluids used for enhanced recovery of oil or natural gas, or inject fluids for storage of liquid hydrocarbons? (FORM 4)		X	
H. Do you or will you inject at this facility fluids for special processes such as mining of sulfur by the Frasch process, solution mining of minerals, in situ combustion of fossil fuel, or recovery of geothermal energy? (FORM 4)		X	
I. Is this facility a proposed stationary source which is one of the 28 industrial categories listed in the instructions and which will potentially emit 100 tons per year of any air pollutant regulated under the Clean Air Act and may affect or be located in an attainment area? (FORM 5)		X	
J. Is this facility a proposed stationary source which is NOT one of the 28 industrial categories listed in the instructions and which will potentially emit 250 tons per year of any air pollutant regulated under the Clean Air Act and may affect or be located in an attainment area? (FORM 5)		X	

III. NAME OF FACILITY

1 SKIP: BUFFALO COLOR CORPORATION

IV. FACILITY CONTACT

A. NAME & TITLE (last, first, & title)	B. PHONE (area code & no.)
2 DAVID E. SAUER MGR. ENV. AFFAIRS	716 827 4525

V. FACILITY MAILING ADDRESS

A. STREET OR P.O. BOX			
3 PO BOX 7027			
B. CITY OR TOWN	**C. STATE**	**D. ZIP CODE**	
4 BUFFALO	NY	14240	

VI. FACILITY LOCATION

A. STREET, ROUTE NO. OR OTHER SPECIFIC IDENTIFIER			
5 100 LEE STREET			
B. COUNTY NAME			
ERIE			
C. CITY OR TOWN	**D. STATE**	**E. ZIP CODE**	**F. COUNTY CODE (if known)**
6 BUFFALO	NY	14210	

EPA Form 3510-1 (6-80)

CONTINUE ON REVERSE

CONTINUED FROM THE FRONT

VII. SIC CODES (4-digit, in order of priority)

A. FIRST	B. SECOND
2865 (specify) DYESTUFF MANUFACTURE	(specify)
C. THIRD	**D. FOURTH**
(specify)	(specify)

VIII. OPERATOR INFORMATION

A. NAME	B. Is the name listed in Item VIII-A also the owner?
BUFFALO COLOR CORPORATION	☐ YES ☒ NO

C. STATUS OF OPERATOR (Enter the appropriate letter into the answer box; if "Other", specify.)
F = FEDERAL M = PUBLIC (other than federal or state)
S = STATE O = OTHER (specify)
P = PRIVATE
(specify)

D. PHONE (area code & no.): A 201 881 1700

E. STREET OR P.O. BOX: ONE GARRET MOUNTAIN PLAZA

F. CITY OR TOWN	G. STATE	H. ZIP CODE
WEST PATERSON	NJ	07424

IX. INDIAN LAND

Is the facility located on Indian lands? ☐ YES ☒ NO

X. EXISTING ENVIRONMENTAL PERMITS

A. NPDES (Discharges to Surface Water)	D. PSD (Air Emissions from Proposed Sources)
0 N NY 0002470	9 P
B. UIC (Underground Injection of Fluids)	**E. OTHER (specify)**
9 U	9 85-05-021 B (specify) BUFFALO SEWER AUTHORITY INDUSTRIAL WASTE PERMIT
C. RCRA (Hazardous Wastes)	**E. OTHER (specify)**
9 R	9 (specify)

XI. MAP

Attach to this application a topographic map of the area extending to at least one mile beyond property bounderies. The map must show the outline of the facility, the location of each of its existing and proposed intake and discharge structures, each of its hazardous waste treatment, storage, or disposal facilities, and each well where it injects fluids underground. Include all springs, rivers and other surface water bodies in the map area. See instructions for precise requirements.

XII. NATURE OF BUSINESS (provide a brief description)

Engaged in the manufacture of certain dyes, cyclic intermediates, and di basic anhydrides

XIII. CERTIFICATION (see instructions)

I certify under penalty of law that I have personally examined and am familiar with the information submitted in this application and all attachments and that, based on my inquiry of those persons immediately responsible for obtaining the information contained in the application, I believe that the information is true, accurate and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment.

A. NAME & OFFICIAL TITLE (type or print)	B. SIGNATURE	C. DATE SIGNED
T. J. Wlodarczak Director of Operations		5/9/86

COMMENTS FOR OFFICIAL USE ONLY

Please print or type in the unshaded areas only
(fill-in areas are spaced for elite type, i.e., 12 characters/inch).

Form Approved OMB No. 158-S80004

FORM 3 RCRA

U.S. ENVIRONMENTAL PROTECTION AGENCY

HAZARDOUS WASTE PERMIT APPLICATION

Consolidated Permits Program

(This information is required under Section 3005 of RCRA.)

I. EPA I.D. NUMBER: F N Y D 0 8 0 3 3 5 0 5 2 | T/A: 1 | C:

FOR OFFICIAL USE ONLY

APPLICATION APPROVED	DATE RECEIVED (yr., mo., & day)	COMMENTS

II. FIRST OR REVISED APPLICATION

Place an "X" in the appropriate box in A or B below *(mark one box only)* to indicate whether this is the first application you are submitting for your facility or a revised application. If this is your first application and you already know your facility's EPA I.D. Number, or if this is a revised application, enter your facility's EPA I.D. Number in Item I above.

A. FIRST APPLICATION *(place an "X" below and provide the appropriate date)*

- [ ] 1. EXISTING FACILITY *(See instructions for definition of "existing" facility. Complete item below.)*
  - C 8 — FOR EXISTING FACILITIES, PROVIDE THE DATE (yr., mo., & day) OPERATION BEGAN OR THE DATE CONSTRUCTION COMMENCED *(use the boxes to the left)* — YR. | MO. | DAY
- [ ] 2. NEW FACILITY *(Complete item below.)*
  - FOR NEW FACILITIES, PROVIDE THE DATE (yr., mo., & day) OPERATION BEGAN OR IS EXPECTED TO BEGIN — YR. | MO. | DAY

B. REVISED APPLICATION *(place an "X" below and complete Item I above)*

- [X] 1. FACILITY HAS INTERIM STATUS
- [ ] 2. FACILITY HAS A RCRA PERMIT

III. PROCESSES – CODES AND DESIGN CAPACITIES

A. PROCESS CODE – Enter the code from the list of process codes below that best describes each process to be used at the facility. Ten lines are provided for entering codes. If more lines are needed, enter the code(s) in the space provided. If a process will be used that is not included in the list of codes below, then describe the process *(including its design capacity)* in the space provided on the form *(Item III-C)*.

B. PROCESS DESIGN CAPACITY – For each code entered in column A enter the capacity of the process.

1. AMOUNT – Enter the amount.
2. UNIT OF MEASURE – For each amount entered in column B(1), enter the code from the list of unit measure codes below that describes the unit of measure used. Only the units of measure that are listed below should be used.

PROCESS	PROCESS CODE	APPROPRIATE UNITS OF MEASURE FOR PROCESS DESIGN CAPACITY
Storage:		
CONTAINER *(barrel, drum, etc.)*	S01	GALLONS OR LITERS
TANK	S02	GALLONS OR LITERS
WASTE PILE	S03	CUBIC YARDS OR CUBIC METERS
SURFACE IMPOUNDMENT	S04	GALLONS OR LITERS
Disposal:		
INJECTION WELL	D79	GALLONS OR LITERS
LANDFILL	D80	ACRE-FEET *(the volume that would cover one acre to a depth of one foot)* OR HECTARE-METER
LAND APPLICATION	D81	ACRES OR HECTARES
OCEAN DISPOSAL	D82	GALLONS PER DAY OR LITERS PER DAY
SURFACE IMPOUNDMENT	D83	GALLONS OR LITERS
Treatment:		
TANK	T01	GALLONS PER DAY OR LITERS PER DAY
SURFACE IMPOUNDMENT	T02	GALLONS PER DAY OR LITERS PER DAY
INCINERATOR	T03	TONS PER HOUR OR METRIC TONS PER HOUR; GALLONS PER HOUR OR LITERS PER HOUR
OTHER *(Use for physical, chemical, thermal or biological treatment processes not occurring in tanks, surface impoundments or incinerators. Describe the processes in the space provided; Item III-C.)*	T04	GALLONS PER DAY OR LITERS PER DAY

UNIT OF MEASURE	UNIT OF MEASURE CODE
GALLONS	G
LITERS	L
CUBIC YARDS	Y
CUBIC METERS	C
GALLONS PER DAY	U
LITERS PER DAY	V
TONS PER HOUR	D
METRIC TONS PER HOUR	W
GALLONS PER HOUR	E
LITERS PER HOUR	H
ACRE-FEET	A
HECTARE-METER	F
ACRES	B
HECTARES	Q

EXAMPLE FOR COMPLETING ITEM III *(shown in line numbers X-1 and X-2 below)*: A facility has two storage tanks, one tank can hold 200 gallons and the other can hold 400 gallons. The facility also has an incinerator that can burn up to 20 gallons per hour.

C | DUP | T/A | C | 1

LINE NUMBER	A. PROCESS CODE (from list above)	B. PROCESS DESIGN CAPACITY 1. AMOUNT (specify)	B. PROCESS DESIGN CAPACITY 2. UNIT OF MEASURE (enter code)	FOR OFFICIAL USE ONLY
X-1	S02	600	G	
X-2	T03	20	E	
1	S04	1,000,000	G	
2	S04	1,000,000	G	
3	T02	60,000	E	
4				
5				
6				
7				
8				
9				
10				

Continued from the front.

III. PROCESSES *(continued)*

C. SPACE FOR ADDITIONAL PROCESS CODES OR FOR DESCRIBING OTHER PROCESSES *(code "T04")*. FOR EACH PROCESS ENTERED HERE INCLUDE DESIGN CAPACITY.

Non-contact cooling water from the Buffalo River Improvement Corp. passes through plant to two outfalls on the Buffalo River (SPDES-NY002470). Process waste water is collected by a separate sewer system and discharged to two (parallel) equalization lagoons. The process waste is pumped from lagoons to three (series) reactors where the pH is adjusted as required. The pH adjusted process waste is sent to the Buffalo Sewer Authority system for treatment in the POTW Secondary Plant. BPDES 85-05-021 B the process Waste Water is corrosive.

Alkalinity in the lagoons may be partially neutralized by the addition of dilute sulfuric acid which is pumped to the lagoons via a pipeline from the PVS plant next door.

IV. DESCRIPTION OF HAZARDOUS WASTES

A. **EPA HAZARDOUS WASTE NUMBER** – Enter the four–digit number from 40 CFR, Subpart D for each listed hazardous waste you will handle. If you handle hazardous wastes which are not listed in 40 CFR, Subpart D, enter the four–digit number*(s)* from 40 CFR, Subpart C that describes the characteristics and/or the toxic contaminants of those hazardous wastes.

B. **ESTIMATED ANNUAL QUANTITY** – For each **listed waste** entered in column A estimate the quantity of that waste that will be handled on an annual basis. For each **characteristic** or **toxic contaminant** entered in column A estimate the total annual quantity of all the non–listed waste*(s)* that will be handled which possess that characteristic or contaminant.

C. **UNIT OF MEASURE** – For each quantity entered in column B enter the unit of measure code. Units of measure which must be used and the appropriate codes are:

ENGLISH UNIT OF MEASURE	CODE	METRIC UNIT OF MEASURE	CODE
POUNDS	P	KILOGRAMS	K
TONS	T	METRIC TONS	M

If facility records use any other unit of measure for quantity, the units of measure must be converted into one of the required units of measure taking into account the appropriate density or specific gravity of the waste.

D. PROCESSES

1. PROCESS CODES:

For listed hazardous waste: For each **listed** hazardous waste entered in column A select the code*(s)* from the list of process codes contained in Item III. to indicate how the waste will be stored, treated, and/or disposed of at the facility.

For non–listed hazardous wastes: For each characteristic or toxic contaminant entered in column A, select the code*(s)* from the list of process codes contained in Item III to indicate all the processes that will be used to store, treat, and/or dispose of all the non–listed hazardous wastes that possess that characteristic or toxic contaminant.

Note: Four spaces are provided for entering process codes. If more are needed: (1) Enter the first three as described above; (2) Enter "000" in the extreme right box of Item IV-D(1); and (3) Enter in the space provided on page 4, the line number and the additional code*(s)*.

2. PROCESS DESCRIPTION: If a code is not listed for a process that will be used, describe the process in the space provided on the form.

NOTE: HAZARDOUS WASTES DESCRIBED BY MORE THAN ONE EPA HAZARDOUS WASTE NUMBER – Hazardous wastes that can be described by more than one EPA Hazardous Waste Number shall be described on the form as follows:

1. Select one of the EPA Hazardous Waste Numbers and enter it in column A. On the same line complete columns B,C, and D by estimating the total annual quantity of the waste and describing all the processes to be used to treat, store, and/or dispose of the waste.
2. In column A of the next line enter the other EPA Hazardous Waste Number that can be used to describe the waste. In column D(2) on that line enter "included with above" and make no other entries on that line.
3. Repeat step 2 for each other EPA Hazardous Waste Number that can be used to describe the hazardous waste.

EXAMPLE FOR COMPLETING ITEM IV *(shown in line numbers X-1, X-2, X-3, and X-4 below)* – A facility will treat and dispose of an estimated 900 pounds per year of chrome shavings from leather tanning and finishing operation. In addition, the facility will treat and dispose of three non–listed wastes. Two wastes are corrosive only and there will be an estimated 200 pounds per year of each waste. The other waste is corrosive and ignitable and there will be an estimated 100 pounds per year of that waste. Treatment will be in an incinerator and disposal will be in a landfill.

LINE NO.	A. EPA HAZARD. WASTE NO. (enter code)	B. ESTIMATED ANNUAL QUANTITY OF WASTE	C. UNIT OF MEASURE (enter code)	D. PROCESSES 1. PROCESS CODES (enter)	D. PROCESSES 2. PROCESS DESCRIPTION (if a code is not entered in D(1))
X-1	K 0 5 4	900	P	T 0 3 D 8 0	
X-2	D 0 0 2	400	P	T 0 3 D 8 0	
X-3	[redacted] 0 0 1	100	P	T 0 3 D 8 0	
X-4	D 0 0 2				included with above

Continued from page 2.

NOTE: Photocopy this page before completing if you have more than 26 wastes to list.

Form Approved OMB No. 158-S80004

I. EPA I.D. NUMBER (enter from page 1)														FOR OFFICIAL USE ONLY					
W	N	Y	D	0	8	0	3	3	5	0	5	2	T/A	C	W	DUP	T/A	C	DUP
														1				2	

IV. DESCRIPTION OF HAZARDOUS WASTES (continued)

LINE NO.	A. EPA HAZARD. WASTE NO. (enter code)	B. ESTIMATED ANNUAL QUANTITY OF WASTE	C. UNIT OF MEASURE (enter code)	D. PROCESSES 1. PROCESS CODES (enter)	D. PROCESSES 2. PROCESS DESCRIPTION (if a code is not entered in D(1))
1	0002	109,500,000	G	S04 T02	Corrosive (pH > 12.5) Process Waste Water
2					
3					
4					
5					
6					
7					
8					
9					
10					
11					
12					
13					
14					
15					
16					
17					
18					
19					
20					
21					
22					
23					
24					
25					
26					

EPA Form 3510-3 (6-80)

CONTINUE ON REVERSE

(enter "A", "B", "C", etc. behind the "3" to identify photocopied pages)

Continued from the front.

IV. DESCRIPTION OF HAZARDOUS WASTES *(continued)*

E. USE THIS SPACE TO LIST ADDITIONAL PROCESS CODES FROM ITEM D(1) ON PAGE 3.

EPA I.D. NO. *(enter from page 1)*

													T/A	C
F	N	Y	D	0	8	0	3	3	5	0	5	2		6

V. FACILITY DRAWING

All existing facilities must include in the space provided on page 5 a scale drawing of the facility *(see instructions for more detail)*.

VI. PHOTOGRAPHS

All existing facilities must include photographs *(aerial or ground--level)* that clearly delineate all existing structures; existing storage, treatment and disposal areas; and sites of future storage, treatment or disposal areas *(see instructions for more detail)*.

VII. FACILITY GEOGRAPHIC LOCATION

LATITUDE *(degrees, minutes, & seconds)*	LONGITUDE *(degrees, minutes, & seconds)*
42 51 40 N	078 50 40 W

VIII. FACILITY OWNER

☐ A. If the facility owner is also the facility operator as listed in Section VIII on Form 1, "General Information", place an "X" in the box to the left and skip to Section IX below.

B. If the facility owner is not the facility operator as listed in Section VIII on Form 1, complete the following items:

1. NAME OF FACILITY'S LEGAL OWNER	2. PHONE NO. *(area code & no.)*
E HILLSIDE CAPITAL INC.	212-935-6090

3. STREET OR P.O. BOX	4. CITY OR TOWN	5. ST.	6. ZIP CODE
F 450 Park Avenue	G New York	NY	10022

IX. OWNER CERTIFICATION

I certify under penalty of law that I have personally examined and am familiar with the information submitted in this and all attached documents, and that based on my inquiry of those individuals immediately responsible for obtaining the information, I believe that the submitted information is true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment.

A. NAME *(print or type)*	B. SIGNATURE	C. DATE SIGNED
T. J. Wlodarczak Director of Operations		05-09-86

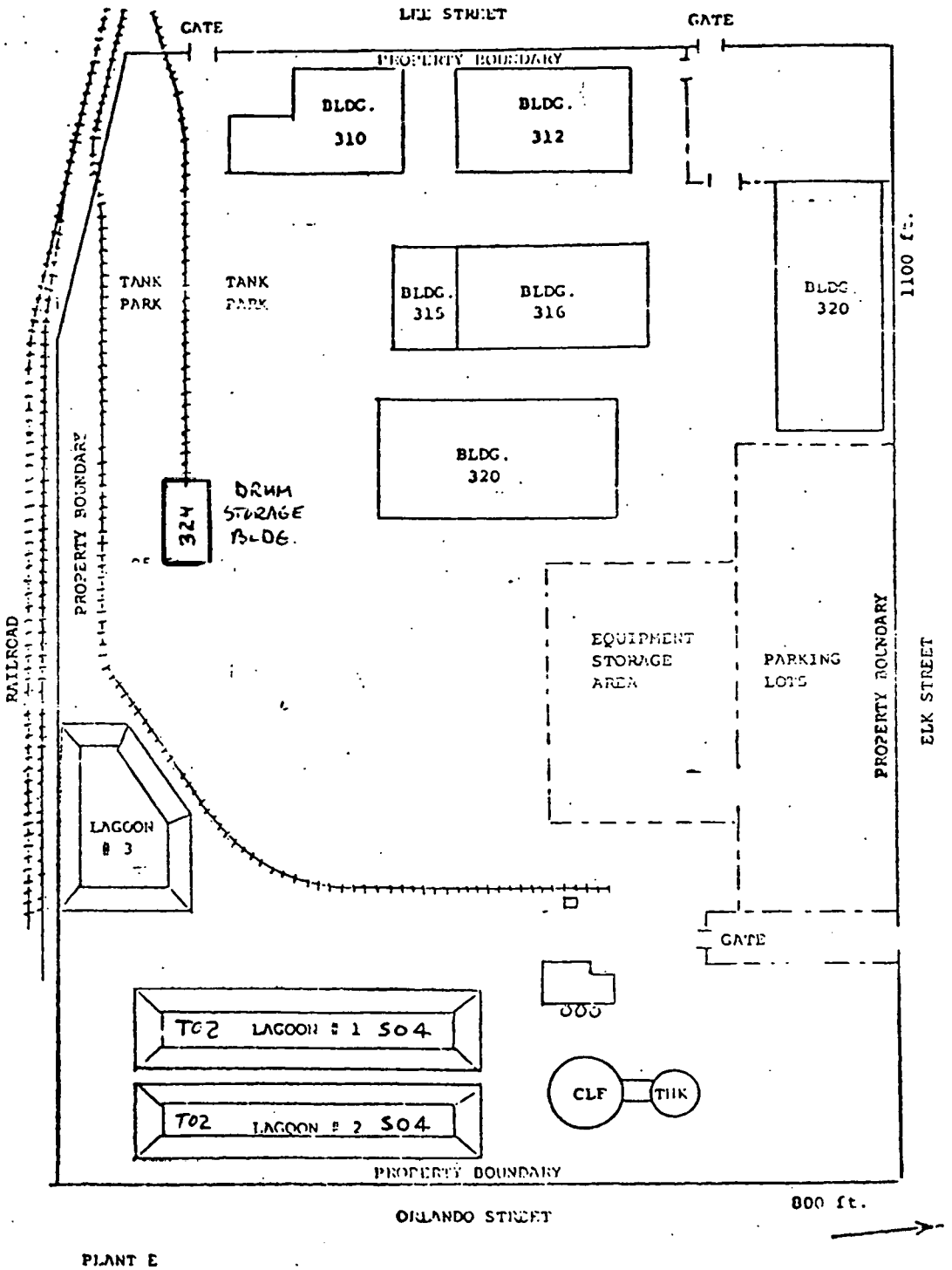
X. OPERATOR CERTIFICATION

I certify under penalty of law that I have personally examined and am familiar with the information submitted in this and all attached documents, and that based on my inquiry of those individuals immediately responsible for obtaining the information, I believe that the submitted information is true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment.

A. NAME *(print or type)*	B. SIGNATURE	C. DATE SIGNED
T. J. Wlodarczak Director of Operations		5/9/86

Form Approved OMB No. 158-S80004

V. FACILITY DRAWING *(see page 4)*



SCALE 1 INCH = 175 FEET

175 FT

PART 373 APPLICATION

(3RD SUBMITTAL)

BUFFALO COLOR CORPORATION

BUFFALO, NEW YORK

EPA I.D. NO. NYD080335052

09 MAY 1986

1ST SUBMITTAL	15 MAY 1984	PART B
2ND SUBMITTAL	11 MAR 1985	PART B

BUFFALO COLOR CORPORATION
PART 373 APPLICATION

TABLE OF CONTENTS

TABLE OF CONTENTS - cont.

TABLE OF CONTENTS - cont.

APPENDICES

A. Chemical and Physical Analysis of Hazardous Waste
B. Surface Impoundment Operating Manual
C. Disaster Control Plan
D. Spill Prevention Control and Countermeasures Plan
E. Hazardous Waste Training Program
F. Closure and Post Closure Plan
G. Facility Plot Plan
H. Area Surrounding Facility
I. Facility Aerial Photo
J. Topographic Map
K. Flood Plain Maps
L. Wind Rose
M. Ground Water Monitoring Plan
N. Sewer Maps
O. Operating Record
P. Design of Treatment Plant and Surface Impoundments
Q. Documentation of Sewer Separation
R. Soil Borings
S. Renovation of Lagoon #1 (1983)
T. Notifications of Hazardous Wastes
U. Certification of Dike Integrity
V. Waste Pile 1 Weathering Area
W. Waste Pile 2 Iron Sludge Lagoons
X. Incinerator
Y. Container Storage Area
Z. Injection Well
AA. Liability Insurance Risk Assessment Report
AB. Buffalo River Soundings Charts
AC. Mobil Oil Refinery Leak Detection System
AD. Environmental History of the Buffalo River
AE. Extended Area Surrounding Facility
AF. Surface Water Downstream
AG. Special Air Sampling Project
AH. Population Calculations
AI. Buffalo River Monitoring Program
AJ. Other Operating Permits
AK. Employment, Medical, and Workers Compensation Records

1. Facility Description

1.1 General Information

Buffalo Color Corporation is located within the City of Buffalo, County of Erie, State of New York. The plant site occupies 61 acres adjacent to the Buffalo River at river mile 4.5 - 5.5.

1.1.1 The street address is: Buffalo Color Corporation
100 Lee Street
Buffalo, New York 14210

1.1.2 The mailing address is: Buffalo Color Corporation
P.O. Box 7027
Buffalo, New York 14240

1.2 Historical Background

The plant was originally built in 1879 by Schoelkopf Aniline and Dye Company, which became National Aniline Chemical Company in 1916 and was one of the five companies which united to become Allied Chemical Corporation in 1920. Buffalo Color was formed July 1, 1977 to purchase the plant from Allied Chemical and has operated it since that date. There has been continuous manufacture of dyestuffs and/or organic chemicals at the facility for 105 years.

Originally all dye plant process waste waters were discharged to the Buffalo River. Much of this material would be classed as hazardous waste under today's regulations.

Over the years efforts were made to ameliorate this situation. A Pollution Control Department was formed in 1939. Efforts were largely aimed at developing changes in the production processes which resulted in a reduction in the weight and impact of effluents to the river.

During the 1940's, 1950's and 1960's Allied Chemical took part in a development process which culminated in the formation of the Buffalo River Improvement Corporation (B.R.I.C.) in 1967. A water pumping station larger that that used by the City of Buffalo was constructed to pump Lake Erie cooling water to the dye plant and four other plants on the Buffalo River. This augmented the flow of the river and reduced the concentration of pollutants 20% annually and by as much as 95% during the low-flow summer months.

In response to a directive from New York State in 1966, Allied Chemical constructed a pretreatment plant which went on line in June 1971. This project entailed the construction of a new sewer system in the plant which separated the flows between process waste (containing the effluents from the production processes) and clear (largely non-contact cooling) water. The process waste sewer diverted the organic and inorganic waste streams out of the Buffalo River and to the pretreatment facility where the extreme acidity of the waste water was neutralized with lime and solids were precipitated and removed to landfills. Pretreated waste water was sent to the Buffalo Sewer Authority. Specifics of the pretreatment operation are discussed in Section 1.3

Production peaked in the early 1950's. Since that time the number of compounds made at the facility has been reduced from more than 1700 to the present 8. Non-contact cooling water from the B.R.I.C. system passes through the plant and augments the flow of the river through two outfalls. The process waste water has become net alkaline rather than net acidic. The loadings to the Buffalo Sewer Authority have been substantially reduced for both inorganic and organic materials. Non-ferrous heavy metals have been virtually eliminated from the inorganics while the organics are largely destroyed at the Buffalo Sewer Authority's secondary treatment facility. There has been no manufacturing use of chlorinated organics since 1981.

This Part 373 Application is submitted for a permit to operate the surface impoundments in accord with New York State regulations.

1.3 Management of Hazardous Waste

Hazardous wastes are generated by chemical processing in production activities. If they are solid wastes they are placed in drums, labeled, handled, and disposed of according to Federal and State regulations. Approximately 1000 drums/year of solid wastes are brought to the Solid Waste Control Building from whence they are transported to the proper disposal facilities. Buffalo Color disposes of these drums in a timely manner and, therefore, claims exemption from the Part 373 permit requirements under the provisions of 6NYCRR 373-1.1(d)(1)(XIV). The Solid Waste Control Area is operated in compliance with 6NYCRR 373-3. The area is fenced, locked and posted. Wastes are labeled, dated and segregated by type. Ignitable and reactive wastes are not stored within 50 feet of the property line or near incompatible materials. The drums are inspected weekly and the operators are trained in the hazards and procedures to be followed when handling the wastes.

Hazardous solid wastes commonly handled include off-grade Indigo paste, off-grade Methyl Violet Solution, Phosphoric Acid, and Waste Solvents. At any point in time there are about 140 drums of hazardous waste in storage, waiting to be shipped out under the 90 day restriction.

Section 1.4 gives a detailed description of the processes which generate hazardous waste.

Process waste in the form of process waste water (200,000 - 600,000 gpd) is transported via the process waste sewer to the pretreatment plant. Two paralle surface impoundments receive the waste water and smooth variations in flow and concentration to prevent "slug" discharges. The process waste water is a hazardous waste due to corrosivity, having a pH in excess of 12.5. A more thorough discussion of this stream is presented in the waste analysis plan.

The process waste water is pumped to three reactors in series where it is neutralized with sulfuric acid to render it no longer corrosive under New York State regulations and acceptable to the Buffalo Sewer Authority (BSA) under their Sewer Use Ordinance. Buffalo Color is permitted by the BSA under 40 CFR 403 to send this neutralized waste water forward.

This application is for the operation of the surface impoundments under 6NYCRR 371,372, and 373. The data in the Part A application applies to the quantities of materials which pass through the surface impoundments. Although the process code (S04) used on the Part A application indicates that the hazardous waste is "stored" in the surface impoundments this is not strictly true. All of the hazardous constituents known to be in the waste are soluble in water and thus are either neutralized or pass out of the impoundments with the forward flow to the BSA as fast as they come in. The solids which settle in the impoundments have not been found to be enriched in the hazardous constituents.

The person responsible for hazardous waste management activities at Buffalo Color is:

David E. Sauer
Manager of
Environmental Affairs
716-827-4525

1.4 Activities Generating Hazardous Waste

1.4.1 The facility site is divided into six geographical areas.

1.4.1.1	Area A Buildings	47 - 83
1.4.1.2	Area B Buildings	101 - 123
1.4.1.3	Area C Buildings	204 - 223
1.4.1.4	Area D No buildings	
1.4.1.5	Area E Buildings	310 - 354

1.4.2 Area A

1.4.2.1 Indigo Crude Paste — Buildings 52, 53

Dry gaseous ammonia reacts with molten metallic sodium to form sodamide and liberate hydrogen. Mixed potassium-sodium phenylglycine reacts with sodamide to form a mixture of potassium and sodium salts of indoxyl, sodium oxide and ammonia gas. The indoxyl salt and sodium oxide are drowned and oxidized to form indigo and water.

Hazardous Wastes Routinely Generated:

1.4.2.2 Potassium Phenylglycine — Buildings 50, 51, 83

Formaldehyde is condensed with aniline in a methanol solution, then treated with mixed potassium-sodium cyanide, then hydrolyzed to potassium phenylglycine

with the liberation of ammonia. Methanol and excess aniline are recovered by distillation. Liberated ammonia is recovered by absorption then recycled to make sodamide which is used to make Indigo.

Hazardous Waste Routinely Generated:

Corrosive Waste Water (Process Waste Sewer)

1.4.2.3 Mixed Sodium/Potassium Cyanide Building 51

Solid Potassium Cyanide and Sodium Cyanide are added to water made alkaline with potassium hydroxide. Sufficient water is used to make a required concentration of the cyanide salts.

Hazardous Waste Routinely Generated:

No wastes are generated as any spillage is discharged to a recovery tank and recycled to process.

1.4.2.4 Indigo Nacco 20% Paste Building 48

Indigo crude paste is standardized.

Hazardous Waste Routinely Generated:

No waste generated as any spillage is recycled.

1.4.2.5 Indigo Nacco Powder - X-Disp, Special, HD, PS Dow - Bldg. 47, 48

Indigo Paste is slurried in water, filtered to reduce alkalinity, reslurried and dried.

Hazardous Waste Routinely Generated:

Corrosive Waste Water (Process Waste Sewer)

1.4.2.6 No solid hazardous wastes are routinely generated in Area A. However, non-routine hazardous solid wastes from sewer and tank cleanouts, decommissioning of PCB - containing transformers, and experimental production runs, occur from time to time.

1.4.3 Area B

1.4.3.1 No manufacturing activity is done in Area B.

1.4.3.2 Waste water flow from Area A passes through Area B, there are no hazardous or non-hazardous waste streams added to the process waste water as it passes through this area.

1.4.3.3 The warehouse Buildings 101, 102, and 103, the plant hospital Building 121, the guardhouse Building 123, and the new Administration Building 100are located in this area.

1.4.3.4 No hazardous solid wastes are generated in Area B.

1.4.4 Area C

1.4.4.1 The Power Department is housed in Buildings 204, 205, 206, 207, and 208.

1.4.4.2 Maintenance shops and offices are housed in Buildings 220, 221, 222 and 223.

1.4.4.3 The Power Department waste water is added to the process waste water flow coming from Area B.

1.4.4.4 No solid hazardous wastes are routinely generated in Area C. However, non-routine hazardous solid wastes from sewer and tank cleanouts, decommissioning of PCB-containing transformers, and waste chlorinated degreasers may occur from time to time.

1.4.5 Area D

1.4.5.1 Area D is a totally decommissioned portion of the facility. It contains no buildings, no operational sewers, no utility services, and is secured against access to or from the rest of the facility.

1.4.5.2 Three of the five solid wast management units cited in Section 14 below are in Area D.

1.4.5.3 There are no wastes generated in Area D.

1.4.6 Area E

1.4.6.1 N,N-Dimethylaniline — Building 312

A mixture of aniline, N-Methylaniline, and Methanol is vaporized and passed through a molten catalyst bed of phosphoric acid. The exiting stream is condensed, then the alcohol and amine phases are separated. The alcohol phase is rectified and recycled. The amine phase is treated with maleic anhydride to separate the N-Methylaniline from the N,N-Dimethylaniline. The N-Methylaniline is hydrolized and recycled.

Hazardous Wastes Routinely Generated:

Phosphoric Acid (Solid Waste Control Area)

1.4.6.2 N-Methylaniline — Building 312

This material is produced as a concurrent byproduct with the manufacture of N,N-Dimethylaniline. The isolated material is recycled to the catalyst bed where it is consumed in the reaction. Hazardous wastes are, therefore, included in those of N,N-Dimethylaniline.

1.4.6.3 N,N-Diethylaniline — Building 312

A mixture of aniline and ethanol is vaporized and passed through a molten catalyst bed of phosphoric acid. The alcohol phase is rectified and recycled. The amine phase is fractionated by distillation into N-Ethylaniline and N,N-Diethylaniline.

Hazardous Waste Routinely Generated

Phosphoric Acid (Solid Waste Control Area)

1.4.6.4 N-Ethylaniline — Building 312

This material is produced as a simultaneous byproduct of the manufacture of N,N-Diethylaniline. The hazardous wastes routinely generated are the same.

1.4.6.5 Dodecenyl Succinic Anhydride — Building 312

Tetrapropylene and Maleic Anhydride are refluxed and condensed, distilled and filtered. The various distillation cuts are blended and packed out.

Hazardous Waste Routinely Generated:

None

1.4.6.6 Hexahydrophthalic Anhydride Building 312

Maleic anhydride is condensed with Butadiene to form tetrahydrophthalic anhydride in the presence of a nickel catalyst. The tetrahydrophthalic anhydride is hydrogenated to form hexahydrophthalic anhydride which is distilled and placed out as a fused product.

Hazardous Waste Routinely Generated:

None

1.4.6.7 Succinic Anhydride Distilled Building 312

Maleic anhydride is hydrogenated with a 5% palladium on charcoal catalyst. The mixture is filtered to remove the catalyst and then distilled and flaked.

Hazardous Waste Routinely Generated:

None

1.4.6.8 Nadic Methyl Anhydride Building 312

Methylcyclopentadiene dimer is cracked to methyl cyclopentadiene and run directly into maleic anhydride and condensed in n-tetradecane. The condensation product is stripped of unreacted maleic anhydride, isomerized, distilled, and packed out as a liquid.

Hazardous Waste Routinely Generated:

None

1.4.6.9 The process waste sewer containing the waste water streams from Areas A, C and E runs to lift pumps which convey it to the surface impoundments. These are also located in Area E.

2. Waste Analysis Plan

2.1 Location of Sampling

Since the process waste sewer represents the convergence of a multiplicity of individual streams from separate production departments and different production steps within departments, it is not practical to attempt to sample the individual tributaries to the process waste stream. On the basis of the normal behavior of numbers, the combined stream can be expected to show far less variability in concentration

than the individual tributaries. Sampling of the stream which enters the surface impoundments will yield the most information concerning the nature of the waste if it is executed downstream of all of the process areas, but upstream of the impoundments themselves. The lift station just upstream of the impoundments meets this specification. The sampling location is shown on the facility plot plan in Appendix G.

2.2 Rationale for Selection of Parameters for Testing.

2.2.1 Corrosivity (D002 Corrosive)

2.2.1.1 Process waste water from the Indigo Department is known to be highly alkaline. When the department is running, the pH of the waste water entering the impoundments is persistantly greater than 12.5. The department normally runs more than 330 days per year.

2.2.2 Ignitability (D001 Ignitable)

2.2.2.1 Ethanol and Methanol are known to be present in the process waste water. The possibility of a low flash point is real if improbable due to the low concentrations.

2.2.3 Reactivity (D003 Reactive)

2.2.3.1 The presence of cyanides and sulfides in the waste water introduces the possibility that they could be liberated by reaction with acids. The normal concentrations, however, are so low as to make their liberation unlikely by themselves. However, treatment of the process waste with sulfuric acid releases an abundance of carbon dioxide from the carbonates present. It is possible that some of the cyanide or sulfides may be entrained in the carbon dioxide bubbles and thus be released with treatment of the waste with acid.

2.2.4 Toxicity

2.2.4.1 Several materials known to be present in the waste water due to production processes are wastes included under 6NYCRR 371. These are discussed in sections 2.2.5 through 2.2.20 below.

2.2.4.2 Additional materials specified in 6NYCRR 371 which may be present in the waste water, but which are not used in production at the facility and do not exist as known waste streams are discussed in sections 2.2.21 through 2.2.34 below.

2.2.5 Aniline

2.2.5.1 Aniline is used as a basic raw material in the manufacture of both Indigo and the four alkylanilines.

2.2.5.2 Analysis of forward flow to the Buffalo Sewer Authority has shown aniline to be persistantly present in the process waste water in concentrations averaging 61 mg/liter and ranging from 9 to 112 mg/liter.

2.2.6 N-Methylaniline

2.2.6.1 N-Methylaniline is produced as a byproduct in the Indigo process and as a recycled byproduct in the N,N-Dimethylaniline process.

2.2.6.2 Analysis of forward flow to the BSA has shown an average concentration of 21 mg/liter ranging from 1 to 58 mg/liter.

2.2.6.3 Although N-Methylaniline is not listed under 6NYCRR 371 a poison under the generic definitions of 49 CFR 172.

2.2.7 N,N-Dimethylaniline

2.2.7.1 Is produced as a finished product in Building 312

2.2.7.2 Analysis of the waste water going forward to the BSA has shown an average concentration of 49 mg/liter ranging from 7 to 117 mg/liter.

2.2.8 N-Ethylaniline

2.2.9 N,N-Diethylaniline

2.2.9.1 These materials are co-produced as finished products in Building 312.

2.2.9.2 Although they are not listed wastes under 6NYCRR 371 they fall under the generic classification as poisons in 49 CFR 172 and are therefore includable here.

2.2.9.3 Analysis of waste water to the BSA has yielded intermittant combined concentrations of 0 to 92 mg/liter averaging 12 mg liter and 3 mg/liter respectively.

2.2.10 Sodium Hydroxide

2.2.11 Potassium Hydroxide

2.2.11.1 These materials are present in the waste water from the Indigo process and are the reason for the corrosivety of the stream entering the surface impoundments.

2.2.11.2 Analysis for alkalinity can be made for hydroxides and/or carbonates by titrating to different final pH values. Such analyses has indicated an average concentration of 6700 mg/liter ranging 500 to 13,900 mg/liter (as Sodium Hydroxide). This, of course, does not go forward to the BSA because it is neutralized out of existance in the reactors of the pretreatment plant.

2.2.12 Sodium Cyanide

2.2.13 Potassium Cyanide

2.2.14 Cyanides

2.2.14.1 Both of the cyanide salts are present in the process waste water from use in the Indigo process.

2.2.14.2 Measured concentrations in the waste water to the BSA have yielded an average total cynaide concentration of 4.1 mg/liter ranging from 0.2 to 20.8 mg/liter.

2.2.14.3 Stable iron complexes of cyanide are also present in the waste water such that the method for total cyanide would give an artifically high estimate of the presence of the two free cyanide salts in the waste water.

2.2.15 Methanol

2.2.15.1 Methanol is introduced to the process waste sewer from both the Indigo and the N,N-Dimethylaniline processes.

2.2.15.2 Methanol is also a flammable liquid under 49 CFR 172.101

2.2.16 Ethanol

2.2.16.1 Ethanol is introduced to the process waste sewer from the N-Ethylaniline and N,N-Diethylaniline processes in Building 312.

2.2.16.2 Ethanol is a flammable liquid under 49 CFR 172.101

2.2.17 Formaldehyde

2.2.17.1 Formaldehyde is introduced to the process waste sewer from the Potassium Phenyl Glycine process.

2.2.18 1,3 Butadiene

2.2.18.1 1,3 Butadiene is introduced to the process waste sewer from the process in Building 312.

2.2.18.2 This material is volatile and is not likely to stay in waste water exposed to the atmosphere

2.2.18.3 1,3 Butadiene is a flammable gas under 49 CFR 172.101

2.2.19 Methylcyclopentadiene

2.2.19.1 Methylcyclopentadiene is introduced to the process waste sewer from the Nadic Methyl Anhydride process in Building 312.

2.2.19.2 This material readily reacts with itself to form the dimer or higher polymers and is therefore unlikely to exist in large concentrations in its nascent state. The fact that the reactions employed in production are anhydrous also greatly restricts the introduction of this material to the waste water.

2.2.19.3 Methylcyclopentadiene is a flammable liquid under 49 CFR 172.101

2.2.20 Nickel

2.2.20.1 Nickel is used in Building 312 to make a nickel catalyst. The spent catalyst is removed as a solid waste. Part of any spillage is washed to the process waste sewer.

2.2.20.2 Analysis of waste water going forward to the BSA has shown an average concentration of 0.330 mg/liter ranging from 0.034 to 1.080 mg/liter. The bulk of this is probably from the corrosion of pipes.

2.2.21 Chromium

2.2.21.1 No salts of this metal are employed for production or other uses at the plant.

2.2.21.2 Sampling of forward flow required as part of the plant's permit with the Buffalo Sewer Authority has shown an average concentration of 0.094 mg/liter ranging from 0.001 to 1.320 mg/liter.

2.2.22 Lead

2.2.22.1 No salts of this metal are employed for production or other used at the plant.

2.2.22.2 Sampling of forward flow required as part of the plant's permit with the Buffao Sewer Authority has shown an averge of concentration of 0.035 mg/liter ranging from 0.001 to 0.245 mg/liter.

2.2.23 Mercury

2.2.23.1 No use of this metal or its salts is made in the facility.

2.2.23.2 Sampling of forward flow to the Buffalo Sewer Authority has shown an average concentration of 0.0018 mg/liter ranging from <0.0001 to 0.0058 mg/liter

2.2.24 Arsenic
2.2.25 Barium
2.2.26 Cadmium
2.2.27 Selenium
2.2.28 Silver

2.2.28.1 No use is now made of any of these metals or their salts in the facility.

2.2.28.2 These are included to address the identification criteria of 6NYCRR 371.

2.2.29 Endrin
2.2.30 Lindane
2.2.31 Methoxychlor
2.2.32 Toxaphene
2.2.33 2,4-D
2.2.34 2,4,5-TP Silvex

2.2.34.1 None of these pesticides has ever been used or made at this facility.

2.2.34.2 These are also included to address the identification criteria of 6NYCRR 371.

2.3 Frequency of Sampling

2.3.1 Samples collected are 24-hour composites (proportional to flow)

2.3.2 Samples are collected at a minimum frequency of once per year at random dates uncoordinated with production.

2.3.3 Analysis is executed for each parameter until such time as:

2.3.3.1 There are five consecutive samples at the limit of detection, or

2.3.3.2 The average result is found to be less than the action level with a confidence level of 99% by Student's t-Test, or

2.3.3.3 The average result is found to be less than the background groundwater concentration in sampling wells upgradient from the surface impoundments with a confidence level of 99% by Students t-Test.

2.3.3 When manufacturing departments are running, process waste water generated at the total plant site does not change significantly over the year since the product line, its volume and type of process employed do not change. When analyzing, the process waste water stream prior to discharge to the surface impoundments, the sampling frequency will be maintained as long as product analysis indicates that yields and specifications are being met. More frequent analysis will be performed if a process deviation should occur which could effect the hazardous characteristics at the surface impoundments.

2.4 Sampling Device

An ISCO sampler will be used to obtain 24 one-hour samples. The 24 hourly samples will be used to make the composite by using volumes proportional to flow.

2.5 Preparation of Bottles and Sample Preservations

2.5.1 Sample containers will be maintained as follows:

2.5.1.1 Extractable Organics

The glass bottles and teflon liners will be washed with laboratory grade detergent, rinsed several times with tap water, and then rinsed with American Society for Testing and Materials (ASTM) Type 1 Deionized Water (organic free). The bottles and liners will be rinsed again with pesticide grade acetone and dried in an oven at 105^{o} for one hour. The bottles then will be sealed with the teflon-lined caps.

2.5.1.2 Metals

Polyethylene bottles and caps will be washed with laboratory grade detergent, rinsed several times with tap water, then cleaned with diluted, metals grade nitric acid. The bottles will then be rinsed with deionized water, allowed to air-dry, and then capped.

2.5.1.3 All Other Parameters

The glass bottles and teflon liners will be washed with laboratory grade detergent, rinsed several times with tap water, then rinsed with distilled water.

2.5.2 Sample Preservations

2.5.2.1	Corrosivity (pH)	None
2.5.2.2	Ignitability (flash point)	None
2.5.2.3	Reactivity (Cyanides)	$C_6H_8O_6$,NaOH to pH>12, 4 deg C
2.5.2.4	Reactivity (Sulfides)	$ZnC_2H_3O_2$,NaOH to pH>9, 4 deg C
2.5.2.5	Aniline	H_2SO_4 to pH > 2
2.5.2.6	N-Methylaniline	H_2SO_4 to pH > 2
2.5.2.7	N,N-Dimethylaniline	H_2SO_4 to pH < 2
2.5.2.8	N-Ethylaniline	H_2SO_4 to pH < 2
2.5.2.9	N,N-Diethylaniline	H_2SO_4 to pH < 2
2.5.2.10	Sodium Hydroxide (Alkalinity)	4 deg C
2.5.2.11	Potassium Hydroxide (Alkalinity)	4 deg C
2.5.2.12	Sodium Cyanide (Free Cyanide)	NaOH to pH >12,4 deg C
2.5.2.13	Potassium Cyanide (Free Cyanide)	NaOH to pH >12,4deg C
2.5.2.14	Cyanides (Total Cyanide)	NaOH to pH >12, 4 deg C
2.5.2.15	Methanol	Seal tight - no air space
2.5.2.16	Ethanol	Seal tight - no air space
2.5.2.17	Formaldehyde	Seal tight - no air space 4 deg C
2.5.2.18	1,3 Butadiene	4 deg C
2.5.2.19	Methylcyclopentadiene	4 deg C
2.5.2.20	Nickel	HNO_3 to pH < 2, 4 deg C
2.5.2.21	Chromium	HNO_3 to pH < 2, 4 deg C
2.5.2.22	Lead	HNO_3 to pH < 2, 4 deg C
2.5.2.23	Mercury	HNO_3 to pH < 2, 4 deg C
2.5.2.24	Arsenic	HNO_3 to pH < 2, 4 deg C
2.5.2.25	Barium	HNO_3 to pH < 2, 4 deg C
2.5.2.26	Cadmium	HNO_3 to pH < 2, 4 deg C
2.5.2.27	Selenium	HNO_3 to pH < 2, 4 deg C
2.5.2.28	Silver	HNO_3 to pH < 2, 4 deg C
2.5.2.29	Endrin	$Na_2S_2O_3$ 4 deg C
2.5.2.30	Lindane	$Na_2S_2O_3$ 4 deg C
2.5.2.31	Methoxychlor	$Na_2S_2O_3$ 4 deg C
2.5.2.32	Toxaphene	$Na_2S_2O_3$ 4 deg C
2.5.2.33	2,4-D	$Na_2S_2O_3$ 4 deg C
2.5.2.34	2,4.5-TP Silvex	$Na_2S_2O_3$ 4 deg C

2.6 Chain of Custody and Sample Integrity

2.6.1 The field sampler will be personally responsible for the care and custody of the collected samples until they are transferred or properly dispatched to the laboratory. The sampler will apply the custody seal to the container upon completionof sample collection, label the container, and complete the chain of custody record. An indelible ink pen will be used for labeling purposes.

2.6.2 Samples will be accompanied by a chain of custody record. When transferring the possession of samples, the individuals relinquishing and receiving will sign, date, and note the time record. This record will document the transfer of custody of the samples from the sampler to another person, or the laboratory doing the anlaytical work.

2.6.3 The outside laboratory will assure that the possession of samples is traceable from the time the samples received. To maintain and document sample possession, the laboratory will follow chain of custody procedures. A sample custodian or a designated alternate will receive samples from the laboratory and will verify that the information on the sample label matches that on the chain of custody record. The custodian will sign the custody record in the appropriate space.

2.6.4 The sample will be stored in a secure area with access limited to the sample custodian. The removal of samples for analysis will be documented by a chain of custody form kept by the sample custodian.

2.6.5 Samples forwarded to the laboratory for analysis will be retained after the analyses are completed. These samples may be disposed of only at the direction of BCC. All chain of custody forms will become part of the laboratory records.

2.7 Methods of Analysis

2.7.1 Physical/Chemical Parameters

2.7.1.1 Corrosivity

Corrosivity is determined by measuring pH using Method 150.1 from Methods for Chemical Analysis of Water and Wastes, USEPA, (Cincinnati, Ohio March 1983). This reference will be hereinafter refered to as MCAWW.

2.7.1.2 Ignitability

Ignitability is determined by measuring flash point using a Pensky-Martens Closed Cup Tester by the method specified in ASTM Standard D-93-79.

2.7.1.3 Reactivity

Reactivity is determined by measuring cyanide and sulfide in the waste water. Cyanides are discussed in 2.7.2.10 and Sulfides are discussed in 2.7.2.17 below.

2.7.2 Known Hazardous Constituents from Current Usage or Analysis

2.7.2.1 Aniline
2.7.2.2 N-Methylaniline
2.7.2.3 N,N-Dimethylaniline
2.7.2.4 N-Ethylaniline
2.7.2.5 N,N-Diethylaniline

These five constituents are determined by EPA Method 625.

2.7.2.6 Sodium Hydroxide
2.7.2.7 Potassium Hydroxide

The combined impact of these two materials is determined by measuring alkalinity using MCAWW Method 310.1 after precipitating carbonates with Barium Chloride.

2.7.2.8 Sodium Cyanide
2.7.2.9 Potassium Cyanide
2.7.2.10 Cyanides

Free cyanides (P106 and P098) are determined using MCAWW Method 335.1 while total cyanide (P030) is determined using MCAWW Method 335.2. The quantity of complex (non-reactive) cyanide can be obtained as the difference between the two analyses.

2.7.2.11 Methanol
2.7.2.12 Ethanol

Methanol and Ethanol are determined by EPA Method 602 (modified).

2.7.2.13 Formaldehyde

Formaldehyde concentration is determined by EPA Method 602 (modified)

2.7.2.14 1,3 Butadiene
2.7.2.15 Methylcyclopentadiene

Concentrations of these materials are determined by EPA Method 602 (modified).

2.7.2.16 Nickel

Nickel is determined by MCAWW 249.2

2.7.2.17 Sulfide

Sulfide is determined by MCAWW Method 376.2

2.7.2.18 Chromium
Chromium is determined by MCAWW Method 218.3

2.7.2.19 Lead
Lead is determined by MCAWW Method 239.2

2.7.2.20 Mercury
Mercury is determined by MCAWW Method 245.1

2.7.3 Other hazardous constituants which may be present in the waste stream:

2.7.3.1 Arsenic
Arsenic is determined by MCAWW Method 206.2

2.7.3.2 Barium
Barium is determined by MCAWW Method 208.2

2.7.3.3 Cadmium
Cadmium is determined by MCAWW Method 213.2

2.7.3.4 Selenium
Selenium is determined by MCAWW Method 270.2

2.7.3.5 Silver
Silver is determined by MCAWW Method 272.2

2.7.3.6 Endrin
2.7.3.7 Lindane
2.7.3.8 Methoxychlor
2.7.3.9 Toxaphene
2.7.3.10 2,4-D
2.7.3.11 2,4,5-TP Silvex
Pesticides are determined by EPA-600 4-79-020 "Methods for Benzidine, Chlorinated Organic Compounds, Pentachlorophenol, and pesticides". Appendix III page 7 and page 115.

3. Security

3.1 Uniformed Guards

All access to the plant is controlled by a uniformed guard service. Currently Pinkerton, Inc. is contracted for this service. A permanent guard-house is maintained in Building 123 and a small guard station is maintained at the South Park Avenue gate. These are shown on the facility plot plan in Appendix G. In addition there are constant patrols to report abnormal conditions or visitors not properly signed in.

3.2 Gates

Except for demolished portions of the facility on the Buffalo River side of Area D the facility is surrounded by chain link fence. Access is restricted through 29 gates. They are:

3.2.1 Area D Buffalo River

This gate faces the river and is not secure. The river fence on the perimeter of Area D is not continuous.

3.2.2 Area D Railroad (1)
3.2.3 Area D Railroad (2)
3.2.4 Area D Railroad (3)

These three pedestrian gates are secure and face the Conrail tracks. They are always locked.

3.2.5 Area D Under Railroad Bridge

This gate is always locked. Area D is no longer an active part of the plant. Buildings which formally stood in this area have been demolished and removed. Fences and security provisions which formally served this area, while still partially present should not be considered secure. The gate which separates Area D from Area A blocks the road which passes under the abandoned DL&W Railroad bridge.

3.2.6 Area A Railroad

This gate is normally locked. It is opened only to pass Conrail railroad tank cars full of product or raw materials. When this gate is open uniformed guards or plant personnel are always stationed nearby.

3.2.7 Area A South Park Avenue (Trucks)
3.2.8 Area A South Park Avenue (Pedestrians)
3.2.9 Area A South Park Avenue (Trucks)
3.2.10 Area A South Park Avenue (Pedestrians)

These gates are used for shipping and receiving finished products and raw materials. When not in use they are locked. When any of these gates are open a uniformed guard is present.

3.2.11 Area B Lee Street Building 121

This is a door on the building facing the street. It is used by the people who work in this building, all of whom carry keys. This door is otherwise always locked.

3.2.12 Area B Prenatt Street

Visitors must sign in and out and obtain a visitor's badge when in the plant area. The guardhouse is located in Building 123 just inside the gate and a uniformed guard is stationed at a

window facing it. This gate is opened during the day shift and is kept closed during the night shifts except when Conrail Railroad tank cars pass through it. This gate is under surveillance 24 hours a day.

3.2.13 Area B Railroad

This gate provides access to the Conrail tracks. When it is open a uniformed guard is stationed at it. It is normally locked.

3.2.14 Area B Railroad

These are pedestrian gates facing the Conrail Property. They are always locked.

3.2.15 Area C Railroad (1)

This is a gate providing access to the plant by a railroad spur from Conrail. When it is opened there is a uniformed guard posted to maintain security. All other times it is locked.

3.2.16 Area C Railroad (2)

These are pedestrian gates facing the Conrail property. They are always locked.

3.2.17 Area B Prenatt Street

This is the main gate to the parking lot. It is usually open and is under surveillance 24 hours a day.

3.2.18 Area C Lee Street

This gate is always locked.

3.2.19 Area B Lee Street Vehicle
3.2.20 Area B Lee Street Pedestrian

These gates are open from 6:00 A.M. to 6:00 P.M. and at the change of the midnight shift. They admit workers and their vehicles.

3.2.21 Area E Lee Street (Bldg. 322)

This complex gate can be opened to either the shipping and receiving dock Building 322 (it's normal orientation during the day shift) or to Building 312 (where raw material is delivered) or to the warehouse Building 322. Buffalo Color employees are on duty at the respective buildings during any of these openings of this gate.

3.2.22 Area E Building 312
3.2.23 Area E Building 310

These gates are not used and are always locked.

3.2.24 Area E Lee Street

This is the main entrance to Area E and normal plant traffic passes through it during the day shift. This gate can not be seen directly from the nearby guardhouse at Building 123 so a closed circuit television camera is used to monitor it. The gate can be locked and opened by remote control from the guardhouse.

3.2.25 Area E Lee Street Railroad
3.2.26 Area E Railroad (1)

These gates admit Conrail railroad tank cars which transport raw materials and finished products to and from Area E. These gates are normally locked and a uniformed guard is present whenever they are opened.

3.2.27 Area E Prenatt Street (Railroad 1)

This gate is always locked. It formerly allowed access to a Buffalo Color-owned railroad spur which used to service the Pretreatment facility when lime used for treatment of acidic wastes, was delivered by rail.

3.2.28 Area E Elk Street Parking Lot (1) Vehicle Gate
3.2.29 Area E Elk Street Parking Lot (2)

This is a pedestrian gates facing the secured parking lot on Elk Street. The gates are always locked.

3.2.30 Area E (Maurice Street)

This gate is normally locked. It allowes access to the Pretreatment facility for sludge hauling trucks when that material was generated from the use of lime. It will be used for vehicles trucking away sludge or clay in any closure operation. At such a time a uniformed guard is stationed at the gate.

3.2.31 Area B Parking Lot (Vehicle)

This gate is normally locked. It is opened only when plant traffic in Area B is restricted along the regular roadway. This gate is under closed circuit television surveillance 24 hours a day.

3.2.32 Area B Parking Lot (Pedestrian)

This gate is open all the time. It is under surveillance from the nearby security office in Bldg. 123.

3.2.33 Area B Lee Street Building 100

This is a double door lobby entrance to the new Building 100 Administration Building. It is open to ingress from 7:00 A.M. to 4:45 P.M. and for egress from 6:00 A.M. to 6:00 P.M. During the day a receptionist is on duty.

3.2.34 Building 100 Punchhouse

This is the punchhouse through which hourly employees pass. There is a uniformed guard on duty at shift change times; 6:00 A.M. - 8:30 A.M., 2:30 - 4:30 P.M., and 11:00 P.M. - 12:30 A.M. The punchhouse also serves as home base for one of the mobile security guards on the night shifts 4:00 P.M. - 8:00 A.M. In addition, the door to the punchhouse is under closed circuit television surveillance 24 hours a day.

3.3 Surface Impoundments Area Building 324

3.3.1 The Pretreatment plant is located in a part of Area E that is removed from the manufacturing areas.

3.3.2 The Solid Waste Control Building 324 is located 60 feet inside the fence separating Area E from the railroad tracks. Building 324 is locked except when there is hazardous waste management activity. A 15" X 24" sign on the gate contains the inscription "HAZARDOUS WASTE - KEEP OUT" in 2 inch letters. The sign is readable more than 25 feet from the gate. All signs are in English only.

3.3.3 The surface impoundment area is not surrounded by a fence of it's own, but the area immediately surrounding the lagoons is posted with warning signs like the one on the gate of the Solid Waste Control Area.

3.3.4 Lighting is provided by "street lights" near the lagoons.

4. Inspection Schedule

4.1 Formal inspections of the entire plant site are carried out on a monthly basis. The inspection team consists of representatives of the hourly force and management. Items included are safety, general housekeeping, industrial hygiene, environmental. Although there is not a written form for this inspection, a narrative report is filed. The plant procedure for housekeeping practices is presented in Appendix 0.6.1.

4.2 In addition, the uniformed guard service inspects the entire plant four times per eight hour shift. Some items specifically covered during this inspection are: unauthorized entry, all outside storage tanks, idle buildings, outside alarm systems, and fire hydrant pressures and accessability. This shift report is shown in Appendix 0.6.2

4.3 It is the responsibility for each shift foreman to be aware of conditions in his buildings and have any abnormal circumstance reported or malfunctioning equipment shut down. See the Spill Prevention Control and Countermeasures Plan in Appendix D.

4.4 The surface impoundments, their control equipment, and solid Waste Control Area are also specifically inspected by the Treatment Plant operators as part of their duties as described in Appendix B. Their inspections are documented on three inspection forms.

4.4.1 Lagoon Periphery Inspection Log
4.4.2 Surface Impoundment Control Inspection Log
4.4.3 Solid Waste Control Area Inspection Log

4.5 Copies of these documentation forms and others are included in Appendix 0. The frequencies of inpections are indicated on the forms. Until a form is completed it is kept in the office of the Treatment Plant, Building 351. When a page is complete it is forwarded to the Environmental Affairs Department, Building 121, where it is kept on file.

5. Contingency Plan

5.1 The surface impoundments are a relatively small part of the dye manufacturing plant and due to the low concentrations of the waste in aqueous solution, constitute an extremely remote source of emergency problems compared to the other areas of the plant where bulk quantities of full strength industrial chemicals are routinely handled by scores of workers.

5.2 In order to address the possibilities of an emergency situation the plant has developed and refined over the years a document called the Disaster Control Plan. This document defines a set of procedures and steps to be taken in the event of a serious emergency such as a fire, explosion, tornado, plan crash, or something of that order. A copy is presented as Appendix C.

5.3 In order to address the possibility of a spill situation, the plant has developed a Spill Prevention, Control and Countermeasures (SPCC) Plan. Since the operating areas are located over floor drains which would convey spills to the process waste sewer and the surface impoundments, spills constitute the most likely "contingency". A revised SPCC Plan is presented in Appendix D.

5.4 Other contingencies, such as power failures affecting the lift pumps of the treatment plant are addressed in the Treatment Plant Operating Manual in Appendix B.

5.5 All operating foremen, mechanical foremen and guard force are equipped

with two-way radios for instant communication. In addition, a special telepphone number, when called, alerts the guard office to the location and type of emergency. The plant has an in-plant fire and rescue squad available on all shifts. Equipment available in case of emergency are: portable fire extinguishers, special equipment such as foam, dry chemicals, spill control equipment, and fire control equipment such as hoses, ladders, emergency lights and self-contained oxygen masks.

5.6 This emergency action squad has monthly drills that simulate an emergency at a different plant location each time. In addition, training sessions are held at the Erie County Fire Training Tower.

5.7 Buffalo Color Corporation has submitted copies of the Disaster Control Plan to the Buffalo Fire Department, Buffalo Police Department. Mercy Hospital, the closest institution of its type, was also sent a copy of the plan. In addition, members of the nearest Buffalo Fire Department are brought in for plant tours and discussions on the emergency handling of various chemicals found at the site. Copies of the correspondence with these departments are found in Appendix C.

6. Ignitable and Reactive Wastes

The surface impoundments do not contain ignitable or reactive wastes in concentrations where, in combination, accidental ignition could occur. The waste stream is process waste water that contains small amounts of some listed hazardous waste. Since it is a dilute aqueous solution it does not meet the ignitable and/or reactive characteristics criteria as defined in 6NYCRR 371. In addition, due to its aqueous state, the impoundment wastes do not meet the "incompatible waste" definition as defined by 6NYCRR 370 Reference the analysis listed in Appendix A.

7. Access

7.1 The Buffalo Color site has an asphalt-paved roadway system with access to all areas. All roads are kept in good condition so that unsafe road conditions are at a minimum. All traffic in the plant area is subject to an enforced speed limit of 10 mpg. The plant-owned vehicles consist of mainly forklifts, 1/2 ton pick-ups, and small vans. Outside trucking would be the normal "over the road" vehicles (averaging 70,000 lbs. gross per load) conforming to the U.S. Department of Transportation's restrictions. These trucks are escorted to plant destination by representative from the uniformed guard force. In addition, drivers of all tank trucks are required to sign a form at end of delivery stating whether a spill occurred during the unloading of their vehicle. All roads in the plant area have been exposed to loads of 80,000 - 90,000 pounds and have not exhibited any fractures or undue stress. In addition, there has been no evidence of these loads causing any fracture in sewer lines, storm water lines or cooling water disicharges. Frequency of large truck movement in the plant is about three a day, on Monday thru Friday schedule. There is no shipping or receiving on Saturday or Sunday.

7.2 For the purpose of providing security, access, and maintenance, roads are positioned in the vicinity of the impoundments. There is no routine traffic of plant vehicles in the surface impoundment area. Outside vehicles in this area are only allowed when sludge is being removed from the lagoons. At that time they would use the Maurice Street gate (3.2.30). The closest area open to traffic is the drum storage area and that is open to outside vendors on a limited basis under strict supervision of the Operating Department. Shipments of the drummed material average 1-2 trucks per month or about 16 per year. Each full shipment containing about 80 drums of solid waste material enters and leaves the facility through the Area E Lee Street gate (3.2.24).

8. Facility Location Documentation

8.1 Seismic Standard

As these are existing facilities rather than new, the seismic standard does not apply. The plant site is not in a fault area.

8.2 Maps and Photograph

8.2.1 Facility Plot Plan (Appendix G)

Plant drawing (SC89241-1) has been modified to show the following features:

8.2.1.1 Property line
8.2.1.2 Secure Perimeter
8.2.1.3 Gates
8.2.1.4 Guardhouses
8.2.1.5 Sampling Location
8.2.1.6 Pump over line from PVS Chemical

8.2.2 Area Surrounding Facility (Appendix H)

Buffalo Zoning Maps have been obtained from the City Planning Office. These maps show the neighborhood surrounding the facility. An extract from the Buffalo City Zoning Ordinance is included in the appendix as a legend to the maps

8.2.3 Aerial Photograph of the Facility (Appendix I)

8.2.4 Topographic Map of Facility (Appendix J)

8.2.4.1 The entire facility lies between the 580 and 590 feet above sea level contours. The elevation of the plant is a fairly consistant 584 feet above sea level.

8.2.4.2 It has been judged that a 585 feet above sea level contour would not come within a quarter mile of the facility.

8.2.5 Flood Plain Maps (Appendix K)

8.2.5.1 Published flood plan maps truncate the facility, dividing it between two plates. A combination plate has been produced from the two published plates from Flood Insurance Rate Maps and this is also included in the Appendix.

8.2.5.2 The scale on these maps is 880 feet per inch instead of the recommended 200 feet per inch. Elevations within a 1000 foot radius of the surface impoundments vary between 584.203 and 584.703 above sea level. This is a variation of only six inches.

8.2.5.3 The location of the surface impoundments is indicated on the maps in red.

8.3 Hazardous Waste Management Facility

The hazardous waste management facility consists of two surface impoundments. These impoundments are within the 100 year flood plain as shown in Appendix K. The third, lagoon #3, is in the process of closure and does not constitute part of this application.

8.4 Wind Rose

Appendix L shows an annual wind rose of meteorological data collected from 1951 to 1960 at the U.S. Weather Bureau Station situated approximately 10 miles north east of Buffalo Color Corporation.

8.5 Flood Plain Standard

The Buffalo Color Corporation facility is located in the vicinity of the Buffalo River at river mile 4.5 - 5.5. The 100 year flood plain elevation at the site is 590 feet.

Appendix K shows that portion of the National Flood Insurance Program flood map that contains the plant site. As explained previously this figure was made from Panel 10 and Panel 20 Flood Insurance Rate Map for the City of Buffalo, New York. The total plant site is located in the zone labeled "B" which indicates areas of the 100 year flood, during which there should be shallow flooding of an average depth of 1 foot or less at the impoundment area.

8.6 Flood Proofing and Flood Protection Measures

The Buffalo River, normally relatively slow, has a median low monthly flow of 49 cfs and during spring, runoff may exhibit monthly flows as high as 1254 cfs for short periods. During any high flow periods, no problems have been encountered with river levels.

If, in the event of the 100 year storm and flooding levels of 1 foot or less, the berm surrounding each impoundment is at an elevation of 600 foot mean sea level equivalent to approximately 10 feet above the flood plain. In the event of an anticipated 100 year flood, the surface impoundments would be emptied of corrosive process waste and could fill with flood water via sewers. Floor drains in all manufacturing buildings are connected to the process waste water sewers discharging to the surface impoundments. In a 100 year storm, all first floor drains would be under water and the process waste sewer would overflow to Lagoon #1 until equlization took place. Lagoon #2 is prevented from filling because the lift pumps carry the waste water first through an elevated loop which is higher than the anticipated 1 ft of standing water in a 100 year storm.

8.7 Flood Plan

In the event of a 100 year flood, the manufacturing facilities on site would be shut down at a time prior to flood crest. Shutdown would be orderly so as to protect safety of workers and equipment.

8.7.1 During and following this shutdown period, the bulk of the process waste in the surface impoundments would be treated and pumped forward to the Buffalo Sewer Authority System. At maximum flow rate 1,000,000 gallons can be sent forward in 11 hours. The empty lagoons should not pose any problem during flood stage, even if Lagoon #1 is filled with flood water.

8.7.2 Abandoned deep well (see 8.10 below) and in the event of a 100 year flood Area E would be under 1 foot of water. This would have little or no effect on the deep well for the following reasons:

8.7.2.1 The well has a welded steel cap.
8.7.2.2 The top of the well is 2 feet above grade.
8.7.2.3 The area surrounding the well is paved right up to the well itself.

8.8 Flood Control/Drainage

General drainage on the property is collected by street drains and discharged through the clear water (BRIC non-contact cooling water) sewer to Buffalo River, under an SPDES permit. All roof drains and downspouts discharge rainfall to street drains. Only process wastes are introduced to the sewers leading to the surface impoundments.

8.9 Plan for Future compliance

At present, it has been judged that the "Flood Plan" is sound. There are no plans to alter this procedure.

8.10 Injection Wells and Withdrawal Wells

An idle injection well is located north of Building 312. This well was used for disposal of a 40% Ammonium Sulfate solution during the period covering 1957 - 1963. In 1963, this process developing the waste was

moved to a plant in another state. Since that time, there has been no attempt to use the well nor are there any plans to do so. There are no other wells on site nor are there any drinking water wells off-site within one-half mile of the facility. See Section 14.

8.11 Buildings

Appendix G shows the manufacturing buildings, structures, and the surface impoundment area. A detailed description of the manufacturing areas is given in Section 1.4 above.

8.12 Recreation Areas

Not applicable.

8.13 Runoff Control

All process waste is collected and, after equalization in the surface impoundments, is pH adjusted and discharged to the Buffalo Sewer Authority System. Runoff is collected in the cooling water sewer system and discharged to the Buffalo River from two outfalls under SPDES Permit No. NY-002470.

There are no other outfalls to the Buffalo River from the facility.

8.14 Deed Notification

8.14.1 Documentation of Notice on Deed per 6NYCRR 373-2 is presented in Appendix T.

8.14.2 Documentation of the type, location, and quantity of wastes held in the surface impoundments is also presented in Appendix T.

9. Training

9.1 Introduction

Buffalo Color Corporation operates the plant site with a labor contract with the United Steelworkers Union. Based on this contract, job requirements are strictly defined. This and seniority minimize unwarrented rotation in operation. Educational requirements for the union labor force are: ability to understand and follow instructions, and pass a physical exam that is work related. The operators of the process waste treatment plant are also responsible for the operation and inspection of the surface impoundments and the containerized solid waste area. Under the labor contract, normal mechanical repairs, installation or removal of equipment can not be done by the operating staff. Such work must be done by a qualified tradesperson. Training is conducted as part of a general facility training program. "Safety Meetings" are held monthly in all departments. In addition to safety and health issues, administrative instruction in plant policies, practices, and procedures is presented to the workers.

9.2 Documentation of Training

9.2.1 Safety Meetings

Minutes are kept of each safety meeting in each department. These meetings are usually conducted by the foreman or supervisor of the operating department. Those in attendance sign on "sign-in" sheets which are a part of or are attached to the minutes of the meetings. The minutes and sign in sheets are forwarded to the Safety Department where they are filed and retained.

9.2.2 Special Training

Special training sessions are held when there is a particular body of knowledge which requires special emphasis or as part of on the job training. This training may be conducted by supervision or by representatives of the staff function in question; Safety, Environmental, Employee Relations, etc.

9.2.3 Hazardous Waste Training

Hazardous waste training falls into both of the above categories. Some of the training is carried out at safety meetings and some is carried out as special training. The present documentation on file is as described above.

9.2.4 Health and Safety Training System

The files of the Safety Department are being computer coded to formalize and systematize the documentation of training. The Health and Safety Training System (HST) is being developed to better manage the training requirements. The system works as follows:

9.2.4.1 Subjects to be taught are assigned "course codes" so that each of the required topics is addressed by such a code. A list of these codes is presented in Appendix E.1. Those course codes related to Hazardous Waste Management are marked.

9.2.4.2 Subjects are grouped into "training groups". Appendix E.3 shows such groupings. Some of the training groups represent departments or areas of the facility where people work. Others represent categorical groupings of courses analogous to "majors" in college.

9.2.4.3 Workers are assigned to various training groups according to the location or nature of the work they do. Appendix E.2 shows the breakdown of worker assignments at the Buffalo Color facility.

9.2.4.4 A list of required courses for each worker is produced. As training is documented at the safety meeting or special sessions. The attendence of each worker will be noted and his frequency of training calculated. For each course, the computer sorts the categorized individuals into order of increasing frequency of training, such that the workers most needful of retraining appear at the top of the list and their frequency of training is brought to the attention of the trainer.

9.3 Hazardous Waste Management Training

9.3.1 Treatment Plant Operators

9.3.1.1 Operators are given special training as they start on the job. The sequenced training schedule is presented in Appendix E.7. All men now on the job have been Treatment Plant Operators since the system started up in 1971.

9.3.1.2 Routine training is conducted at the safety meetings. Appendix 0.5.1 is the form used by the treatment plant foreman to document the meetings. This form reflects the new course designations. Courses related to the operation of the surface impoundments are described in Section 9.4 below.

9.3.2 Hazardous Waste in Other Areas of the Facility

9.3.2.1 Although the surface impoundments contain process waste water which generally flows to them without being seen or felt by workers in the rest of the facility, hazards of the waste water are included in the required courses for operating departments (See Appendix E.3).

9.3.2.2 Training is also required in the hazards of solid wastes which are handled in the operating departments. The presence of these courses in the departmental training groups can also be seen in Appendix E.3.

9.3.3 Qualifications of Trainers and Trainees

9.3.3.1 Routine training at the safety meetings is done under the guidance of the Manager of Environmental Affairs.

9.3.3.2 His qualifications are presented in Appendix E.5.

9.3.3.3 Job titles and descriptions of Treatment Plant personnel are provided in Appendix E.6.

9.4 Courses of Study - Hazardous Waste Management

9.4.1 Treatment Plant Operators

9.4.1.1 HZW0001 HZW: Hazardous Waste (General)

This is an annual review of the RCRA regulations and of the responsibilities of the treatment plant operators under them. It includes both the surface impoundments and the drum handling requirements. This may be a formally presented lesson, a film, or a canned training program. A sample lesson plan is presented in Appendix E.7.

9.4.1.2 WTP0001 WTP: Initial Training of Operators

This is the initial training sequence (5 weeks) in which a new treatment plant operator is trained. It is largely an on the job course and is not repeated. A lesson plan is presented in Appendix E.8

9.4.1.3 WTP0002 WTP: Operator's Manual
9.4.1.4 WTP0003 WTP: Operating Record (Forms)
9.4.1.5 WTP0004 WTP: Freeboard Levels in Lagoons
9.4.1.6 HZW0006 HZW: Inspections: Lagoon Periphery
9.4.1.7 HZW0007 HZW: Inspections: Control Equipment
9.4.1.8 HZW0008 HZW: Inspections: Drum Storage

The subject matter for these courses is found in the WTP Operators Manual in Appendix B and the Operating Record in Appendix O.

9.4.1.9 RTK6000 RTK: Right to Know Sheets
9.4.1.10 HZW0002 HZW: Wastes: Toxic
9.4.1.11 HZW0003 HZW: Wastes: Corrosive
9.4.1.12 HZW0004 HZW: Wastes: Ignitable
9.4.1.13 HZW0005 HZW: Wastes: Reactive

The treatment plant operators are trained in the nature, hazards, and handling requirements for a host of materials which they handle in the course of their duties. These generally constitute the RTK6000 series of courses. A selection of these is presented in Appendix E.11.

9.4.1.14 RST0001 RST: Respirator Training
9.4.1.15 RST0003 RST: Types of Canister

All treatment plant operators are trained in the BCC Respirator Program. An abbreivated copy of the program is presented in Appendix E.12.

9.4.1.16 EGY0003 EGY: Disaster Control Plan
9.4.1.17 EGY0002 EGY: Evacuation Procedure
9.4.1.18 FAD0005 First Aid: Burn Emergency
9.4.1.19 FIR0005 Fire: In Drum Storage Area
9.4.1.20 FIR0006 Fire: In Lagoons

Treatment Plant Operators are trained in the Disaster Control Plan with special emphasis on evacuation procedures, first aid, and fire contingencies. The details of this plan can be found in Appendix C.

9.4.1.21 ENV00102 ENV: SPCC Plan

Treatment Plant Operators are trained in the provisions of the SPCC Plan with special emphasis on the notification requirements.

9.4.2 Workers in Other Parts of the Facility

9.4.2.1 RTK6000 Right to Know Sheets

Workers are trained in the chemical hazards they face using the Right-To-Know Sheets. Use of specific elements of RTK 6000 series (wastes) is made where workers in certain departments are exposed (usually during the drumming off).

9.4.2.2 EGY0003 ~~EG4~~ EGY: Disaster Control Plan
9.4.2.3 EGY0002 ~~EGY~~: Evacuation Procedure

Appendix C shows the Disaster Control Plan for the entire facility. Workers are trained in the evacuation procedures which relate to their area.

10. Closure

The Closure and Post-Closure Plans to meet the requirements of NYCRR 373-2 and 373-3 are found in Appendix F. The closure plan calls for the removal of sludge and contaminated clay folllowed by backfill. The Post-Closure Plan calls for groundwater monitoring for two years according to the groundwater

monitoring schedule in Appendix M. The plan for the closure Lagoon #3 has already been submitted and is still being reviewed by agency staff. Comments are expected shortly. Impoundment #3 was taken out of service in late 1984. Actual physical disconnection of the piping will be part of the closure but no hazardous waste is now entering the impoundment. Although it is not a part of this application, the Lagoon #3 documents are also included in Appendix F.

10.1 Closure Schedule

10.1.1 Lagoon #3

As indicated, the closure plan for this lagoon has been approved by NYDEC. A copy is included as Appendix F. It is projected that the closure will proceed as follows:

a)	Discontinuance of Usage	Nov 1984
b)	Physical Disconnection	May 1985
c)	Sludge Removal	May 1986
d)	Level, Fill, Cover, Seed	Jul 1986

10.1.2 Lagoon #2

This basin is next to go after Lagoon #3.

a)	Physical Disconnection	Oct 1986
b)	Sludge Analysis	Apr 1987
c)	N.Y. D.E.C Approval	Jul 1987
d)	Sludge Removal	Sep 1987
e)	Level, Fill, Cover, Seed	Nov 1987

10.1.3 Lagoon #1

This basin was upgraded in early 1984. In order to utilize its condition, for as long as possible within the regulations, its closure is projected as follows:

10.1.3.1 Option 1 Closure

a)	Physical Disconnection	Oct 1988
b)	Sludge Analysis	May 1989
c)	N.Y. D.E.C. Approval	Jul 1989
d)	Sludge Removal	Sep 1989
e)	Level, Fill, Cover, Seed	Nov 1989

10.2 Post Closure Schedule

Ground water sampling at monitoring wells surrounding the impoundment area will continue according to the schedule defined in Appendix M. This sampling will continue until sufficient data has been accumulated indicating that no level for two years or of any parameter has shown any increase between the downgradient and upgradient wells. Revisions of the data will be coordinated with the N.Y. D.E.C.

10.3 Closure Plan Cost

Projected closure costs have been on file with the Agency since 1983. Appendix F contains copies of updated closure and post-closure costs and financial assurance as specified in updated 6NYCRR 373-2 and 373-3.

10.4 Contingency Closure Plan

If during the course of operation, it became a requirement that the surface impoundments be closed, the following plan would be put in place. This plan assumes that all sludge would remain in impoundments as part of the fill.

10.4.1 All supernatent water in the impoundments would be pumped forward to the waste treatment plant and processed for discharge to the Buffalo Sewer Authority. A gasoline powered trash pump would be used so that suction could be moved to remove all pockets of liquors.

10.4.2 Clean fill will be used as needed to bring impoundment area up to grade. The final surface layer shall be capable of supporting vegetation.

10.4.3 The grade of the top layer shall be left in a condition that will not allow for standing water after rains or during the spring thaw. The entire area to be seeded with appropriate ground cover to prevent erosion.

10.4.4 As required by the regulation, ground water monitoring will start as soon as physical disconnection of impoundments is complete and such monitoring will continue for 30 years.

10.4.4.1 Three down gradient and two upgradient wells will be sampled quarterly.

10.4.4.2 The analysis will be those listed as groundwater contamination indicators - pH, specific conductance, total organic carbon and total organic halogen. Analyses will also include necessary replicates. Analytical methodology used will be those procedures approved by the agency.

10.4.4.3 In all sampling will follow approved protocols including cleaning at sampling equipment, sample bottle preparation, sample preservation and chain of custody.

10.4.5 All data will be forwarded to the agency on a yearly report.

10.4.6 Any significant deviation in sample analysis will: 1) be reported to appropriate agency personnel immediately and 2) increase sampling surveillance until cause of deviation is known.

10.5 Deed notification and notification of local authorities are included in Appendix T.

11. Ground Water Monitoring

11.1 Background on July 28, 1982 an authorized EPA representative conducted an inspection of the hazardous waste management activities at the plant site. At that time, it was indicated that the present surface impoundments ware considered to be in violation of Section 5005 of RCRA which requires permits. This condition was corrected on October 11, 1982 when a Part A new permit application was submitted. It was also pointed out at that time of inspection that the monitoring well data indicated there had been no indication of leaks to ground water.

On September 8, 1983 an EPA contractor - ERTC audited the ground water monitoring program at the site. Their report dated October 1983 indicated BCC was not in compliance with ground water monitoring as required by 40 CFR 265 Subpart F. On December 7, 1983 a proposed monitoring well installation and sampling program was submitted to EPA for review. Comments by ERTC and the EPA were received February 24, 1984. The complete proposal together with the comments was re-evaluated. Well installations were executed and the first sampling was conducted July 18, 1984.

On the basis of data collected on the neighboring PVS property and the geologists report presented in Appendix M.4, EPA required additional wells, this time in the shallow aquifer. This was required as part of a consent order. The wells were iinstalled on schedule and a report was filed on October 30, 1985. Sampling of the new wells began in November, 1985.

11.2 A ground water monitoring plan was prepared for the deep aquifer wells and is now being followed for both the deep and shallow aquifer wells. It is presented in Appendix M.1.

Thomsen Associates of Groton, New York was contracted to revise the Ground Water Quality Assessment Outline and this is presented as Appendix M.2.

Monitoring data collected to date is presented in Appendix M.3.

11.3 Groundwater Quality Assessment

A Groundwater Quality Assessment plan was submitted to NYDEC on January 10, 1986. On the basis of the finding of statistically significant changes between upgradient and downgradient wells, the plan was executed and an assessment report was filed on February 7, 1986. The plan and report can be found in Appendices M.5 and M.6.

12. Surface Impoundment Construction

12.1 Two of the impoundments (Lagoons #1 and #2) were put into operation in 1971. The third pond (Lagoon #3) was installed in 1976. The original installations were part of a "Consent Agreement" between the New York Department of Environmental Conservation that required removal of process waste in discharges to the Buffalo River. Lagoon #3 is not a part of this Part B Application.

12.2 Appendix R contains National Aniline Division Drawing No. SC-83618 which lists boring results of the area taken in 1946. The borings No, 2, 7, 12 Alt, and 13 Alt - were taken in the area where the impoundments are now located. The ground under the lagoons is generally clay down to bedrock.

12.3 Lagoon construction consisted of excavation of all fill, sand and other extraneous material. The bottom of the impoundment area was at the undisturbed clay region. The sides were built of natural soil with a surface containing at least three feet of compacted clay. The side slopes were constructed on a 1:1 ratio.

12.4 The surface impoundments are generally holding basins only. The process waste water is treated and sent forward to the BSA. Occasionally dilute sulfuric acid is purchased from the adjacent PVS Chemical Plant and added to the lagoons to partially neutralize the high alkalinity. Due to the historical reduction in the number of products made at the manufacturing site, the operating schedule for the impoundments is very liberal compared to its original design. The average retention time for the process waste is 1.2 days. The two impoundments are operated in alternating sequence with process flow into one unit with the other unit discharging to the Buffalo Sewer Authority's POTW.

12.5 In 1977, prior to the formation of Buffalo Color Corporation, Allied Chemical, with approval of the N.Y.D.E.C., removed the six year accumulation of sludge in impoundments #1 and #2. Both lagoons were cleaned of sludge and the side wall slopes and clay depths returned to

original 1971 specification of 1:1 slope and three feet of clay depth all around.

12.6 In 1983 Lagoon #1 was cleaned of it's own sludge accumulation and sludge which had been transferred from impoundments #2 and #3 to it again with the approval of the N.Y.D.E.C. The clay sides were changed to a 1:2 slope, a foot of clay was added to them, and a 3" layer of crushed gravel stone was added as reinforcement. The specifications for this renovation are contained in Appendix S.

12.7 Lagoons are operated to maintain at least 24 inches of freeboard. See Appendix B Section V.B.

13. Considerations under Federal Law

13.1 Buffalo Color operates and will operate the surface impoundments subject to the provisions of the following federal laws.

13.1.1 The Wild and Scenic Rivers Act
13.1.2 The National Historic Preservation Act of 1966
13.1.3 The Endangered Species Act
13.1.4 The Coastal Zone Management Act
13.1.5 The Fish and Wildlife Coordination Act

14. Information Regarding Potential Hazardous Waste and Hazardous Wast Constituent Releases from Solid Waste Management Units.

14.1 The following solid waste management units are known to have existed at the facility.

. Waste Piles	2
. Incinerator	1
. Container Storage Area	1
. Injection Well	1

The information which follows constitutes the substance of the federal questionnaire submitted earlier.

14.2 Descriptions of the waste that were stored, treated or disposed of in each unit are presented as follows:

14.2.1	Waste Pile 1 Weathering Area	Appendix V.1
14.2.2	Waste Pile 2 Iron Sludge Lagoons	Appendix W.1
14.2.3	Incinerator	Appendix X.1
14.2.4	Container Storage Area	Appendix Y.2
14.2.5	Injection Well	Appendix Z.1

14.3 Determination of hazardous characteristics in the wastes involved are presented as follows:

14.3.1	Waste Pile 1 Weathering Area	Appendices V.3, V.4
14.3.2	Waste Pile 2 Iron Sludge Lagoons	Appendices W.3, W.4
14.3.3	Incinerator	Appendix X.1
14.3.4	Container Storage Area	Appendix Y.2
14.3.5	Injection Well	Appendix Z.1

14.4 A description of each unit is presented as follows:

14.4.1	Waste Pile 1 Weathering Area	Appendix V.2
14.4.2	Waste Pile 2 Iron Sludge Lagoons	Appendix W.2
14.4.3	Incinerator	Appendix X.2
14.4.4	Container Storage Area	Appendix Y.1
14.4.5	Injection Well	Appendix Z.1

14.5 Information on any prior or current release of hazardous waste or hazardous waste constituents from the units is presented as follows:

14.5.1	Waste Pile 1 Weathering Area	Appendix V.5
14.5.2	Waste Pile 2 Iron Sludge Lagoons	Appendix W.5
14.5.3	Incinerator	Appendix X.4
14.5.4	Container Storage Area	Appendix Y.1
14.5.5	Injection Well	Appendix X.2

14.6 Analytical data on the extent of contamination of the units or releases from them are presented as follows:

14.6.1	Waste Pile 1 Weathering Area	Appendix V.4
14.6.2	Waste Pile 2 Iron Sludge Ponds	Appendix W.4
14.6.3	Incinerator	Appendix X.3
14.6.4	Container Storage Area	Appendix Y.3
14.6.5	Injection Well	Appendix Z.3

14.7 There are no other known sites of solid waste management units or hazardous waste releases at the facility.

D2.19

15. Exposure Information

15.1 General Information

15.1.1 Physical descriptions of the facility and of the processes which generate the waste streams which enter the surface impoundments are given in Section 1 above.

15.1.2 A detailed description of the analytical program used to determine the character of the waste stream in the surface impoundments is given in Section 2 above.

15.1.3 Security is discussed in detail in Section 3 while access control is described in Section 7 Above.

15.1.4 Inspection procedures are outlined in Section 4 above.

15.1.5 The contingency plan is discussed in Section 5 above. The plan is cross referenced to the facility SPCC Plan in Appendix D and to the Disaster Control Plan in Appendix C.

15.1.6 Procedures to prevent exposure via overfilling are presented as part of the operators manual in Appendix B.

15.1.7 The location of the facility is discussed in Section 8 above and is cross referenced from there to various appendices.

15.1.8 Closure plans, post-closure plans, and documentation of insurance are all presented in Appendix F.

15.1.9 A USGS topographical map can be found in Appendix J.

15.1.10 The list of wastes which run to the surface impoundments is presented in Appendix A.

15.1.11 A risk assessment report was done by a contractor for the facility's insurance carrier. There have been no liability claims made against Buffalo Color which were related to the surface impoundments. A copy of the latest report is found in Appendix AA.

15.1.12 Zoning maps for the immediate vacinity are presented in Appendix H. This appendix has been supplemented to include Lackawana, Cheektowaga, and West Seneca as well as parts of Buffalo within four miles of the facility. The additional maps can be found in Appendix AE.

15.1.13 The aerial photograph of the facility is presented in Appendix I.

15.1.14 The waste analysis has been augmented by two more samplings. Appendix A has been modified to reflect the new information.

15.1.15 The waste amounts presented in the Part A Application of March 11, 1985 are not changed as a result of the new analysis.

15.1.16 The Buffalo Sewer Authority regulates the discharge of process waste water from the facility. A copy of the current (BPDES) permit along with a summary of exceedences of permit levels is presented in Appendix AJ. None of the exceedences have been major. All reports and correspondence between the BSA and Buffalo Color are on file at the Environmental Services Department.

15.2 Groundwater Pathway

15.2.1 Exposure of the public to leaks from the surface impoundments to groundwater have been addressed both in design and in practice.

15.2.2 The design of the clay liner and leak detection systems of the surface impoundments are described in Appendices P and S while the operating procedures for leak detection and overfill prevention are described in Appendix B.

15.2.3 A system of wells has been installed and monitored in accord with the detailed groundwater monitoring program defined in Appendix M. A geologists report identifying an upper aquifer is also presented in Appendix M. That report is based in part on soil boring data from Appendix R.

15.2.4 Groundwater monitoring results from the well system can also be found in Appendix M. The monotoring program has completed the first year of samplings and is now awaiting the first of the sample sets which are to be compared with the now established "background" levels. No contamination has been indicated by the samplings to date and there is, therefore, no corrective action program, nor any need at this time to demonstrate an alternative concentration limit for any parameter.

15.2.5 Since the surface impoundments continue as an interim status unit, there is no detection or compliance monitoring program.

15.2.6 Neither the topographic maps (Appendix J) nor the zoning maps (Appendix H) nor the flood plain maps (Appendix K) nor the Buffalo River Soundings maps (Appendix AB) show any extraction wells or groundwater recharge or discharge in within four miles of the facility. The Erie County Health Department knows of no drinking water wells anywhere within the Cities of Buffalo or Lackawana, or within four miles of the plant in the towns of West Seneca or Cheektowaga.

15.2.7 No use appears to be made of groundwater in the area. The Allied Chemical deep well described in Appendix Z has been idle since 1963. The Mobil Oils Refinery's leak detection system, described in Appendix AC makes no use of the groundwater extracted, but forwards it immediately into the Buffalo Sewer Authority. That system probably depresses the water table near the surface impoundments.

15.2.8 Rainfall in the area averages 35.69 inches according to the U.S. Weather Service. The Climatic Atlas of the U.S. shows evaporation rates (taken with a Class A Pan Evaporator) at 35.5 - 36.0 inches per year. At face value this would seem to indicate no net precipitation. Obviously, the Class A Pan Evaporator method does not take into effect some real phenomena, the most probably important of which is the tendency of precipitation to percolate into groundwater.

A different approach is presented in Appendix AD (page 5) where the total rainfall to the Buffalo River watershed is compared with the measured flow of the river. Assuming that all of the groundwaters and run-off emerges as flow in the river, the implied net precipitation rate is 18.22 inches per year.

15.2.9 There has been no known contamination of the food chain due to releases from the surface impoundments to groundwater.

15.3 Surface Water Pathway

15.3.1 The surface impoundments are located within the watershed of the Buffao River. In normal operations the waste water moves to the Buffalo Sewer Authority and does not threaten the Buffalo River. Flood and storm water discussions are presented in Section 8.5 - 8.9 above.

15.3.2 Operating procedures and steps to be taken to prevent overtopping are presented in Appendix B.

15.3.3 The dike integrity certification is presented in Appendix U.

15.3.4 The Buffalo River is not used as a drinking water source, nor are any firms presently known to be using it for cooling water. Virtually all of the industrial effluents to the river have been either treated, diverted, or eliminated. A history of this process is presented in Appendix AL. The river undoubtedly still contains residuals from more than a century of heavy industrial activity. Maps showing the water intakes in the Niagara River which are ultimately "downstream" of the Buffalo River are presented in Appendix AF.

15.3.5 A set of U.S. Army Corps of Engineers Soundings Charts are presented in Appendix AB. Using Buffalo River natural flow data summarized in Appendix AD, and the dimensions of the cross sectional area of the river at the South Park Bridge taken from the soundings charts in Appendix AB, the following results are calculated:

		Median Flow Rate (MM Gal/Day	Area $_2$ (ft^2)	Velocity (ft/min)
15.3.5.1	January	451	3797.4	11.0
15.3.5.2	February	441	3797.2	10.8
15.3.5.3	March	810	3803.2	19.8
15.3.5.4	April	727	3802.1	17.8
15.3.5.5	May	231	3791.9	5.7
15.3.5.6	June	108	3787.0	2.6
15.3.5.7	July	39	3782.2	1.0
15.3.5.8	August	32	3781.4	0.8
15.3.5.9	September	41	3782.4	1.0
15.3.5.10	October	67	3784.5	1.6
15.3.5.11	November	279	3793.6	6.8
15.3.5.12	December	467	3797.7	11.4
15.3.5.13	Annual	344	3770.1	8.5

15.3.6 In order to maintain the time series used in the preparation of Appendix AD, the Buffalo River has been sampled at the Michigan Street Bridge. A summary of these data is presented in Appendix AI. All of these samples were grabbed using dipping bottles.

15.3.7 There have been no known releases to the Buffalo River from the surface impoundments since their beginning in 1971. Prior to that date the waste water which now passes through the impoundments went directly to the Buffalo River. The description of this process can be found in Appendix AD. The waste water now goes to the Buffalo Sewer Authority after neutralization. The BSA secondary plant achieves approximately 90 percent abatement of BOD before discharging to the Niagara River.

15.3.8 The surface impoundments have caused no known food-chain contamination through the surface water pathway.

15.4 Air Pathway

15.4.1 The surface impoundments carry only a slight potential for air contamination. Since the organic species present are present in low aqueous concentrations, they offer very small partial pressures to the atmosphere. Normal operation of the surface impoundments do not result in any significant air emissions of hazardous materials.

15.4.2 The impoundments have been registered as air pollution sources with the New York State Department of Environmental Conservation. Copies of the air permits are presented in Appendix AJ. Annual emissions of hazardous materials from the impoundments are minor.

15.4.3 Data collected for Appendix A shows that the material in the surface impoundments has no flash point. There is no danger of dilute aqueous concentrations catching fire.

15.4.4 Buffalo Color has conducted no air monitoring work in the area surrounding the unit. Erie County conducted some ambient monitoring for the Anilines as a special project. A copy of their report is included as Appendix AG.

15.4.5 The civilian population within a 4 mile radius of the impoundments is calculated in Appendix AH.

15.4.6 There have been no releases to the air beyond those permitted by NYDEC.

15.5 Subsurface Gas Pathway

15.5.1 Since the unit in question is a surface impoundment, it is by definition on the surface of the ground and therefore open to the atmosphere. Releases of gas would therefore be almost immediately lost as air emissions. Such emissions are discussed in Section 15.4 above. The clay lined bottoms and sides of the lagoons effectively prevent downward migration of gas as well as liquid. The leak detection system trench which surrounds the impoundments is also vented to the atmosphere.

15.5.2 The materials which constitute the contaminants in the waste water are not present in concentrations sufficient to liberate dangerous quantities of gas. The highly alkaline state of the waste water also reduces the potential for gas release.

15.5.3 The surface impoundments are built on fill material as indicated in Appendix M.4. The origin of this fill material is unknown. There has been no known disposal of municipal type wastes at or near the surface impoundments.

15.5.4 The principal conduit for gas migration away from the site of the surface impoundments is the system of process waste sewers, maps of which are presented in Appendix N.1. The Buffalo Sewer Authority sewers include storm drainage lines and service laterals which parallel all of the city streets. The location of the city streets in proximity to the surface impoundments can be seen in Appendices H, K, and N.3.

15.5.5 There are no monitoring or control systems for subsurface gas release nor have there been any known releases.

15.6 Contaminated Soil Pathway

15.6.1 There has been no known release from the surface impoundments which has resulted in the contamination of the soil surrounding the unit.

15.6.2 The lagoons have filled with sediment several times during the course of their existance and in the course of the removal of those sediments some of the clay liners have been mixed with the material removed. When this occurred, the clay could be said to have been "contaminated" with the sediments. However, in each case the resulting solids have been found to be non-hazardous. The solids were in each case removed to licensed landfills and the clay liners were restored.

15.6.3 Sampling of the soils around the surface impoundments for contamination has not been executed.

15.6.4 All clay removed from the lagoons has been landfilled. There has been no use of the removed clay for raising crops. Consequently, there has been no food-chain contamination.

15.7 Transportation Information

15.7.1 Traffic patterns of vehicles going to or near the treatment plant are described in Section 7.2 above.

15.7.2 Waste is transported to the surface impoundments via the process waste sewer from the processing departments. This is described in detail in Section 1.3 above. The pumping system can lift as much as 2,000,000 gallons per day to the surface impoundments, but the average flow in the past few years has been on the order of 400,000 gallons per day with peaks of 1,000,000 gallons per day.

15.7.3 During abnormal operations waste water may be pumped between or to the impoundments by means of portable trash pumps. During a spill clean-up a vacuum truck owned by a disposal vendor may be contracted to pick up waste water from one part of the plant and convey it to the surface impoundment through any of the manholes of the process waste sewer. Under normal conditions process waste water moves to the surface impoundments unassisted.

15.7.4 Sulfuric acid purchased from PVS Chemical is pumped to the surface impoundments via a pipeline between the two facilities.

15.7.5 Drummed wastes are brought to the drum disposal area on ordinary plant lift trucks ranging in capacity from four drums to twenty drums.

15.7.6 Solid waste is moved from the Drum Storage Building 324 to vendor's vehicles for transportation and disposal in accord with Federal and State regulations. In the event of a spill of such material on a roadway the transporter is responsible for proper clean-up. Buffalo Color is ready to assist the transporter in any way needed for proper clean-up.

15.7.7 There have been no transportation accidents releasing hazardous wastes on site or in the immediate vicinity.

15.8 Management Practices Information

15.8.1 Training programs for people handling hazardous waste are described in detail in Section 9 above.

15.8.2 Medical and Workman's Compensation records have been compared to work records and events related to the operation of the surface impoundments. A summary is presented in Appendix AK.

D2.16

APPENDIX A

APPENDIX A

EAF

ENVIRONMENTAL ASSESSMENT - PART I

Project Information

NOTICE: This document is designed to assist in determining whether the action proposed may have a significant effect on the environment. Please complete the entire Data Sheet. Answers to these questions will be considered as part of the application for approval and may be subject to further verification and public review. Provide any additional information you believe will be needed to complete PARTS 2 and 3.

It is expected that completion of the EAF will be dependent on information currently available and will not involve new studies, research or investigation. If information requiring such additional work is unavailable, so indicate and specify each instance.

NAME OF PROJECT:

Part 373 Application
Surface Impoundments

ADDRESS AND NAME OF APPLICANT:

Buffalo Color Corporation
(Name)
100 Lee Street
(Street)
Buffalo, New York 14210
(P.O.) (State) (Zip)

NAME AND ADDRESS OF OWNER (If Different)

(Name)

(Street)

(P.O.) (State) (Zip)

BUSINESS PHONE:

DESCRIPTION OF PROJECT: (Briefly describe type of project or action)

EAF to accompany Part 373 Application for two existing surface impoundments.

(PLEASE COMPLETE EACH QUESTION - Indicate N.A. if not applicable)

A. SITE DESCRIPTION

(Physical setting of overall project, both developed and undeveloped areas)

1. General character of the land: Generally uniform slope X Generally uneven and rolling or irregular ____.

2. Present land use: Urban ____, Industrial X, Commercial ____, Suburban ____, Rural ____, Forest ____, Agriculture ____, Other ____.

3. Total acreage of project area: ____acres.

Approximate acreage:	Presently	After Completion
Meadow or Brushland	____acres	0 acres
Forested	____acres	0 acres
Agricultural	____acres	0 acres
Wetland (Freshwater or Tidal as per Articles 24, 25 or F.C.L.)	____acres	0 acres
Water Surface Area	____acres	0 acres
Unvegetated (rock, earth or fill)	____acres	0 acres
Roads, buildings and other paved surfaces	____acres	0.5 acres
Other (indicate type)	____acres	1.5 acres

4. What is predominant soil type(s) on project site? Clay/Silt

5. a. Are there bedrock outcroppings on project site? ____Yes X No

b. What is depth to bedrock? 30-50 (In feet)

6. Approximate percentage of proposed project site with slopes: 0-10% 100%; 10-15% ____%; 15% or greater ____%.

7. Is project contiguous to, or contain a building or site listed on the National Register of Historic Places? ____Yes __X__No

8. What is the depth to the water table? 8-15 feet

9. Do hunting or fishing opportunities presently exist in the project area? ____Yes X ____No

10. Does project site contain any species of plant or animal life that is identified as threatened or endangered - ____Yes __X__No, according to - Identify each species _____

_____

11. Are there any unique or unusual land forms on the project site? (i.e. cliffs, dunes, other geological formations - ____Yes __X__No. (Describe _____)

12. Is the project site presently used by the community or neighborhood as an open space or recreation area - ____Yes __X__No.

13. Does the present site offer or include scenic views or vistas known to be important to the community? ____Yes __X__No

14. Streams within or contiguous to project area:

a. Name of stream and name of river to which it is tributary _____
Buffalo River

15. Lakes, Ponds, Wetland areas within or contiguous to project area:

a. Name _____; b. Size (in acres) _____

16. What is the dominant land use and zoning classification within a 1/4 mile radius of the project (e.g. single family residential, R-2) and the scale of development (e.g. 2 story). Industrial

B. PROJECT DESCRIPTION

1. Physical dimensions and scale of project (fill in dimensions as appropriate)

a. Total contiguous acreage owned by project sponsor 65 acres.

b. Project acreage developed: 2 acres initially; 2 acres ultimately.

c. Project acreage to remain undeveloped 0.

d. Length of project, in miles: - (if appropriate)

e. If project is an expansion of existing, indicate percent of expansion proposed: building square footage _____; developed acreage _____.

f. Number of off-street parking spaces existing N/A; proposed _____.

g. Maximum vehicular trips generated per hour 0 (upon completion of project)

h. If residential: Number and type of housing units:

	One Family	Two Family	Multiple Family	Condominium
Initial				
Ultimate				

i. If:

	Orientation Neighborhood-City-Regional	Estimated Employment
Commercial		
Industrial		5

j. Total height of tallest proposed structure 40 feet.

2. How much natural material (i.e. rock, earth, etc.) will be removed from the site - 2000 tons
0 cubic yards.

3. How many acres of vegetation (trees, shrubs, ground covers) will be removed from site - ____acres.

4. Will any mature forest (over 100 years old) or other locally-important vegetation be removed by this project? ____Yes X No

5. Are there any plans for re-vegetation to replace that removed during construction? X Yes ____No

6. If single phase project: Anticipated period of construction ____months, (including demolition).

7. If multi-phased project: a. Total number of phases anticipated 3 No.

b. Anticipated date of commencement phase 1 ____month ____year (including demolition)

c. Approximate completion date final phase ____month ____year.

d. Is phase 1 financially dependent on subsequent phases? ____Yes X No

8. Will blasting occur during construction? ____Yes X No

9. Number of jobs generated: during construction 5 ; after project is complete 0.

10. Number of jobs eliminated by this project 3.

11. Will project require relocation of any projects or facilities? X Yes ____No. If yes, explain:
Closure will require construction of tank.

12. a. Is surface or subsurface liquid waste disposal involved? ____Yes X No.

b. If yes, indicate type of waste (sewage, industrial, etc.) ____.

c. If surface disposal name of stream into which effluent will be discharged ____.

13. Will surface area of existing lakes, ponds, streams, bays or other surface waterways be increased or decreased by proposal? ____Yes X No.

14. Is project or any portion of project located in the 100 year flood plain? X Yes ____No

15. a. Does project involve disposal of solid waste? X Yes ____No

b. If yes, will an existing solid waste disposal facility be used? X Yes ____No

c. If yes, give name: CECOS; location Niagara Falls or others
At closure

d. Will any wastes not go into a sewage disposal system or into a sanitary landfill? X Yes ____No

16. Will project use herbicides or pesticides? ____Yes X No

17. Will project routinely produce odors (more than one hour per day)? X Yes ____No

18. Will project produce operating noise exceeding the local ambience noise levels? ____Yes X No

19. Will project result in an increase in energy use? ____Yes ____No. If yes, indicate type(s) ____
Electricity to pump water.

20. If water supply is from wells indicate pumping capacity ____ gals/minute.

21. Total anticipated water usage per day ____gals/day.

22. Zoning: a. What is dominant zoning classification of site? Industrial.

b. Current specific zoning classification of site Industrial.

c. Is proposed use consistent with present zoning? Yes.

d. If no, indicate desired zoning ____.

26. Approvals: a. Is any Federal permit required? ____Yes X No

b. Does project involve State or Federal funding or financing? ___Yes X No

c. Local and Regional approvals:

	Approval Required (Yes, No)	(Type)	Submittal (Date)	Approval (Date)
City, Town, Village Board	No			
City, Town, Village Planning Board	No			
City, Town, Zoning Board	No			
City, County Health Department	No			
Other local agencies	No			
Other regional agencies	No			
State Agencies	No			
Federal Agencies	No			

C. INFORMATIONAL DETAILS

Attach any additional information as may be needed to clarify your project. If there are or may be any adverse impacts associated with the proposal, please discuss such impacts and the measures which can be taken to mitigate or avoid them.

PREPARER'S SIGNATURE: Paul Lauer

TITLE: Manager Environmental Affairs

REPRESENTING: Buffalo Color Corporation

DATE: May 8, 1986

ENVIRONMENTAL ASSESSMENT - PART II

Project Impacts and Their Magnitude

General Information (Read Carefully)

- In completing the form the reviewer should be guided by the question: Have my decisions and determinations been reasonable? The reviewer is not expected to be an expert environmental analyst.
- Identifying that an effect will be potentially large (column 2) does not mean that it is also necessarily significant. Any large effect must be evaluated in PART 3 to determine significance. By identifying an effect in column 2 simply asks that it be looked at further.
- The Examples provided are to assist the reviewer by showing types of effects and wherever possible the threshold of magnitude that would trigger a response in column 2. The examples are generally applicable throughout the State and for most situations. But, for any specific project or site other examples and/or lower thresholds may be more appropriate for a Potential Large Impact rating.
- Each project, on each site, in each locality, will vary. Therefore, the examples have been offered as guidance. They do not constitute an exhaustive list of impacts and thresholds to answer each question.
- The number of examples per question does not indicate the importance of each question.

INSTRUCTIONS (Read Carefully)

a. Answer each of the 18 questions in PART 2. Answer Yes if there will be any effect.

b. Maybe answers should be considered as Yes answers.

c. If answering Yes to a question then check the appropriate box (column 1 or 2) to indicate the potential size of the impact. If impact threshold equals or exceeds any example provided, check column 2. If impact will occur but threshold is lower than example, check column 1.

d. If reviewer has doubt about the size of the impact then consider the impact as potentially large and proceed to PART 3.

e. If a potentially large impact or effect can be reduced by a change in the project to a less than large magnitude, place a Yes in column 3. A No response indicates that such a reduction is not possible.

		1. SMALL TO MODERATE IMPACT	2. POTENTIAL LARGE IMPACT	3. CAN IMPACT BE REDUCED BY PROJECT CHANGE
IMPACT ON LAND	NO (X) YES ( )			
1. WILL THERE BE AN EFFECT AS A RESULT OF A PHYSICAL CHANGE TO PROJECT SITE?				
Examples that Would Apply to Column 2				
___ Any construction on slopes of 15% or greater, (15 foot rise per 100 foot of length), or where the general slopes in the project area exceed 10%.		___	___	___
___ Construction on Land where the depth to the water table is less than 3 feet.		___	___	___
___ Construction of paved parking area for 1,000 or more vehicles.		___	___	___
___ Construction on land where bedrock is exposed or generally within 3 feet of existing ground surface.		___	___	___
___ Construction that will continue for more than 1 year or involve more than one phase or stage.		___	___	___
___ Excavation for mining purposes that would remove more than 1,000 tons of natural material (i.e. rock or soil) per year.		___	___	___
___ Construction of any new sanitary landfill.		___	___	___

	1. SMALL TO MODERATE IMPACT	2. POTENTIAL LARGE IMPACT	3. CAN IMPACT BE REDUCED BY PROJECT CHANGE
___ Construction in a designated floodway.	___	___	___
___ Other impacts: _____	___	___	___
_____	___	___	___
2. WILL THERE BE AN EFFECT TO ANY UNIQUE OR UNUSUAL LAND FORMS FOUND ON THE SITE? (i.e. cliffs, dunes, geological formations, etc.) NO (X) YES ( )			
___ Specific land forms: _____	___	___	___
_____	___	___	___
IMPACT ON WATER			
3. WILL PROJECT AFFECT ANY WATER BODY DESIGNATED AS PROTECTED? (Under Articles 15, 24, 25 of the Environmental Conservation Law, E.C.L.) NO (X) YES ( )			
Examples that Would Apply to Column 2			
___ Dredging more than 100 cubic yards of material from channel of a protected stream.	___	___	___
___ Construction in a designated freshwater or tidal wetland.	___	___	___
___ Other impacts: _____	___	___	___
_____	___	___	___
4. WILL PROJECT AFFECT ANY NON-PROTECTED EXISTING OR NEW BODY OF WATER? NO (X) YES ( )			
Examples that Would Apply to Column 2			
___ A 10% increase or decrease in the surface area of any body of water or more than a 10 acre increase or decrease.	___	___	___
___ Construction of a body of water that exceeds 10 acres of surface area.	___	___	___
___ Other impacts: _____	___	___	___
_____	___	___	___
5. WILL PROJECT AFFECT SURFACE OR GROUNDWATER QUALITY? NO (X) YES ( )			
Examples that Would Apply to Column 2			
___ Project will require a discharge permit.	___	___	___
___ Project requires use of a source of water that does not have approval to serve proposed project.	___	___	___
___ Project requires water supply from wells with greater than 45 gallons per minute pumping capacity.	___	___	___
___ Construction or operation causing any contamination of a public water supply system.	___	___	___
___ Project will adversely affect groundwater.	___	___	___
___ Liquid effluent will be conveyed off the site to facilities which presently do not exist or have inadequate capacity.	___	___	___
___ Project requiring a facility that would use water in excess of 20,000 gallons per day.	___	___	___
___ Project will likely cause siltation or other discharge into an existing body of water to the extent that there will be an obvious visual contrast to natural conditions.	___	___	___

		1. SMALL TO MODERATE IMPACT	2. POTENTIAL LARGE IMPACT	3. CAN IMPACT BE REDUCED BY PROJECT CHANGE
___	Other Imoacts: _____	___	___	___
	_____	___	___	___
6.	WILL PROJECT ALTER DRAINAGE FLOW, PATTERNS OR SURFACE WATER RUNOFF? ..... NO (X) YES ( )			
	Example that Would Apply to Column 2			
___	Project would impede flood water flows.	___	___	___
___	Project is likely to cause substantial erosion.	___	___	___
___	Project is incompatible with existing drainage patterns.	___	___	___
___	Other impacts: _____	___	___	___
	IMPACT ON AIR			
7.	WILL PROJECT AFFECT AIR QUALITY?..... NO (X) YES ( )			
	Examples that Would Apply to Column 2			
___	Project will induce 1,000 or more vehicle trips in any given hour.	___	___	___
___	Project will result in the incineration of more than 1 ton of refuse per hour.	___	___	___
___	Project emission rate of all contaminants will exceed 5 lbs. per hour or a heat source producing more than 10 million BTU's per hour.	___	___	___
___	Other imoacts: _____	___	___	___
	_____	___	___	___
	IMPACT ON PLANTS AND ANIMALS			
8.	WILL PROJECT AFFECT ANY THREATENED OR ENDANGERED SPECIES? NO (X) YES ( )			
	Examples that Would Apply to Column 2			
___	Reduction of one or more species listed on the New York or Federal list, using the site, over or near site or found on the site.	___	___	___
___	Removal of any portion of a critical or significant wildlife habitat.	___	___	___
___	Application of Pesticide or herbicide over more than twice a year other than for agricultural purposes.	___	___	___
___	Other impacts: _____	___	___	___
	_____	___	___	___
9.	WILL PROJECT SUBSTANTIALLY AFFECT NON-THREATENED OR ENDANGERED SPECIES? ..... NO (X) YES ( )			
	Example that Would Apply to Column 2			
___	Project would substantially interfere with any resident or migratory fish or wildlife species.	___	___	___
___	Project requires the removal of more than 10 acres of mature forest (over 100 years in age) or other locally important vegetation.	___	___	___

		1. SMALL TO MODERATE IMPACT	2. POTENTIAL LARGE IMPACT	3. CAN IMPACT BE REDUCED BY PROJECT CHANGE
IMPACT ON VISUAL RESOURCE				
10. WILL THE PROJECT AFFECT VIEWS, VISTAS OR THE VISUAL CHARACTER OF THE NEIGHBORHOOD OR COMMUNITY?	NO (X) YES ( )			
Examples that Would Apply to Column 2				
___ An incompatible visual affect caused by the introduction of new materials, colors and/or forms in contrast to the surrounding landscape.		___	___	___
___ A project easily visible, not easily screened, that is obviously different from others around it.		___	___	___
___ Project will result in the elimination or major screening of scenic views or vistas known to be important to the area.		___	___	___
___ Other impacts: _____		___	___	___
_____		___	___	___
IMPACT ON HISTORIC RESOURCES				
11. WILL PROJECT IMPACT ANY SITE OR STRUCTURE OF HISTORIC, PRE-HISTORIC OR PALEONTOGICAL IMPORTANCE?	NO (X) YES ( )			
Examples that Would Apply to Column 2				
___ Project occuring wholly or partially within or contiguous to any facility or site listed on the National Register of historic places.		___	___	___
___ Any impact to an archeological site or fossil bed located within the project site.		___	___	___
___ Other impacts: _____		___	___	___
_____		___	___	___
IMPACT ON OPEN SPACE & RECREATION				
12. WILL THE PROJECT AFFECT THE QUANTITY OR QUALITY OF EXISTING OR FUTURE OPEN SPACES OR RECREATIONAL OPPORTUNITIES?.....	NO (X) YES ( )			
Examples that Would Apply to Column 2				
___ The permanent foreclosure of a future recreational opportunity.		___	___	___
___ A major reduction of an open space important to the community.		___	___	___
___ Other impacts: _____		___	___	___
_____		___	___	___
IMPACT ON TRANSPORTATION				
13. WILL THERE BE AN EFFECT TO EXISTING TRANSPORTATION SYSTEMS?	NO (X) YES ( )			
Examples that Would Apply to Column 2				
___ Alteration of present patterns of movement of people and/or goods.		___	___	___
___ Project will result in severe traffic problems.		___	___	___
___ Other impacts: _____		___	___	___
_____		___	___	___

			1	2	3
			SMALL TO MODERATE IMPACT	POTENTIAL LARGE IMPACT	CAN IMPACT BE REDUCED BY PROJECT CHANGE
	IMPACT ON ENERGY				
14.	WILL PROJECT AFFECT THE COMMUNITIES SOURCES OF FUEL OR ENERGY SUPPLY?	NO (X) YES ( )			
	Examples that Would Apply to Column 2				
___	Project causing greater than 5% increase in any form of energy used in municipality.		___	___	___
___	Project requiring the creation or extension of an energy transmission or supply system to serve more than 50 single or two family residences.		___	___	___
___	Other impacts: _____		___	___	___
	_____		___	___	___
	IMPACT ON NOISE				
15.	WILL THERE BE OBJECTIONABLE ODORS, NOISE, GLARE, VIBRATION or ELECTRICAL DISTURBANCE AS A RESULT OF THIS PROJECT?	NO ( ) YES (X)			
	Examples that Would Apply to Column 2				
___	Blasting within 1,500 feet of a hospital, school or other sensitive facility.		___	___	___
___	Odors will occur routinely (more than one hour per day).		X	___	___
___	Project will produce operating noise exceeding the local ambient noise levels for noise outside of structures.		___	___	___
___	Project will remove natural barriers that would act as a noise screen.		___	___	___
___	Other impacts: Some housing exists within 300 feet of the surface impoundments. Some minor intermittant odor is possible.		___	___	___
	IMPACT ON HEALTH & HAZARDS				
16.	WILL PROJECT AFFECT PUBLIC HEALTH AND SAFETY?	NO (X) YES ( )			
	Examples that Would Apply to Column 2				
___	Project will cause a risk of explosion or release of hazardous substances (i.e. oil, pesticides, chemicals, radiation, etc.) in the event of accident or upset conditions, or there will be a chronic low level discharge or emission.		___	___	___
___	Project that will result in the burial of "hazardous wastes" (i.e. toxic, poisonous, highly reactive, radioactive, irritating, infectious, etc., including wastes that are solid, semi-solid, liquid or contain gases.)		___	___	___
___	Storage facilities for one million or more gallons of liquified natural gas or other liquids.		___	___	___
___	Other impacts: _____		___	___	___
	_____		___	___	___

	SMALL TO MODERATE IMPACT	POTENTIAL LARGE IMPACT	CAN IMPACT BE REDUCED BY PROJECT CHANGE
IMPACT ON GROWTH AND CHARACTER OF COMMUNITY OR NEIGHBORHOOD			
17. WILL PROJECT AFFECT THE CHARACTER OF THE EXISTING COMMUNITY? ..... NO (X) YES ( )			
Example that Would Apply to Column 2			
___ The population of the City, Town or Village in which the project is located is likely to grow by more than 5% of resident human population.	___	___	___
___ The municipal budgets for capital expenditures or operating services will increase by more than 5% per year as a result of this project.	___	___	___
___ Will involve any permanent facility of a non-agricultural use in an agricultural district or remove prime agricultural lands from cultivation.	___	___	___
___ The project will replace or eliminate existing facilities, structures or areas of historic importance to the community.	___	___	___
___ Development will induce an influx of a particular age group with special needs.	___	___	___
___ Project will set an important precedent for future projects.	___	___	___
___ Project will relocate 15 or more employees in one or more businesses.	___	___	___
___ Other impacts: _____	___	___	___
_____	___	___	___
18. IS THERE PUBLIC CONTROVERSY CONCERNING THE PROJECT? ..... NO (X) YES ( )			
Examples that Would Apply to Column 2			
___ Either government or citizens of adjacent communities have expressed opposition or rejected the project or have not been contacted.	___	___	___
___ Objections to the project from within the community.	___	___	___

IF ANY ACTION IN PART 2 IS IDENTIFIED AS A POTENTIAL LARGE IMPACT OR IF YOU CANNOT DETERMINE THE MAGNITUDE OF IMPACT, PROCEED TO PART 3.

PORTIONS OF EAF COMPLETED FOR THIS PROJECT:

PART I ___X___ PART II ___X___ PART 3 _____

DETERMINATION

Upon review of the information recorded on this EAF (Parts 1, 2 and 3) and considering both the magnitude and importance of each impact, it is reasonably determined that:

A. The project will result in no major impacts and, therefore, is one which may not cause significant damage to the environment.

B. Although the project could have a significant effect on the environment, there will not be a significant effect in this case because the mitigation measures described in PART 3 have been included as part of the proposed project.

C. The project will result in one or more major adverse impacts that cannot be reduced and may cause significant damage to the environment.

PREPARE A NEGATIVE DECLARATION ___(X)___

PREPARE A NEGATIVE DECLARATION ___( )___

PREPARE POSITIVE DECLARATION PROCEED WITH EIS ___( )___

May 7, 1986
Date

Signature of Preparer (if different from responsible officer)

Signature of Responsible Official in Lead Agency

Print or type name of responsible official in Lead Agency

ENVIRONMENTAL ASSESSMENT - PART III

EVALUATION OF THE IMPORTANCE OF IMPACTS

INFORMATION

- Part 3 is prepared if one or more impact or effect is considered to be potentially large.
- The amount of writing necessary to answer Part 3 may be determined by answering the question: In briefly completing the instructions below have I placed in this record sufficient information to indicate the reasonableness of my decisions?

INSTRUCTIONS

Complete the following for each impact or effect identified in Column 2 of Part 2:

1. Briefly describe the impact.
2. Describe (if applicable) how the impact might be mitigated or reduced to a less than large impact by a project change.
3. Based on the information available, decide if it is reasonable to conclude that this impact is important to the minicipality (city, town or village) in which the project is located.

   To answer the question of importance, consider:

   - The probability of the impact or effect occurring
   - The duration of the impact or effect
   - Its irreversibility, including permanently lost resources or values
   - Whether the impact or effect can be controlled
   - The regional consequence of the impact or effect
   - Its potential divergence from local needs and goals
   - Whether known objections to the project apply to this impact or effect.

DETERMINATION OF SIGNIFICANCE

An action is considered to be significant if:

One (or more) impact is determined to both large and its (their) consequence, based on the review above, is important.

PART III STATEMENTS

(Continue on Attachments, as needed)

C

BUFFALO COLOR CORPORATION
BUFFALO PLANT

DISASTER CONTROL PLAN

Revised October 21, 1985

DISASTER CONTROL MANUAL COPYHOLDERS

L. Franckowiak
W. Witzleben
F. Fleshman
R. Kovalski
E. Baczkowski
R. Bronstein
W. Smith
R. Crane
J. Provenzola
F. Parker
J. O'Sullivan
R. Januszkiewicz
H. Bolden
J. Leitten
C. Popp
R. Keenen
R. Ladowski
P. Mescall
F. Bialy
R. Kellogg
R. Ruszala (Mechanical)
Capt. Fernan
Library

T. Wlodarczak
G. Collins
D. Donahue
L. Schenk
J. Marino
R. Duggan
H. Place
R. Troyer
G. Bolles
L. Kaminski
W. Beakman
G. Pudlewski
C. Montgomery
P. Krauss
D. Kaczanowski
J. Dick
R. Tufts
E. Graf
R. Herdle
W. Orluk
V. Wawrzyniak (Manufacturing)
Firehouse

Buffalo Fire Department 6th Battalion
Buffalo Police Department Precinct No. 9
Mayor's Office City of Buffalo
Disaster Control Officer City of Buffalo
Mercy Hospital

TABLE OF CONTENTS

SECTION "C" LOCATION OF MAJOR SERVICE SHUTOFFS

SECTION "D" EVACUATION PROCEDURES

SECTION "E" MSDS - MATERIAL SAFETY DATA SHEETS

INTRODUCTION

The Buffalo Plant of the Buffalo Color Corporation is located in an industrial area. Within close proximity are various private homes. Not too distant are several grain mills, metal fabricating shops, auto assembly plants, railroad yards, as well as smaller diversified industrial plants.

The plant is engaged in the manufacture of Indigo and intermediate organic chemicals and in so doing consumes and produces materials that can, under unusual circumstances, present a serious threat to plant personnel, as well as to neighboring properties, plants and industries. The purpose of this plan is to minimize those losses which might occur by:

1. Preventing injuries and saving lives.
2. Reducing property damage.
3. Providing for continuity and expeditious resumption of operations.
4. Compliance with 40 CFR 265.20-56 with respect to hazardous waste (E.P.A.).

Protection of the plant properties and personnel is an integral part of our daily activity. Uniformed guards maintain surveillance over plant entrances and patrol boundaries in mobile units equipped with two-way radio communication systems 24 hours per day, 7 days per week. The Buffalo Plant maintains an active, volunteer Emergency Action Squad trained at York Fire School, Texas A&M and American Red Cross in CPR, first aid, rescue, firefighting, chemical firefighting, and the hazards specific to the mix of chemicals used in the plant. This squad is the first line of defense for emergency response and is on call at all times. In addition, Buffalo Color maintains a dispensary staffed by a qualified physician, nurse, and technician. Medical services are available Monday through Friday, day shifts. The means of alert and action by these teams and the other Buffalo Plant Employees who have disaster responsibilities are described in detail in the pages which follow. Response to emergencies on site is from plant employees who are Emergency Action Squad Members working when the emergency occurs.

The actions of the Buffalo City Fire and Police Departments as well as near by Mercy Hospital are coordinated with the Disaster Officer. Outside emergency personnel such as police, fire, ambulance are directed to wait at the plant gates after being summoned. Their actions inside the plant are to be conducted with the advice and consent of the Disaster Officer. Outside emergency personnel have been requested to respond to our security headquarters located at the plant entrance by the R.R. tracks on Lee Street.

The Disaster Officer (Emergency Coordinator) will determine if the emergency is caused by a chemical release, fire or explosion could represent a hazard to the environment or human health and assure that the proper notifications are made.

The general disaster headquarters will be the Director of Operations Office, Bldg. 100, with the Safety Office, Bldg. 121, as the alternate. In the event of total disaster all members of the Disaster Control Organization identified by title on page 14 not actively engaged in initially dealing with the emergency will assemble at headquarters where initial instructions will be issued.

In the event of a localized plant emergency, the headquarters will be the Area Mechanical Office in which area the emergency occurs, or as listed below:

Area A - Bldg. 46 Area B - Bldg. 100
Area C - Bldg. 100 Area D - Bldg. 46
Area E - Bldg. 310

Should the emergency affect the designated office, alternate headquarters will be the Safety Office, Bldg. 121.

BUFFALO COLOR CORPORATION
DISASTER CONTROL PLAN

The plan will be put into effect by the sounding of coded blasts on the plant steam horns. (See below) Normally the sounding of the steam horns is in response to an emergency call on a specially assigned telephone line (Ext. 4555) located in the guard headquarters. The guards have standing orders regarding the disposition of emergency notification and call-in of supervision not in attendance at the time of the emergency. (See page 10-11)

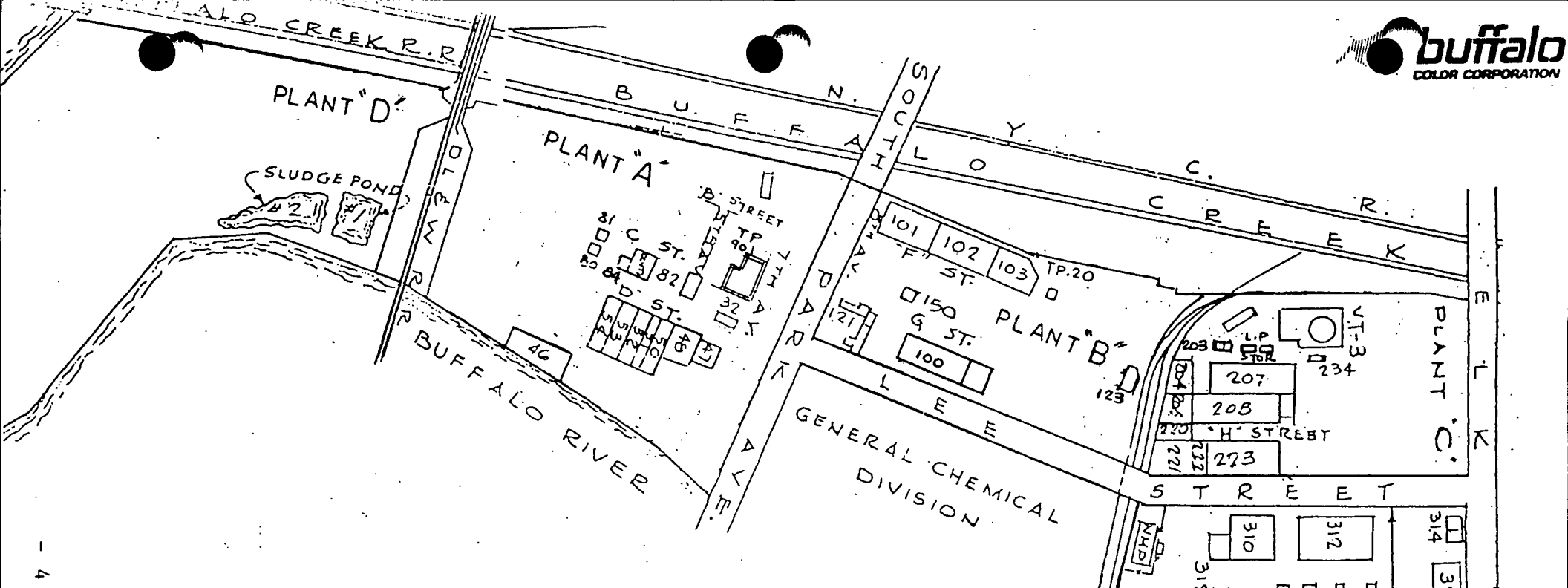
EMERGENCY SIGNAL CODE

ENTIRE SQUAD RESPONSE		FIRST AID AND RESCUE ONLY
1 Long - 1 Short	Area D	2 long - 1 short
1 - 2	Area A	2 - 2
1 - 3	Area B & Parking Lot	2 - 3
1 - 4	Area C	2 - 4
1 - 5	Area E	2 - 5
1 - 7	Elk Parking Lot	2 - 7

1 - 1 - 1 - 1 (LONG)
ENTIRE PLANT EVACUATE

1 - 1 - 1 - 1 (SHORT)
ALL CLEAR

SIGNALS WILL BE SOUNDED FOUR ROUNDS



BLDG.NO	CONTENTS	BLDG.NO	CONTENTS	BLDG.NO	CONTENTS	BLDG NO	CONTENTS
47	INDIGO POWDER (DUST)	100	OFFICES LOCKER RM	208	AIR COMPRESSORS	317	VACANT
48	SULFURK ACID CAUSTIC	101	CYANIDE WAREHOUSE	234	#6 FUEL PUMP HOUSE	TP 930	BUTADIENE ALCOHOL, CAUSTIC TETRAPROPYLENE
50	ANILINE CYANIDE FORMALDEHYDE ALCOHOL	102	LOCKER ROOM	310	MAINT. BLDG	VT-3	#6 FUEL OIL
-		103	CYANIDE WAREHOUSE	312	ANILINE ALCOHOL HYDROGEN BUTADIENE	TP 901	FORMALDEHYDE ANILINE, AMMONIA, INDIGO
51	CYANIDE CAUSTIC	32	CYANIDE			32	CYANIDE
52 NO WATER AREA	DEHYDRATED CAUSTIC SODIUM SODAMIDE	121	DISPENSARY SAFETY OFFICE	314	ELEC. TRANSFORMERS		
		123	GUARD HOUSE	315	VACANT		
53 NO WATER AREA	DEHYDRATED CAUSTIC SULFURK ACID	150	FIRE PUMP HOUSE	316	VACANT		
		203	#2 FUEL OIL	319	VACANT		
54	VACANT	204	SULFURIC ACID	320	VACANT		
46	MACHINE SHOP	205	CARPENTER SHOP	322	WAREHOUSE Q.C. LAB		
82 NO WATER	SODIUM	220	INSTRUMENT SHOP	361	FIRE HOUSE		
83	P&K. DUST	221	MACHINE SHOP	326	VACANT		
84	PRO POLYNE GLYCOL	222	CARPENTERS RIGGING	324	VACANT		
80	ELEC. TRANSFORMERS	223	OFFICES	351	TREATMENT PLANT		
81	ELEC. TRANSFORMERS	207	BOILERS: NAT. GAS.	353	MAINTENANCE BLDG		

RESPONSIBILITY FOR PUTTING PLAN INTO EFFECT

Responsibility for emergency planning and disaster control has been assigned to the following listed members of the plant staff. Succession of command is in the order listed.

Director of Operations

Manager - Production

Manager - Engineering

Manager - Maintenance

In the event an emergency or disaster occurs at night, on weekends or on a holiday, the shift supervisor in charge (until the Chief of the Emergency Action Squad arrives on the scene) will:

1. Instruct the guard sergeant to carry out the emergency call-in procedure.

2. Ascertain the need for Buffalo Fire Department and/or emergency ambulance assistance and instruct the guard sergeant to call for same if necessary as soon as possible. For emergencies contact agencies as follows: Buffalo Fire Department 856-5111 - Ambulance call 911.

3. Take charge of the Emergency Action Squad.

4. Coordinate necessary shut down and mechanical activities until plant officials arrive on the scene.

DUTIES OF THE OFFICERS

Disaster Officer - Director of Operations (or Designate)

Only the Director of Operations will initiate the disaster control plan and appraise all emergencies and determine conditions that warrant implementation of the plan.

If there is a fire, explosion, or release to the environment, he will immediatetly identify the character, exact source, amount, and areal extent of any released materials. He may do this by observations, or review of plant records, and, if necessary, by chemical analysis.

At the same time in accord with 40 CFR 264.56 (c) he must assess possible direct or indirect hazards to human health or the environment that may result from the fire, explosion, or release, and direct the Environmental and Communications Officers to make the appropriate notifications. He will notify the Vice President - Operations, Buffalo Color Corporation of the extent of injuries or property damage.

After notification to families of any injured personnel, he will formulate or approve press releases. No information to the press other than that submitted by the Director of Operations will be permitted.

When the disaster or emergency is under control he will direct salvage and reestablishment of operations.

Safety Officer - Safety Manager

The Safety Officer will coordinate with the Operations Officer, Production and Services Supervisors and organize disaster control parties in the affected areas.

He will arrange for orderly evacuation of the area affected or the total plant if necessary.

He will coordinate with the foremen of services to provide necessary mobile units to convey additional safety and fire equipment to the disaster site if necessary.

The Safety Officer will direct the Communications Officer to procure additional fire fighting, safety, first aid, or medical supplies from outside sources, if needed, as soon as possible in conjunction with the Buffalo Fire Department.

Environmental Officer - Manager Environmental Affairs

The Manager of Environmental Affairs will direct the environmental group in their notification of the National Response Center, U.S. Coast Guard, EPA or other government agencies in accord with the Spill Prevention, Control, and Countermeasures Plan.

Initial notification will include: name and telephone number of caller, name and address of facility, time and type of incident, name and quantity of materials involved, possible health or environmental hazards.

Duties of the Officers - cont.

Operations Officer - Production Manager

The Operations Officer will assist the disaster officer in putting the plan into effect. In the absence of the Disaster Officer, his duties will be assumed by the Operations Officer.

He will coordinate with the production and services supervisors, for a safe and orderly shutdown of processes and services. He will coordinate with the Mechanical Office to prevent injury to personnel and damage to property.

He will also coordinate with the Mechanical Officer in restoring the plant to normal operations as soon as possible.

The Engineering Manager will assume the duties of the communications officer in the absence of the latter.

Communications Officer - Director of Human Resources

At the direction of the Disaster Officer he will:

1. Arrange for contacting disaster team members who are out of the plant.

2. Monitor telephone communications and priority calls if necessary.

3. Arrange for the release of information regarding injuried employees to their families.

4. Prepare news releases for the Director of Operations signature or approval and arrange headquarters for the press if the occasion demands.

5. Notify appropriate insurance carriers.

6. Direct all plant protection (Security) forces to:

   A. Provide guard service for the plant corporate comptroller to safeguard company records.

   B. Set up inplant traffic control at strategic locations.

   C. Restrict the entrance of unauthorized persons to the plant.

   D. Coordinate with Buffalo Police Department directing the flow of traffic away from the plant.

   E. Protect company property from looting, sabotage or any nefarious activity that could arise during an emergency.

7. At the direction of the Plant Physician, Emergency Action Chief or Safety Officer, he will request additional medical and/or hospital supplies.

8. He will maintain contact with neighboring industries to request assistance if needed or to provide assistance to them as may be the case.

9. In the event telephone communications are disrupted, he will arrange headquarters at the nearest possible location, i.e., P.V.S. Chemical Co., Root Neal, and coordinate a messenger service.

Mechanical Officer - Manager of Maintenance.

The Mechanical Officer will coordinate with the operations officer and Power Department personnel to provide for services from one plant area to another during a plant disaster.

Through the Power Department he will maintain contact with National Fuel Gas, Niagara Mohawk Power Company, Buffalo City Water Department Buffalo River Improvement Corporation (BRIC) and other vital agencies to arrange for emergency service where necessary.

The mechanical officer shall coordinate with the operations officer and perform necessary maintenance work to prevent injury to personnel and minimize damage to property, product and materials during the emergency.

He shall direct the restoration of plant properties and equipment to normal operations as soon as possible after the emergency.

Fire Chief - Chief of the Emergency Action Squad

The Emergency Action Squad (EAS) Chief or his designated representative will be in charge of all emergency activities in conjunction with the Buffalo Fire Department.

He shall have full authority to summon outside assistance, i.e., Buffalo City Fire Department, and if necessary, employees not in the plant at the time of the emergency.

The EAS Chief shall coordinate with the Operations Officer and Production and Services Supervisors so that all shutdown and mop up details are covered thoroughly.

Emergency Action Squad personnel on the particular shift on which the emergency or disaster occurs will proceed directly to the scene under the direction of the Area shift supervisor until the Fire Chief arrives.

In the event the disaster is other than fire, the Fire Chief and his personnel will come under the direction of the Operations Officer. The Fire Chief shall coordinate with the First Aid Chief and provide protection and additional manpower if needed to affect removal of injured from disaster area.

Following the emergency the EAS Chief will assure that all emergency equipment is cleaned and made fit for reuse.

First Aid Chief - Assistant Chief of the Emergency Action Squad

The First Aid Chief will direct the Rescue Squad in removing trapped and injured persons from the disaster area.

The First Aid Chief will coordinate closely with the Fire Chief and the Operations Officer to determine if it is safe to enter the disaster area because of poisonous gases or flammable vapors.

He will set up first aid stations in the area and arrange for transportation of victims to the plant dispensary or area hospitals.

He will notify the communications officer of the names of injured persons and the extent of injury to the best of his ability.

RELEASE OF INFORMATION TO NEWS MEDIA

No information shall be released to the news media unless authorized by the Director of Operations or his designated alternate.

The Communications Officer shall arrive on the scene as promptly as possible.

He will contact the First Aid Chief and procure names of injured personnel.

He will contact plant supervision of the affected area and determine if possible the cause of the incident, damage to equipment, building, etc. and prepare immediately a concise report including the names and addresses of the injured, location of the incident, facts of the incident whether fire, poisonous gas, or explosion and the possible cause if known. This information will then be transmitted to the Director of Operations or his designated alternate and, after notification to families of any injured personnel, forwarded via telephone or special messenger to the City Editor of the Buffalo Evening News and local radio and television stations.

If the Communications Officer is not available, the information will be compiled by the Operations Officer and handled as described above.

EMERGENCY NOTIFICATION LIST

IN THE EVENT OF AN EMERGENCY, PERSONNEL IN CHARGE OF THE VARIOUS COMPANY DEPARTMENTS WILL BE CALLED AS LISTED. IF THE OFFICIAL IN CHARGE CANNOT BE REACHED, HIS ALTERNATE WILL BE CALLED.

IN THE CASE OF OPERATIONS, THE LOCATION OF THE EMERGENCY SHALL DETERMINE THE PRODUCTION SUPERVISOR OR ALTERNATE TO BE CALLED.

WHEN CALLED, THE DEPARTMENT HEAD OR HIS ALTERNATE SHALL ADVISE THE SECURITY SERGEANT IN CHARGE WHAT OTHER PERSONNEL ARE TO BE CALLED IN AND IN WHAT ORDER.

IN THE EVENT OF AN EMERGENCY IN THE POWER DEPARTMENT NOTIFY R. CRANE FIRST. IF A STEAM FAILURE OCCURS IN THE POWER DEPARTMENT ALLIED CHEMICAL MUST BE NOTIFIED.

NAME	ALTERNATE	DEPARTMENT	ADDRESS	PHONE NOS.
T. Wlodarczak		Director of Operations	30 Pinewood Trail East Aurora, N.Y.	652-5335 X4536
	D. Donahue	Director of Technology	236 Conant Kenmore, N.Y.	834-4491 X4533
F. Fleshman		Mgr. Production	4517 Candlewood Drive Lockport, N.Y.	433-8845 X4570
	R. Kovalski	Mgr. Engineering	14 Redbud Court East Amherst, N.Y.	688-4049 X4639
G. Collins		Dir. Human Resources	54 Quaker Lake Orchard Park, N.Y.	662-0057 X4529
D. Kaczanowski		Mgr. Safety	134 Crownland Cir. West Seneca, N.Y.	675-2762 X4646
D. Sauer		Manager Env. Affairs	150 Floss Avenue Buffalo, N.Y.	897-5385 X4525
C. Popp		Services	100 Green Hill West Seneca, N.Y.	675-2791 X4580
	H. Bolden	Services	977 Northland Buffalo, N.Y.	895-2114 X4641
G. Bolles		Indigo	155 Covington West Seneca, N.Y.	826-0969 549-4360 X4665
	P. Mescall	Indigo	S3459 Emerling Drive Blasdell, New York	822-7684 X4681
E. Baczkowski		Area E	95 Lopere Buffalo, N.Y.	895-0329 X4615
	R. McMahon	Bldg. 312	5218 Thurston Road Hamburg, N.Y.	824-1579 X4659

NAME	ALTERNATE	DEPARTMENT	ADDRESS	PHONE NO.
	R. Keenen	Bldg. 312	129 Willowdale Drive West Seneca, N.Y.	674-8029 X4659
	R. Troyer	Treatment Plant	9300 Tonawanda Cr.Rd. Clarence Center, N.Y.	741-3727 X4615
J. Provenzola		Prod. Control	247 Donna Lee Williamsville, N.Y.	634-8729 X4514
J. Marino		Mgr. Maint.	12 Wilma Dr. Lancaster, N.Y.	684-1830 X4566
	L. Kaminski	Maint.	25 W. Cavalier Rd. Cheektowaga, N.Y.	675-1317 X4563
	F. Parker	Maint.	92 Newgate Rd. Amherst, N.Y.	838-3482 X4632
R. Crane		Power	227 Newell Ave Tonawanda, N.Y.	695-6894 X4697
	J. Marino	Power	12 Wilma Drive Lancaster, N.Y.	684-1830 X4566
. Duggan		Quality Control	66 Pleasent Ave. Hambrug, N.Y.	648-6394 X4553
L. Schenk		Accounting	121 Bridle Path Williamsville, N.Y.	634-9671 X4503
	A. Schwenkel	Accounting	27 North Willow E. Aurora, N.Y.	655-1336 X4513

Allied Chemical Research Labs

F. Scarcello		Group Leader Research Services	Ellis Drive West Falls, N.Y.	652-2847 X74-214
	J. Wilczynski	Research Engr.	61 Academy Road Buffalo, N.Y.	892-9547 X74-219

Revised 10/21/85

MISCELLANEOUS EMERGENCY CALL LIST

Dr. R. G. Wilkinson	Office	10 Century Road	837-0049
	Home	218 E. Treehaven Cheektowaga, N.Y.	836-7653
Buffalo Fire Department		City Hall Buffalo, N.Y.	856-5111
Buffalo Fire & Police Emergency			911
Buffalo Police Department Precinct No.9		Seneca & Southside	855-4409
Medical Examiner		Grider Street	895-6858
Civil Defense Office		Amherst	689-8610
National Response Center			1-800-424-8802
Buffalo River Improvement Corp.		1016 Fuhrman Blvd.	826-1112

AMBULANCE SERVICES - CALL 911 FIRST

LaSalle Ambulance Service	1593 Main Street	882-8400
Memorial Ambulance Service	343 Leroy Avenue	832-8223
Mercy Flight	565 Abbott	886-3000

HOSPITALS

Mercy Hospital	565 Abbott Road	826-7000
Sheehan Memorial (Emergency Hospital)	425 Michigan Ave.	842-2200
Sisters of Charity	2157 Main St.	862-2000
Columbus Hospital	300 Niagara St.	845-4300

REVISED 10/21/85

PURCHASING CONTACTS

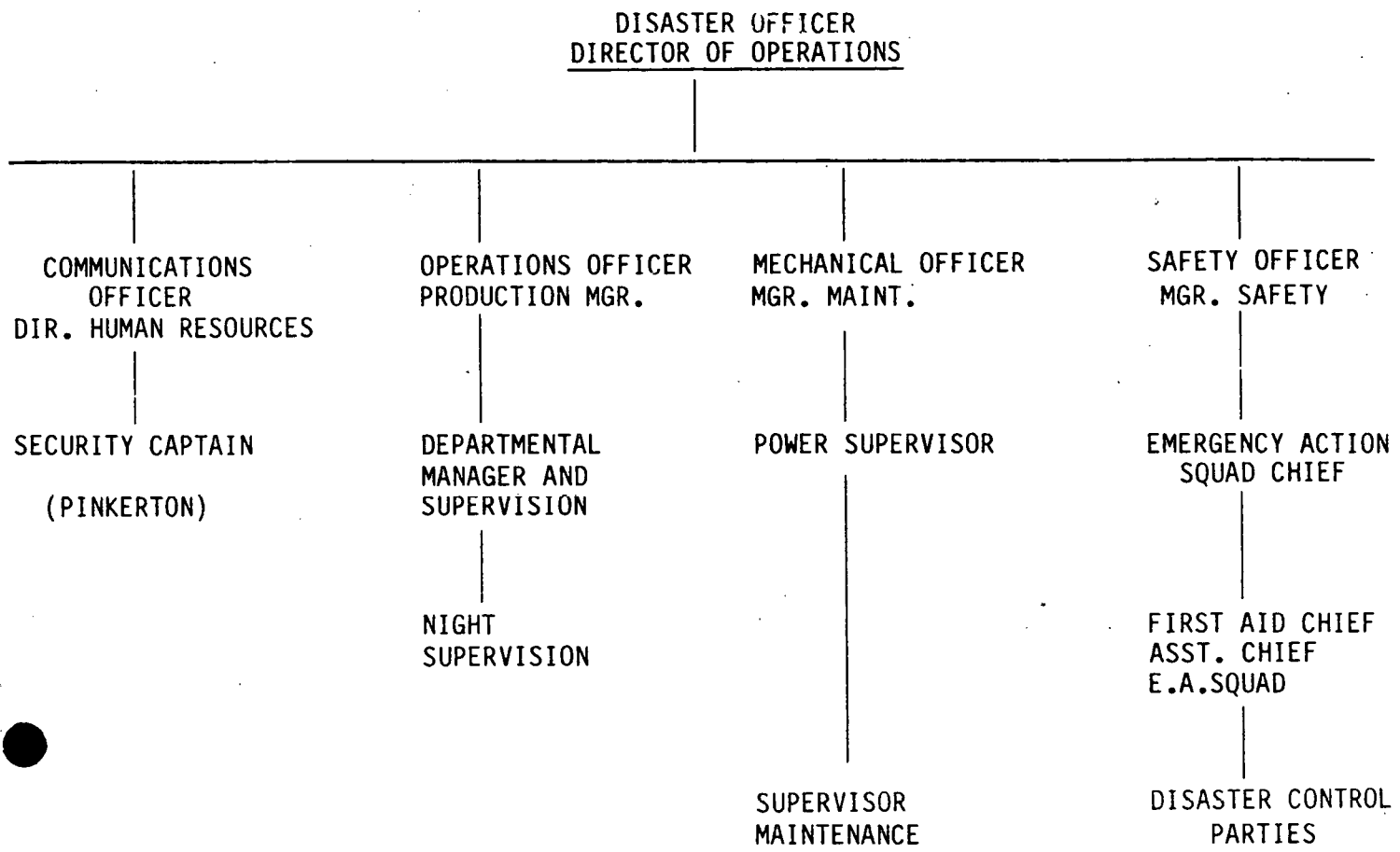
BILL BEAKMAN 434-895 CARL SCHADE 674-5973

Vendor contacts for evenings, weekends and holidays to be used when in plant EMERGENCIES arise and Purchasing Personnel cannot be reached at home.

VENDOR	COMMODITY	CONTACT	PHONE
Air Products	Liquid Hydrogen	24 Hr. Emergency	800-321-9492
		Local	668-6925
A.T. Supply 505 N. French Tonawanda, N.Y.	Falk Drive, Couplings Chain, Belts, Pulleys	Dave Martin Fran Martin Store	832-6817 832-5540 691-3331
Buffalo Insl. 356 Hertel Ave. Buffalo, N.Y.	Contractor Insulator	Bob Hall	773-5084
Buffalo Rubber 526 Niagara Buffalo, N.Y.	S&S Steel Hose, Belts Sheaves, Sprockets	Geo Graff	694-6285
C&C Plumbing 80 Sugg Rd. Buffalo, N.Y.	Contractor Plumber	Sam Clandra Joe Terranova Office	627-3757 832-7529 634-4524
Chamberlin Rubber 200 Creekside Dr. Amherst, N.Y.	Hose, Garlock Packing Belts	Don Ketter Don Gephart Craig Covel	649-4880 896-5445 542-9712
Commercial Pipe 1920 Elmwood Ave. Buffalo, N.Y.	Pipe, Valves, Fittings	John Hurley Jay Hurley	835-5616 836-3359
Erb Company 1400 Seneca St. Buffalo, N.Y.	Plumbing Supplies	Art Reich	691-9059
Ferguson Electric 333 Ellicott Buffalo, N.Y.	Contractor Electrical	Emergency Answering Ser. Tim Lang Normal Emergency	852-2010 876-7106 825-4384
G. E. Service 175 Milens Road Tonawanda, N.Y.	Motor Compressor Repair	24 Hour Emergency No.	876-1200 876-1200
Hanes Marine 1294 Seneca St. Buffalo, N.Y.	Steel & Galvanized Cable, Slings, Rope	Dave Learn Bill Hanes	877-4572 655-4481
Industrial Bearings 490 Cayuga Road Cheektowaga, N.Y.	Bearings, Seals, Belts	Bob Keiffer Tom Fitzgerald	634-9713 632-4398

VENDOR	COMMODITY	CONTACT	PHONE
Leak Repairs Pittsburgh	Valve & Pipe Line	24 Hr Emergency No.	691-5012
Linde	Nitrogen Service	Dispatching 24 Hr. Emergency Bob Esper	800-321-9492 854-1616
Metal Locking Ser. 68 Hayes Place Buffalo, N.Y.	Metal Locking Service	Answering Service	824-4359
Nia Flo Supply 48 Comet St. Buffalo, N.Y.	Chesterton Mechanical Seals	Tony Paolini Phil Roderick Terry McDonnel	874-4774 773-0916 773-9299
Niagara Insulation 79 Perry St. Buffalo,N.Y.	Contractor	Fred Dittmar Bob Staeker Ray Braun	941-6333 837-8268 834-5513
Nicholson & Hall Boiler & Welding 41 Columbia St. Buffalo, N.Y.	Boiler Repair Welders, Regular & Code	Gary G. Mide Madia	773-7267 773-5760
Norgas	Propane Delivery	R. Shoemaker Dave Williams Dick Nye	773-1719 791-3079 625-9245
Rhodes Welding 2412 Bailey Ave. Buffalo, N.Y.	Welders		759-8471
Root Neal 64 Peabody Buffalo, N.Y.	Belts, Sheaves, Couplings	Jim Neal Jack Neal Bob Meissner	837-4171 877-3361 649-2662
Rupp Rental 101 Great Arrow Buffalo, N.Y.	Crane, Compressor, JLG Backhoe, Pumps, Rental		692-4136 649-0116 773-3161
Rupp Rigging 101 Great Arrow Buffalo, N.Y.	Rigging Contractor, Men Men & Equipment, Millwrights Welders, Riggers		674-5988 773-5720 839-3155
Stetson Chemicals 391 Exchange St. Buffalo, N.Y.	Bagged Soda Ash	Thomas Sanko Gene Nowakowski Jim Robinson Edward Kruk	873-3329 826-1130 731-3643 773-4203
L. A. Woolley 75 Ellicott St. Buffalo,N.Y.	Electrical Items	Denny Fisher Dave Woolley	649-0904 648-0665
Wizard Method Inc. 1100 Connecting Rd. Niagara Falls, N.Y.	High Pressure Water Clean. Sewer Clean Chemical Spill, Vac. Truck	John Kozlowski Pager No. Garlen Stonemen 24 Hr. Service	285-7111 690-7118 625-8836 283-7087

BUFFALO COLOR CORPORATION
DISASTER CONTROL ORGANIZATION



COMMUNICATIONS

GENERAL INFORMATION

The problem of communications is extremely critical in that successful operations of a Disaster Control Plan depends on expeditious mustering of all personnel involved, as well as effective maintenance of a communications system during the emergency period.

A specially assigned line (Ext. 4555) is maintained at all times for emergency notification to guard headquarters.

On nights, week-ends and holidays the communications center is the Prenatt Street Guard Headquarters. This will also serve as the alternate if the main board in Bldg. 100 is knocked out.

The communication center for both in plant and out-of-plant telephone service is the switchboard located in Bldg. 100. This board is operated by trained personnel Monday through Fridays, from 8:00 A.M. to 4:30 P.M.

In the event of a electrical power failure all of the telephones will be inoperable with the exception of eight phones located throughout the plant that are automatically connected to the New York Telephone Central Office trunks. Only these stations will have service to the outside (see page 18) and they are limited to this service only. No communication between emergency phones is possible.

To place an outgoing call on any of the eight stations: 1) depress the dial tone start key located at the side of the telephone, 2) with dial tone, dial the 7 or 10 digit number you desire.

In the event an emergency disrupts complete telephone communications the Communications Officer will put into effect the messenger service for plant communications. He will also arrange for telephone service in adjacent industrial offices and maintain contact with plant officials through messenger service.

Key mechanical personnel within the plant carry two-way radios monitored on station WNBF 968. During an emergency, these two-way radios can be used very effectively for in-plant communications. A list of personnel having radios is on page 19.

Location of telephones which will remain in service during a commercial power failure

1.	Director of Operations Office - Bldg. 100	X 4536
2.	Power Office Bldg. 208	X 4597
3.	Guard Shanty - Prenatt Street	X 4606
4.	Maintenance Office - Bldg. 223	X 4565
5.	Safety Office - Bldg. 121	X 4647
6.	Indigo - Indigo Trailer	X 4677
7.	Production Control/Traffic - Bldg. 100	X 4514
8.	Maintenance - Area E Bldg. 310	X 4630

PERSONNEL ASSIGNED TWO-WAY RADIOS

1. P. Mescall
2. R. Tufts
3. Spare Battery
4. Spare (Maint.)
5. L. Kaminski
6. D. Kaczanowski
7. R. Graf
8. J. Moran
9. R. Keenen
10. Spare (Indigo)
11. Spare (Indigo)
12. W. Goldbach
13. R. Januszkiewicz
14. R. Troyer
15. L. Dulniak
16. F. Parker
17. W. Hammer
18. C. Montgomery
19. J. O'Sullivan
20. P. Krauss
21. J. Simpson
22. H. Bolden
23. L. Collins
24. Spare Battery
25. Spare (Maint.)
26. J. Marino
27. M. Griffin
28. G. Bolles
29 R. Ladowski
30. Guards
31. Spare (M. Griffin)
32. Spare (Maint.)
33. Spare (Maint.)
34. J. Leitten
35. G. Carpenter
36. G. Pudlewski

EMERGENCY ACTION SQUAD
GENERAL INFORMATION

The plant supports a volunteer group of personnel, both hourly and salary, trained in fire fighting, rescue and first aid techniques peculiar to the plant. This group is known as the plant Emergency Action Squad and meets for a two hour long training drill on a monthly basis. Current strength is approximately fifty individuals. Approximately thirty E.A.S. Members are on the 8-4 shift while about ten E.A.S. Members will be on the 4-12 or 12-8 shifts.

Members of the squad have been instructed to proceed to the plant area identified by the emergency signal code and prepare to deal with the emergency. On weekdays, they will be under the command of the Squad Chief, Assistent Chief or shift supervisor in that order. On nights, weekends or holidays, the shift supervisor shall be in command.

Only the person in command of the squad shall determine the need to and request aassistance from the Buffalo Fire Department and/or an outside ambulance service. He shall relay this request to the guard headquarters and the guard on duty shall make the telephone call requesting such assistance. The call shall include instructions to come to a specific plant gate and wait for instructions. The person in command of the squad shall be responsible for meeting the person in responsible charge of the outside agency called for assistance, briefing him on the nature and location of the emergency and coordinating their activities with those of plant personnel.

In many cases, efforts to bring emergency situations under control are hindered by the presence of people who have no business being on the scene. * Plant personnel who are not members of the Emergency Action Squad or whose assistance is not requested by the person in charge of the squads activities are to keep away from the emergency area. Emergency Action Squad Members will be ordered to physically remove violators.

The Buffalo Fire Department (856-5111) will be notified when B.C.C. is in a shutdown mode thereby causing a skeleton E.A.S. crew on site.

LOCATION AND DESCRIPTION OF MAJOR FIRE FIGHTING AND RESCUE EQUIPMENT

A specially designed emergency truck is garaged in Bldg. 361. This truck is equipped with the basic tools and equipment considered necessary to handle a fire or rescue emergency including five Scott Air Paks. Also available on the truck is personal protective equipment in the form of Nomex gloves, hip boots and Nomex fire coats for 25 persons. Emergency Action Squad and security personnel have received training in driving the vehicle and instructions that upon hearing an emergency signal calling for the entire squad to respond, the first person to the truck shall drive it to the scene of the emergency. Two way communications with security headquarters is provided on the emergency truck.

There is also a plant ambulance which is equipped with first aid supplies, including oxygen. On nights, weekends and holidays, this vehicle is assigned to the shift supervisor so that he may proceed to the scene as quickly as possible in the event of an emergency. The vehicle is equipped with a bull horn and a two-way radio connected to the Prenatt Street guard house.

A 1500 watt gasoline driven generator is housed in the Electrical Shop, Bldg. 220 and is available in the event of an emergency. The guard sergeant on duty and all electricians have keys to the shop. The unit is maintained and supervised by the Electrical Department.

Plant fire protection consists of an underground pipe grid system serving the building sprinklers and the in-plant fire hydrants. With the exception of the Power House, Buildings 207 and 208 electrical sub-stations, Buildings 80, 81 and 314, and Buildings 52, 53,and 82 all operating areas and most service and shop areas are fully protected by standard sprinkler systems.

Active fire hydrants are strategically located throughout the plant. Most are protected by hydrant houses containing a minimum of (50) fifty feet of 2 1/2" fire hose. Both the sprinkler systems and the hydrant houses are maintained by BCC personnel.

The plant sprinkler systems have two sources of water; City water supplied by 10" mains at city water pressure from lines in Elk Street and South Park Avenue and two fire pumps, one in Bldg. 208 which is steam turbine driven and is supplied from city water main in Lee Street, and one "auto-start" diesel driven fire pump at Bldg. 150 supplied from the B.R.I.C. system at that location. The "Auto-Start" pump will activate on drop in pressure on the sprinkler system. The steam turbine pump will be operated by the Powerhouse "shift engineer".

Additional water flow can be made available if Buffalo Fire Department pumpers connect to our fire mains. Connections to do so are located at:

1. The fence line on the south side of Elk Street near the center of Bldg. 322.

2. The north east corner of Bldg. 208.

3. The south east corner of the Machine Shop (Bldg. 221) on Lee Street.

4. The fence line on the south side of South Park Avenue immediately west of the entrance to Plant A.

   Caution - If this becomes necessary, fire department personnel must be instructed that pressure is not to exceed 90 psi.

In case of fire call the Buffalo Fire Department at 856-5111.

The Buffalo City Fire Department may be summoned by alarm boxes located at:

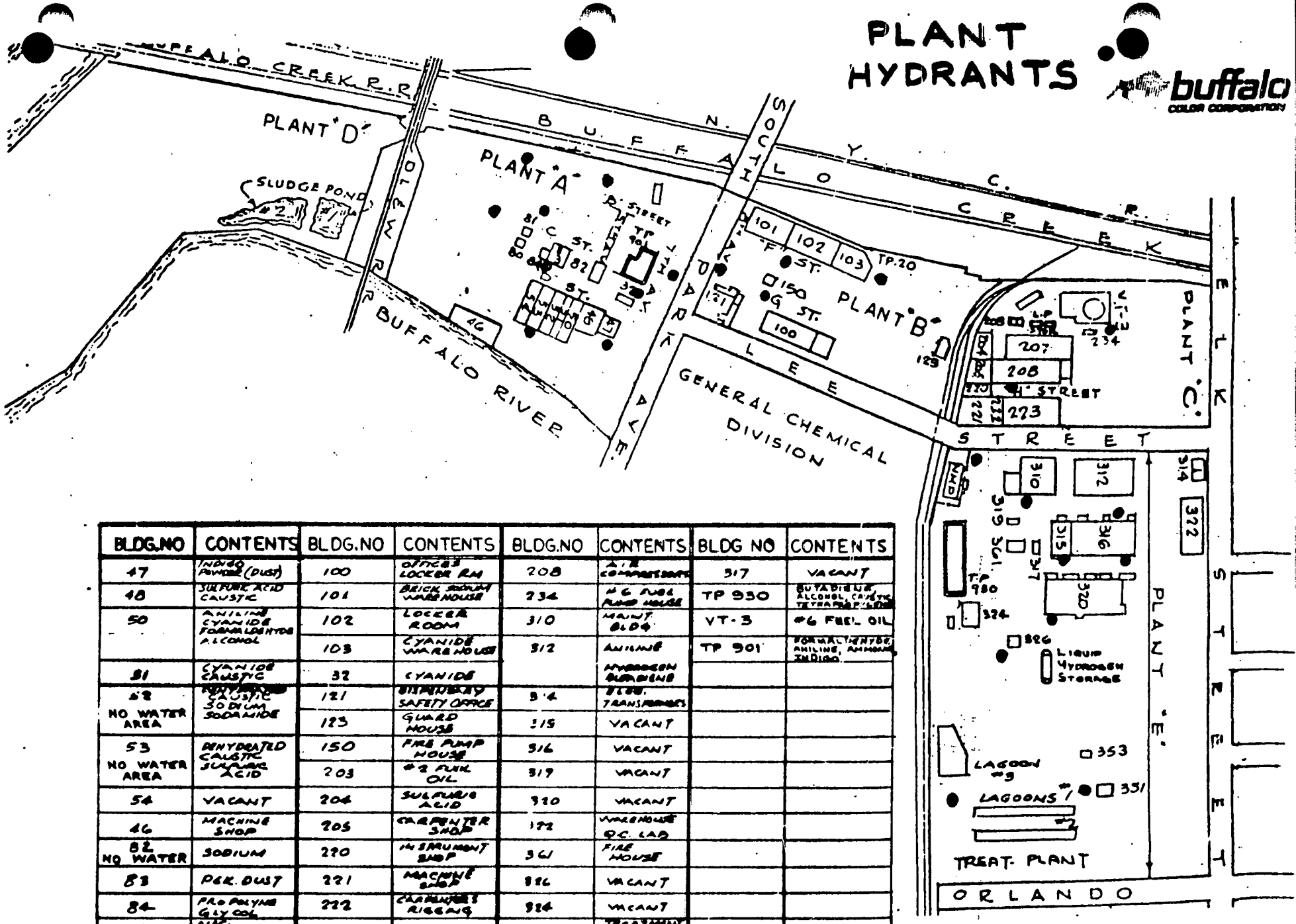
1. Telephone pole, north wall of Bldg. 121.

2. North west corner of Bldg. 223.

3. East side of Lee Street immediately south of the railroad crosssing at Prenatt Street.

PLANT HYDRANTS

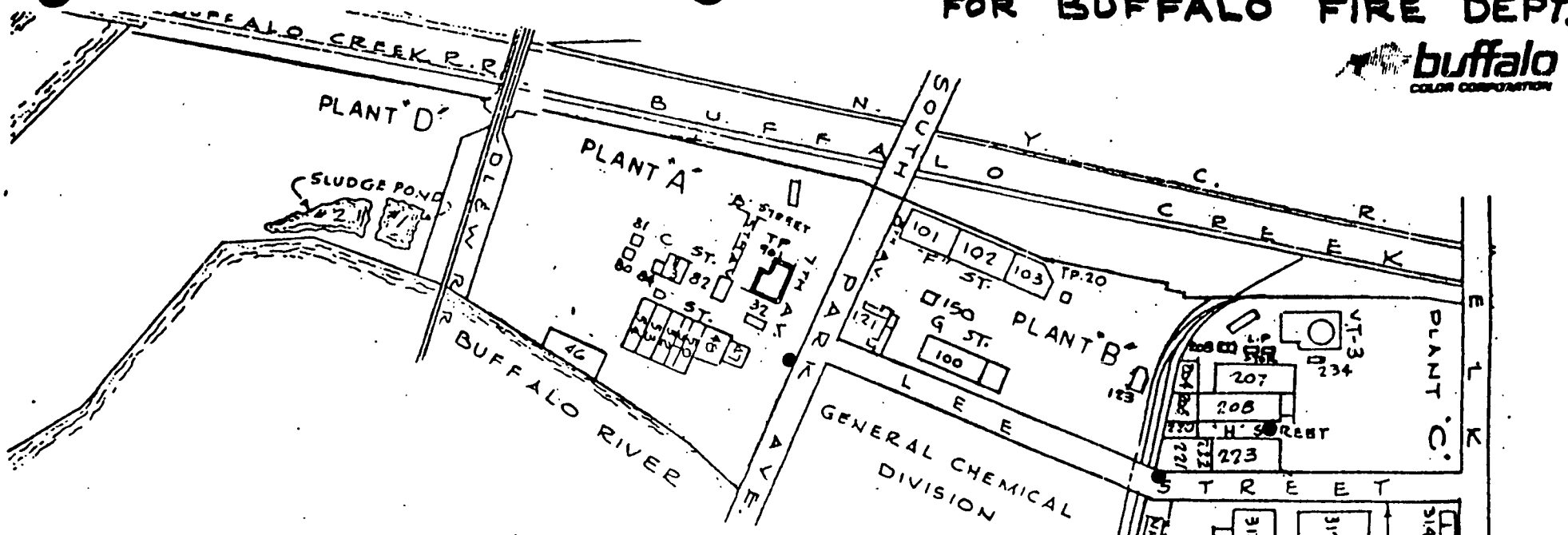
buffalo COLOR CORPORATION



BLDG.NO	CONTENTS	BLDG.NO	CONTENTS	BLDG.NO	CONTENTS	BLDG NO	CONTENTS
47	[illegible] POWDER (DUST)	100	OFFICES LOCKER RM	208	[illegible] COMPRESSORS	317	VACANT
48	SULFURIC ACID CAUSTIC	101	BRICK [illegible] WAREHOUSE	234	#6 FUEL PUMP HOUSE	TP 930	BUTADIENE ALCOHOL, CAUSTIC TETRAMER [illegible]
50	ANILINE CYANIDE FORMALDEHYDE ALCOHOL	102	LOCKER ROOM	310	MAINT. BLDG	VT-3	#6 FUEL OIL
		103	CYANIDE WAREHOUSE	312	ANILINE	TP 901	FORMALDEHYDE, ANILINE, AMMONIA, INDIGO
81	CYANIDE CAUSTIC	32	CYANIDE		HYDROGEN BUTADIENE		
52 NO WATER AREA	[illegible] CAUSTIC SODIUM SODAMIDE	121	[illegible] SAFETY OFFICE	314	[illegible] TRANSFORMERS		
		123	GUARD HOUSE	315	VACANT		
53 NO WATER AREA	DEHYDRATED CAUSTIC SULFURIC ACID	150	FIRE PUMP HOUSE	316	VACANT		
		203	#2 FUEL OIL	319	VACANT		
54	VACANT	204	SULFURIC ACID	320	VACANT		
46	MACHINE SHOP	205	CARPENTER SHOP	322	WAREHOUSE QC. LAB		
82 NO WATER	SODIUM	220	INSTRUMENT SHOP	326	FIRE HOUSE		
83	PER. DUST	221	MACHINE SHOP	326	VACANT		
84	PROPYLENE GLYCOL	222	CARPENTERS RIGGING	324	VACANT		
80	ELEC. TRANSFORMERS	223	OFFICES	351	TREATMENT PLANT		
81	ELEC. TRANSFORMERS	207	BOILERS: NAT. GAS	353	MAIN [illegible] BLDG		

PUMPER CONNECTIONS FOR BUFFALO FIRE DEPT.

buffalo COLOR CORPORATION



BLDG.NO	CONTENTS	BLDG.NO	CONTENTS	BLDG.NO	CONTENTS	BLDG NO	CONTENTS
47	INDIGO POWDER (DUST)	100	OFFICES LOCKER RM	208	AIR COMPRESSOR	317	VACANT
48	SULFURIC ACID CAUSTIC	101	BRICK SODIUM WAREHOUSE	234	#6 FUEL PUMP HOUSE	TP 930	BUTADIENE, ALCOHOL, (AVETIC TETRA PROPYLENE)
50	ANILINE CYANIDE FORMALDEHYDE ALCOHOL	102	LOCKER ROOM	310	MAINT BLDG	VT-3	#6 FUEL OIL
		103	CYANIDE WAREHOUSE	312	ANILINE	TP 901	FORMALDEHYDE ANILINE, AMMONIA INDIGO
51	CYANIDE CAUSTIC	32	CYANIDE		HYDROGEN BURNING		
52 NO WATER AREA	ANHYDROUS CAUSTIC SODIUM CYANIDE	121	DISPENSARY SAFETY OFFICE	314	ELEC. TRANSFORMERS		
		183	GUARD HOUSE	315	VACANT		
53 NO WATER AREA	ANHYDROUS CAUSTIC SULFURIC ACID	150	FIRE PUMP HOUSE	316	VACANT		
		203	#2 FUEL OIL	319	VACANT		
54	VACANT	204	SULFURIC ACID	320	VACANT		
46	MACHINE SHOP	205	CARPENTER SHOP	322	WAREHOUSE QC LAB		
82 NO WATER	SODIUM	220	INSTRUMENT SHOP	361	FIRE HOUSE		
83	PER. DUST	221	MACHINE SHOP	326	VACANT		
84	PROPYLENE GLYCOL	222	CARPENTERS RIGGING	324	VACANT		
80	ELEC. TRANSFORMERS	273	OFFICES	361	TREATMENT PLANT		
81	ELEC. TRANSFORMERS	207	BOILERS. NAT. GAS	323	MAINTENANCE BLDG		

The Buffalo Plant is serviced by Niagara Mohawk Power Corporation at two points; 2400 volt, 25 cycle power delivered to the high voltage bus in Bldg. 208, and 23,000 volt, 60 cycle power delivered to Bldg. 314 - the 60 cycle substation in Plant "E".

All plant areas can be isolated in an emergency by operation of circuit breakers at Bldg. 208 or Bldg. 314 to terminate electric power delivery.

Natural Gas

The Buffalo Plant is serviced by National Fuel Gas Corporation at four locations; One in Plant "A" one in Plant "C" and two in Plant "E" from mains in South Park Avenue, Lee Street and Elk Street. This service is monitored by and under the supervision of the Power Department.

City Water

City Water is supplied to four plant areas; Plant "A" one connection, Plant "B" two connections, Plant "C" two connections and Plant "E" three connections from the City of Buffalo water mains in South Park, Lee Street and Elk Street. This service is monitored by and under the supervision of the Power Department. All city water systems are equipped with backflow prevention.

Lake Water

Lake Water is supplied to the plant by the Buffalo River Improvement Corporation from a pumping station located on Fuhrman Blvd. Direct telephone contact to this pumping station is maintained at the Prenatt Street guard house.

In the event that it was necessary to isolate in-plant lake water distribution piping from the B.R.I.C. system refer to the specific instructions on Page 27. In the event that lake water is not available, there are provisions in certain operating areas for temporary connection of city water. Under the latter condition, the lake water system must be isolated by appropriate valving in the local area.

Steam

Steam for all plant uses is generated in Bldg. 207 and distributed throughout the plant. In addition, 30 Lb. and 150 Lb. steam are normally supplied to the Allied Chemical facility in Plant F.

PRESERVATION OF PLANT RECORDS

Engineering data pertinent to restoration of service after an emergency are located primarily in the Engineering Office, Bldg. 100 and also in Bldg. 100 Planning Department. Other critical data are located in the plant Library and Computer Room in Bldg. 100.

In the event of emergency, these records shall be safeguarded by the assigning of personnel designated by the Communications Officer, cordinating with the Plant Comptroller, the Manager - Engineering, Manager - Maintenance and the Manager - Technical.

Any hazardous waste material created by the emergency will be disposed of in accord with federal regulations.

Small quantities will be drummed, washed and delivered to the Solid Waste Control Area. Bulk quantities will be stacked on concreted areas and isolated from street drains until they can be shipped to approved hazardous waste disposal facilities.

The usual operating conditions of the Solid Waste Control Area will be observed; incompatable wastes will be separated, reactive and ignitable wastes will be kept more than 50 feet from the property line, and all will be disposed of within 90 days of the emergency.

All emergency equipment will be cleaned in areas that drain to the process waste sewer system, and must be made fit for intended usages before operations are resumed.

USEPA and NYDEC must be notified that the above post-emergency steps have been taken before operations are resumed. The implementation of the Disaster Control Plan must be entered in the operating record of the Treatment Plant.

Within 15 days after the incident, the Regional Administrator of USEPA must be given a written report which will include the type of incident, the name and quantity of materials involved, the extent of injuries, and assessment of actual or potential hazards to the environment, and estimates of quantity and disposition of recovered material resulting from the incident.

SHUTDOWN PROCEDURE - ENTIRE PLANT AREA OR BUILDING OR SET OF BUILDINGS - GENERAL INFORMATION

A. In the event of a major catastrophe in any of the four plant areas in the Buffalo Plant, a complete shutdown of the area can be effected by the following procedure:

1. Call the Guard Headquarters on telephone extension 4555 and explain clearly and concisely the nature and location of the incident and request assistance.

2. The guard will immediately sound code signal for the affected area summoning the plant Emergency Action Squad.

3. The guard will then notify departmental supervision of the plant involved by the most practical means (telephone, radio, or pager).

4. At the direction of departmental supervision:

   A. Power Department engineers at ext. 4597 (Powerhouse) will be notified regarding curtailment or continuation of services.

   B. Plant official will be notified in the order listed on the Emergency Call list.

5. Plant supervision in charge, who automatically respond to the code signal, will determine the extent of services necessary, direct the guard to call outside assistance (Buffalo Fire Department, ambulances, etc.) if necessary, and then proceed with process shutdown for plant involved.

B. In the event of an incident of less than catastrophic proportions, and involving a building or set of buildings in any one plant, the following procedure will be followed:

1. Call 4555. Explain clearly and concisely the nature and location of the incident and request assistance.

2. The guard on duty will immediately sound the code signal for the affected area summoning the plant Emergency Action Squad.

3. At the direction of plant supervision in charge, the guard on duty will then notify plant officials in order listed on the emergency call list.

4. Plant supervision in charge will shutdown essential services and equipment by operation of main control valves and electric cutout switches as listed in the Shutdown Procedure for each building, coordinating with Power operating personnel at Ext. 4597 (Powerhouse).

C. On nights, weekends, and holidays, the shift supervisor responds to all emergency signals and directs all fire and first aid activities.

1. He will evaluate the necessity of outside assistance (Buffalo Fire Department, ambulances, etc.)

2. He will arrange the notification of the departmental supervision for the plant involved.

3. The shift supervisor will keep the Power Department shift engineer informed as to necessary services and those to be shutdown at ext. 4597.

4. In the event of a disaster of catastrophic proportions he will invoke the Disaster Control Plan and direct the Prenatt Street guard to notify plant officials in the order listed on the Emergency Call List.

5. He will institute the emergency shutdown of services and equipment as listed in the Shutdown Procedure for each building.

D. The location of each of these main shutoff valves and switches is designated in the Shutdown Procedure in each department.

Process equipment in the buildings affected will cease operations with the cut off of essential power services. In the majority of cases these operations will terminate with little or no hazard. In special cases operators and/or shift supervisors familiar with the units will effect a complete and safe shutdown.

In all cases where main shutoff valves or switches are operated, the Power Department engineer in charge must be notified by calling telephone extention 4597.

SPECIFIC INSTRUCTIONS
POWER SERVICES

1. Power Department
Buildings: 203, 204, 205, 207, 208, 223, 234

1. Any disaster situation within the plant could involve power services distribution systems or directly involve power operating areas of the above listed buildings. In either event immediately make telephone contact with the following personnel in the order listed:

Ron Crane	695-6894 227 Newell Avenue Tonawanda, New York
Jim Marino (Manager)	684-1830 12 Wilma Drive Lancaster, New York
Ron Januszkiewicz	893-6670 78 Lemoine Avenue Cheektowaga, New York

2. When these men are contacted they should be given a brief picture of the situation and requested to be at the plant with minimum delay.

2. Disaster Situations Involving Plant Areas Other Than Power Operating Areas.

1. Under these circumstances it is likely that the delivery of certain power services to the disaster area will have to be terminated. The decision to so terminate will be initiated by the Disaster Officer, with due consideration of the impact of such action on other plant processes and overall power operations. These area power service shutdowns are covered under the "Emergency Procedures" for the respective areas which include the location of valves and electrical switch gear to effect service termination.

2. Power Department personnel will be directed by their supervision coordinating with the Disaster Organization. The Power Department will make every effort to maintain the availability of power services essential to coping with the emergency.

3. Disaster Situation Directly Involving Power Operating Areas

1. Confirm that telephone call-in's have been made. The situation will have to be appraised and these personnel will direct the emergency actions to be taken.

2. Due to the complexity of the overall operation, the interrelationship of systems, and the high concentration of hazards under disaster situations, it is deemed impractical and unsafe to involve personnel unfamilar with the facility and it's operation in lengthy, detailed shutdown procedures. In any event, immediately following any disaster situation involving Power Operating areas, the shift engineer is in responsible charge of the overall operations.

SPECIFIC INSTRUCTIONS
WASTE TREATMENT PLANT

In the event of a disaster situation in areas of the plant not directly involving the Waste Treatment Plant, alert the Treatment Plant Operator at Ext. 4637 of the situation. He is instructed to isolate any unusual effluent resulting from the emergency and hold in one of the three lagoons for testing prior to disposal. This could be done without disrupting the remainder of the plant operations. If the unusual effluent represents a personnel hazard, the operator should be informed.

If normal 60 cycle electrical service to the Treatment Plant is interrupted critical units in the Treatment Plant will be supplied with power from the diesel-engine emergency generator located in Bldg. 351. The diesel supply tank for this generator unit is located at the southwest corner of Bldg. 351.

If the emergency directly involves the Waste Treatment Plant, it is possible that forward flow in the process sewers to the Treatment Plant cannot be treated. It is essential that process areas of the plant be curtailed immediately since any discharge of process waste to the city sewers is in violation of BSA Regulatory Standards, and an increase in waste water volume in the lagoons above the 24 inches of freeboard level is a violation of federal regulations. This latter violation is preferable because it does not endanger any humans and allows time for a return of control, preventing the discharge of any untreated waste to the Bufflo Sewer Authority. If the evacuation procedure is executed, the lagoons should be allowed to fill. (See page 49).

Once efforts to stop flow are instituted, make telephone contact with the following personnel in the order listed.

Treatment Plant Supervision

Richard Troyer — Phone 741-3727
9300 Tonawanda Creek Road
Clarence Center, New York

Environmental Services

David Sauer — Phone 897-5385
150 Floss Avenue
Buffalo, New York 14215

SPECIFIC INSTRUCTIONS
SOLID WASTE CONTROL AREA

1. These instructions are included to meet the requirements of 40 CFR 265.50-56.

2. In the event of a leaky drum, fire, emission of fumes or other abnormal conditions, the finder will immediately notify the Treatment Plant operator who will notify the shift supervisor who will determine if the problem is major or minor.

3. The Operations of Solid Waste Control Area are provided (on site) with the following:

   3.1 Hard Hats
   3.2 Safety Glasses with Side Shields
   3.3 Long Sleeve Shirts
   3.4 Leather Safety Shoes
   3.5 Rubber Boots
   3.6 Rubber Gloves
   3.7 A Class ABC Fire Extinguisher
   3.8 A Scott Air Pak
   3.9 Acid Suit
   3.10 Respirators

4. Operator Instructions

   4.1 Leaking Drum

   Wearing rubber gloves, isolate leaking drum and transfer contents to DOT approved drum.

   4.2 Fuming Drum

   Wearing Acid Suit and Scott Air Pak, investigate cause of fuming. Relieve pressure on drum.

   4.3 Any Fire

   4.3.1 Call 4555 and notify guard of condition.
   4.3.2 Fight fire with fire extinguisher if practical.
   4.3.3 Emergency Action Squad Chief is in charge of fire fighting equipment and personnel.
   4.3.4 Fire Hydrants are located:

   4.3.4.1 189 Feet WNW East of Bldg. 326
   4.3.4.2 348 Feet NE South of Bldg. 351
   4.3.4.3 240 Feet ESE at South end of Lagoon 1

5. Notify Environmental Supervision in order listed:

   5.1 Richard Troyer · 9300 Tonawanda Creek Road
   Clarence Center, New York
   Phone: 741-3727

   5.2 David Sauer 150 Floss Avenue
   Buffalo, New York
   Phone: 897-5385

6. As required by safety rules for the total plant site, all operators must wear hard hat, protective glasses, gloves and safety shoes. In addition, arms must be covered to wrist at all times.

SPECIFIC INSTRUCTIONS
B.R.I.C. WATER SHUTDOWN
ENTIRE PLANT

There may be situations that occur which will require that the Lake Water System in the plant be isolated from the Buffalo River Improvement Corporation (BRIC) distribution system. When this becomes necessary there are three (3) valved connections supplying lake water from BRIC to the plant which may have to be closed.

When locating these valves in the field care should be used so that the proper valve is positively identified. In the vicinity of each branch connection there are additional valves which are the responsibility of BRIC. These valves are not to be operated by area personnel. They shall only be operated by a BRIC representative or Power Department personnel. These valves are indicated on SC9399-10 drawing available in the Power Department, and identified in the field by the letters B-R-I-C painted on the manhole covers.

The three branch valves are the responsibility of the Power Department and should only be operated by area personnel in an emergency, when a representative of the Power Department is not available. When any valve is operated, notification should be given to the Power Office (Ext. 4582 - 4583 - 4584) or the shift engineer (Ext. 4597). These three branch valves are:

1. Lake Water Valve #2 - this connection supplies Plant A. The valve pit has a 30" manhole cover located just south of the D.L.&W viaduct, 16 feet southeast of a plant power line pole. (Sign on pole).

2. Lake Water Valve #3. - This connection serves only the diesel driven fire pump at Bldg. 121. The valve curb box is in the paved area north of Bldg. 121. Any time that this valve is to be closed, the Safety Department should be notified since fire protection in the plant will be limited to the Bldg. 208 steam driven fire pump.

3. Lake Water Valve #4 - This connection supplies Plants "E", "C", "F" and the Waste Treatment Plant. The shut off is a curb box in Lee Street near Prenatt Street. The cover is 19' north of the fire hydrant and 9' west of the east curb. The plant "B" system is presently isolated and out of service.

Valve wrenches for the operation of these valves may be obtained from Bldg.208 - Contact the shift engineer.

In the event of a failure of the lake water system the guard at Prenatt Street will receive an emergency call via the direct line from the pumping station on Furhman Blvd.

If the failure occurs during a regular working day the Power Department Office (Ext. 4583) and Shift Engineer (Ext. 4597) should be called. The Power Department will shut water off.

If the failure occurs on nights, weekends, or holidays, Shift Supervision will inform the Power Department Engineer (4597) and make arrangements for isolating the plant.

SPECIFIC INSTRUCTIONS
B.R.I.C. WATER LOSS - CONVERSION TO CITY WATER
BUILDING 312

In event of supply loss, the following procedures should be followed:

Bldg. 312

1. Shutdown Hydrogenator Unit.
2. Shutdown DMA unit.
3. Shutdown DEA/MEA unit.
4. Shutdown steam or distillation columns.
5. Shutdown Ejectors.
6. Resin still and reactors requiring reflux until city water service is available.

City water service is available via two 3" lines off the 10" main. These lines are tied in on the first floor over the south door center aisle. The lines are equipped with check-valves to prevent Lake Water back-up into the City Water lines. In warm weather, city water is supplied to one lake water connection on 1st floor over south door, center aisle and to lake water connection on 2nd floor east side adjacent to DMA converters from sprinkler houses east side center of building. Fire hoses are connected between points. Adapters for sprinkler house connections are available from the Maintenance group.

All equipment currently on Lake Water service could be supplied, for these tie-ins would simply flood the present lake water line with city water.

Prior to opening these valves, it is necessary to close off the 10" lake water supply valve inside the south-east door 1st floor.

All floors and equipment may be isolated as the demand necessitates.

Use of city water extensively will be on an emergency basis only.

LOCATION OF MAJOR SERVICE SHUT-OFFS

AREA "A"

1. Major service shut-offs for Area A

1.1 30# steam - valve under South Park Bridge.

1.2 150# steam - valve just south of the South Park Bridge.

1.3 66° sulfuric acid - HT3 storage tank at former Bldg. 10. Shut off pump at tank

1.4 City water - shut off valve is located outside Bldg. 47 east wall alongside the roll up door on Bldg. 48 N.E. wall.

1.5 City water - Another shut off valve in pit approximately 18 feet north of fence along north side of concrete pad north of Bldg. 43 and approximately 4 feet inside the fence along the creek bank. Note that location in 1.4 above is more accessible.

1.6 Lake water - sign on telephone pole just south of railroad underpass directing to underground valve about 16' southeast of the telephone pole.

1.7 60 cycle power from sub-station Bldg. 81. 60 cycle for compressors supplied from sub-station Bldg. 80.

1.8 25 cycle power for Indigo and Bldg. 54 from sub-station Bldg. 80.

1.9 Natural gas - shut off at meter at NW corner Bldg. 48.

1.10 Brine and brine returns - shut off valves at northwest corner Bldg. 48 and also about 200 feet west from Bldg. 48. Propylene Glycol Solution is circulated through supply headers via 1CP6 and 7 Bldg. 84. VT-1 is Proyplene Glycol Storage Tank located west of Bldg. 84.

1.11 100# air - 2AC1 and 2 Bldg. 54. Main shut off valve located east end of second floor Bldg. 54 on discharge side of dryer 2D-1, inside compressor room.

100# air -1AC4 Bldg. 83. Main shut off valve located at north wall on discharge line for dryer 1D-2.

Note: Main crossover valve from 2AC1 and 2 to 1AC-4 systems is located outside Bldg. 83 east wall between two trap tanks.

1.12 60# air - shut off valve at regulators along east wall second floor of Bldg. 54, inside the compressor room.

1.13 30# air - Main shut off valve located at discharge end of 2AC-3 Bldg. 54, inside compressor room.

1.14 Hot water - shut off valve at north end Bldg. 48 outside.

LCOATION OF MAJOR SERVICE SHUT-OFFS

INDIGO DEPARTMENT

LOCATION OF SERVICE AND RAW MATERIALS SHUT OFFS

1. 150# Steam - chain valve located Bldg. 52 east alley.

2. 150# Steam (to HT1 Bldg. 50) - chain valve located in Bldg. 48 west alley.

3. 30# steam - valve located east end of Bldg. 53 on roof.

4. Lake Water - valve located in Bldg. 50 east alley.

5. City Water - north feeder - valve located in Bldg. 48, 2nd floor at 2FP13 on north end.

   South feeder - valve located in Bldg. 53 in south west corner about 3rd floor level.

6. Hot water - valve located over Bldg. 48 westside
   Note: shuts all hot water off to area.

7. Natural Gas - Valve located in Bldg. 52 - west side 2nd floor level. Can also be shut off at gas meter, Bldg. 48.

8. #2 Fuel Oil - TP-901 - VT-15 - Shut off outlet valve and GP18 or 19 located outside dike on eastside emergency shut off button - 1st floor Bldg. 52 smoke room.

9. Propylene Glycol - supply and return valves located in Bldg. 50 3rd floor level west side of Bldg. The propylene glycol solution is supplied from a diked storage tank VT-1, west of Bldg. 84 via 1CP-6 and 7.

10. 60# Air - Valves located on the east side of the second floor Bldg. 54 inside the compressor room.

11. 30# Air - Four supply lines off main located west of department on west side of street. Valves off main for each line supplying Bldg. 50, 52, 53 and 48.

12. 100# Inst. Air - Main runs along west side of Bldgs. 48 - 53 valve on each supply line off mains to Bldgs. 48 and 51. Main shut off to Indigo, southeast corner of Bldg. 54, second floor inside compressor room.

13. 66 Acid - at HT-3 - Shut off handle on breaker box or to Indigo only shut off chain valve located west side Bldg. 51.

14. Aniline - VT-12 TP 901 - Shut off bottom outlet valve and shut down 1CP-14 - (TP-901) Switch at pump and third floor Bldg. 50 at meter along north wall.

15. Formaldehyde - VT-21-TP-901 - Close bottom outlet and shut down CP-21 (TP-901) - Switch at pump and second floor Bldg. 50 north wall alongside 2K-3.

16. Alcohol - TP-901 HT-36 - Shut off 1CP15 - Switch located on platform over tank and second floor Bldg. 50 alongside 2VT-3.

17. KOH - TP-48 - VT-35 - Close off bottom outlet - shut down 1CP-20 located in Bldg. 50 east end of building. Switch at pump.

18. Liquid Sodium - Bldg. 82 - Shut down pump 1EMP-2 - Switch located east end of building just across from door. 1EMP-2 can also be shut down by "Stop" button located on panel board, Bldg. 52, 5th floor.

19. Ammonia - TP901 storage tanks HT9 and VT5 serviced by 1CP4, CP12, and CP22. Pump start-stop buttons located at east end of dike on column at VT12.

LOCATION OF MAJOR SERVICE SHUT-OFFS

BLDG. 54

150# Steam - Bldg. 54, 3rd floor east side - 2" valve located outside window.

30# Steam - Bldg. 53 - 3rd floor, valve located on east wall or another valve located on 3rd floor - 53 - middle of building.

Lake water - Bldg. 53 - 3rd floor east wall.

City water - Bldg. 53 in southwest corner about 3rd floor level.

Propylene Glycol - Supply and return valves located Bldg. 54 - 2nd floor level west side of building.

100# Inst. air - Bldg. 54 east side of building - valve off supply line from main.

60# Air - Bldg. 54 - valve located east side inside compressor room.

66 Acid - At HT3 - shut off handle on breaker box - kills pump to 54 only - Bldg. 54 - 3rd floor south west corner shut off valve.

LOCATION OF MAJOR SERVICE SHUT-OFFS
AREA "D"

TYPE OF SERVICE	LOCATION
Electricity	Bldg. 80 (Circuit Breaker)

LOCATION OF MAJOR SERVICE SHUT-OFFS

BLDGS. 312 and 316

Azoics Division - Bldgs. 312 and 316

A. Power Services:

1. Electrical: 110 and 440 volt - 60 cycle.

Main switches for the two buildings are in locked room in Bldg. 316 located on the second floor at center of west wall. The power shift engineer and the guard sergeant on duty have keys for this room. There is also one available in the Electrical Shop.

(a) Circuit Breakers - Bldg. 312

For Equipment - 3rd, 4th and roof breakers are located in the 3rd floor panel room, southeast corner.

For Equipment - On 2nd floor - breakers are located in the 2nd floor panel room, southeast corner.

For Equipment - On 1st floor - breakers are located on 1st floor panel room, southeast corner.

(b) Circuit Breakers - Bldg. 316 (north end)

For Equipment - 3rd, 4th and roof north of firewall breakers are located in panel room, 3rd floor at EL2.

For Equipment - 2nd floor north of firewall breakers are located in panel room, 2nd floor at EL-2.

For Equipment - On 1st floor north of firewall breakers are located in panel room, 1st floor at EL-2.

EL-2 is in the second bay from the north end west side of the building.

For Equipment - 3rd, 4th and roof south of firewall breakers are located in panel room 3rd floor at EL-1

For Equipment - 2nd floor south of firewall breakers are located in panel room, 2nd floor at EL-1.

(c) Circuit Breakers - Bldg. 316 - (south end)

For Equipment - 1st floor south of firewall breakers are located in panel room, 1st floor at EL-1

EL-1 is located at southeast corner, Bldg. 316.

2. 900# Steam: Serves Bldg. 312 only - notify Power personnel.

   Bldg. 312 shutoff behind 3NVT-3 on 3rd floor of Bldg. 312 westside, two bays south from north end. May also be shut off at Area "E" main valve located at southwest corner of Bldg. 312 outside at 3rd floor level. There is an orifice between the 900# steam main and the 150# steam main located on the second floor on the west side of the building. The valve below this orifice must be shut to prevent a 150# steam buildup in the 900# system.

3. Bldg. 312

   Gas
   Brine
   Hot Water
   30# Air (Main shutoff valves at south end of Bldg. 312, 2nd floor).
   60# Air
   30# Steam
   *150# Steam

   Steam condensate return - 1st floor, southwest at 1VT-15.

   Lake Water Main shutoff valves at south end of Bldg. 312, 1st City Water floor.

   Sanitary Water

B. Bulk Liquid Raw Materials:

1. Aniline is located in 1HT2, 1HT5 and TP930. HT2 - pumps to Bldg. 312 using 1CP1. Stop button for 1CP1 is located on panel board in control room, 3rd floor Bldg. 312. 1CP1 start and stop button also located at tank.

   Circuit breaker is located in Bldg. 319.

   HT5 has equalizing line to HT2 but no pump.
   HT17 - Pumps MEA to Bldg. 312 using CP25. Stop button for CP25 is located on the catwalk on top of HT-17. Circuit breaker is located in panel room, northeast corner 2nd floor Bldg. 315.
   Circuit breaker is located in panel room, northeast corner, 2nd floor, Bldg. 315.

2. Special #29 Alcohol is stored in 1HT-15, T.P. #930, and pumped to Bldg. 312 by 1CP-41. Stop button for 1CP-41 and shutoff valve are located on panel board in control room, 3rd floor, Bldg. 312.

   Circuit Breaker in panel room, 1st floor, Bldg. 312, southeast.

3. Tetrapropylene is stored in 1HT-7, T.P. 930, and pumped to Bldg. 312 by 1CP-7. Stop button for 1CP-7 and shutoff valve are located at NW corner, Bldg. 312 on 2nd floor at 2NAT-1.

   Circuit Breaker - 3rd floor panel room, southeast.

4. Sales DEA is stored in 1HT-11, TP. 930 and pumped to Bldg. 312 by 1CP-11. Stop button for 1CP-11 is located at 1HT11 and shutoff valve is located in the 1VT5 meter platform.

   Circuit Breaker - 1st floor, Bldg. 320, west center.

5. Liquid Hydrogen is stored in a 4500 gallon storage tank south east of Bldg. 320. Hydrogen is transferred to 3APT-2, located northwest corner, Bldg. 312, 3rd floor, by its own reduced pressure.

   Main shutoff valves are located at storage tank. A shutoff valve into Bldg. 312 is located in the northwest corner of hydrogenator room.

6. Liquid Caustic Soda is stored in 1HT-10, T.P. 930 and is pumped to Bldgs. 312, 316 and 320 by 1CP-10. Stop button for 1CP-10 and shutoff cocks are located at 4VT-14, Bldg. 312 center, also at 4VT-15, Bldg. 316 center, also on panel board in control room, 3rd floor, Bldg. 312, and at 4VT-38, Bldg. 320, northeast.

   For positive stop of 1CP-10, pull circuit breaker in panel room, 1st floor, Bldg. 320.

7. Methyl Alcohol is stored in 1HT-13 and is pumped by 1CP-23 to Bldgs. 312, and 320. Stop buttons are located on panel board, 3rd floor control room, Bldg. 312.

   1HT6 and 1HT1 have equalizing lines to 1HT13. There is also a switch in Bldg. 320 on the fourth floor by 4VT-68.
   Circuit Breaker in panel room, northeast corner, 2nd floor, Bldg. 315.

   Circuit Breaker - 1st floor panel room, Bldg. 320, west center.

8. DDSAA is stored in 1HT-1 Bldg. 312, located at south end of Bldg. 312. Shutoff cocks are located on top of the tank. Stop button for 1CP11 is located on wall, south of the tank.

   Circuit Breaker in panel room, 1st floor, Bldg. 312, southeast.

9. MEA/DEA crude 1VT3) 1VT4) — T.P. 930 — Pumped to Bldg. 312 by 1CP46-stop button for 1CP46 is located on panel board in DMA control room, 3rd floor, Bldg. 312 and outside dike below truck loading station.

   DMA Product 1VT5 — T.P. 930 — Pumped to Bldg. 312 and tank trucks and cars by 1CP45.

   MEA Product 1VT2 — T.P. 930 — Pumped to Bldg. 312 tank trucks and 1HT4 by 1CP48.

Stop switch for 1CP44, 45, 46 and 48 are located outside dike below truck loading station.

Circuit breaker for 1CP44, 45 and 46 located in Bldg. 320, 1st floor, west center.

Circuit breaker for 1CP48 located in Bldg. 320, 1st floor, west center.

MEA Product 1HT4	TP930	Pumped to VT2 and tank trucks by 1CP4. Stop switch is located on catwalk at HT4. Circuit breaker is located in Bldg. 319.

10. Methyl Cyclopentadiene Dimer is stored in 1HT-14, T.P. #930, and is pumped to Bldg. 312 by 1CP-24. Stop button and shutoff valve are located at 3MT-9 behind 3NAT-4, Bldg. 312, 3rd floor.

    Circuit Breaker is located on 1st floor, Bldg. 312.

11. Butadiene is stored in 1HT-16, TP. 930. Butadiene is transferred to 3NAT-5, Bldg. 312, by nitrogen pressure. 3NAT-5 is located in a room on 3rd floor, west side, 3 bays from north end. Main shutoff valves are located on 1HT-16 discharge pipe located at center top of tank.

12. Nitrogen Station - supplies nitrogen at 80 pounds pressure to various points in Bldgs. 312, 316 and 320. Main shutoff valve in Bldg. 312, 2nd floor, adjacent to panel room.
    Other buildings supplies - shutoff at storage located south of Bldg. 315.

13. Aniline - MEA is stored in 1HT-12 and pumped to Bldg. 312 by 1CP-12. Stop button is located at 1HT-12 on platform outside the thaw shed. Shutoff valve is located beside 2VT-7, Bldg. 312.

    Circuit Breaker located in panel room, 1st floor, Bldg. 320 southwest.

14. HT-17 Pumps MEA to Bldg. 312 using CP25 stop buttons for CP25 is located on the catwalk on top of HT17.

    Circuit Breaker is located in panel room, N.E. corner 2nd floor, Bldg. 315.

LOCATION OF MAJOR SERVICE SHUT-OFFS
RECEIVING AND STORES DEPARTMENT
BLDG. 322

Type of Service	Building	Location
30 # Steam	312	4" valve - north end Bldg. 312 overhead center aisle.
Electricity - 60 Cycle	322 - Stores	Panel box in panel room south side Bldg. 322 (Warehouse portion of the building). 480 volts originates in Bldg. 316 2nd floor switchroom.
Cold Water		Ignore
Sprinkler System		Leave Intact
Electricity - 60 Cycle	322 Q.C. Lab	480 Volt originates in Bldg. 320 transformer vault located on 1st floor.

LOCATION OF MAJOR SERVICE SHUT-OFFS - BLDG. 100

1. Electrical

   Disconnect building electrical service located in the electrical equipment room just inside the building near the north stairwell on the first floor west side of Bldg. 100 or at the transformer in Power, Bldg. 207.

2. 30 PSI Steam Service

   Close the 30 psi steam valves located in the utility room on the first floor, near the northwest corner of the office building portion of Bldg. 100. If the above valves cannot be reached, an alternative main steam valve can be closed. This valve is located on the east side of Bldg. 103.

3. City Water

   Close the city water valve main located in the middle of Lee Street or in Bldg. 100 in the women's room.

4. Central Air

   Shut off the air conditioning units in the utility room on the first floor, near the Northwest corner of the office building portion of Bldg. 100.

EVACUATION PROCEDURE
BLDG. 312

1. Upon being alerted of the need to evacuate by either the plant steam horn signal (4 long blasts, repeated four times) or by personal contact, all operating department personnel in the Azoics Department (Bldg. 312) will put their operations in a safe stand-by condition to the fullest possible extent depending on the circumstances and using the safest route possible, assemble on the west end of 4-12 parking lot.

2. Note: A key to the 4-12 parking lot will be assigned to the Manager of Q.C. and will be available for emergency evacuation only.

3. All personnel are to remain at the assembly point until notified by the Communications Officer or his designated representative. A roll call shall be taken by a member of supervision or the senior hourly roll person present and furnished to the communications officer upon request.

4. Building 312 evacuation alarm is one continuous blast from air horn located on 3rd floor Bldg. 312.

5. When conditions warrant an "All Clear" (1-1-1-1 Short Blasts) will be given and employees will be allowed to return to Bldg. 312.

6. An alternate emergency evacuation route has been authorized when Bldg. 312 personnel cannot reach the primary assembly point. In this case Bldg. 312 personnel will exit Area E through the north gate at the Treatment Plant.

   6.1 The north gate will be normally locked. A key for the gate will be available in a glass faced box which is hung inside Bldg. 351 at the north door.

EVACUATION PROCEDURE
WAREHOUSE, RECEIVING, STORES, Quality Control & R&D
BLDG. 322

1. Upon being alerted to the need to evacuate by either the plant steam horn signal (4 long blasts, repeated four times) or by personal contact, all Receiving and Stores (Bldg. 322) personnel will put their operations in a safe stand-by condition to the fullest possible extent depending on the circumstances and, using the safest route possible, assemble on the west end of 4-12 parking lot. Outside drivers who may be in the plant at the time shall be escorted to the same assembly point.

2. Note: A key for the gate to the 4-12 parking lot will be assigned to the Manager of Quality Control and will be available for emergency evacuation only.

3. All personnel are to remain at the assembly point until notified by the communication officer or his designated representative. A roll call shall be taken by a member of supervision or the senior hourly roll person present and furnished to the communications officer upon request.

4. When conditions warrant an "All Clear" (1-1-1-1 Short Blasts) will be given and employees will be allowed to return to Bldg. 322.

5. An alternate emergency evacuation route has been authorized when Bldg. 322 personnel cannot reach the primary assembly point. In this case, Bldg. 322 personnel will exit Area E through the north gate at the Treatment Plant.

   5.1 The north gate will be normally locked. A key for the gate will be available in a glass faced box which is hung inside Bldg. 351 at the north door.

EVACUATION PROCEDURE
TREATMENT PLANT
BLDG. 351

1. Upon being alerted to the need to evacuate by either the plant steam horn signal (4 long blasts, repeated four times) or by personal contact, all Treatment Plant personnel will shut down the forward flow to the BSA and put their operations in a safe stand-by condition, to the fullest possible extent, depending on the circumstances. Personnel will use the safest route possible to exit the Treatment Plant area and assemble on the west end of the 4-12 parking lot.

2. Note: A key for the gate to the 4-12 parking lot will be assigned to the Manager of Quality Control and will be available for emergency evacuation only.

3. All personnel are to remain at the assembly point until notified by the communications officer or his designated representative. A roll call shall be taken by a member of supervision or the senior hourly roll person present and furnished to the communications officer upon request.

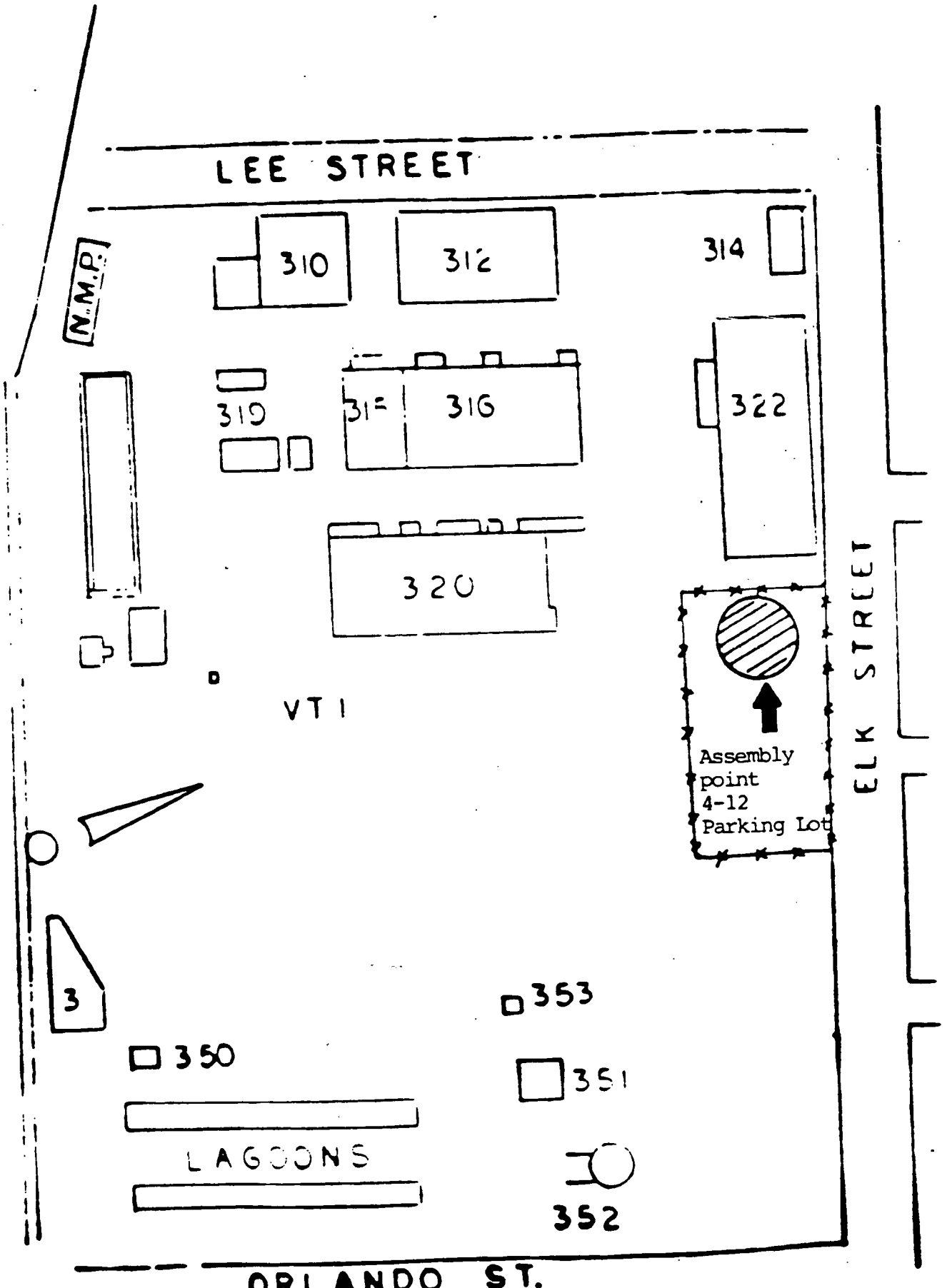
4. When conditions warrant an "All Clear" (1-1-1-1 Short blasts) will be given and employees will be allowed to return to the Treatment Plant area.

5. An alternate emergency evacuation route has been authorized when Treatment Plant personnel cannot reach the primary assembly point. In this case, Treatment Plant personnel will exit the Treatment Plant through the north gate at the Treatment Plant.

   5.1 The north gate will be normally locked. A key for the gate will be available in a glass faced box which is hung inside Bldg. 351 at the north door.

EVACUATION ALARM ASSEMBLY POINT

PLANT E



EVACUATION PROCEDURE
BUILDING 100

POLICY

In the event of an emergency of such proportion that evacuation of personnel in Building 100 is considered necessary, it shall be the responsibility of each department manager (or designated representative) to direct his personnel to a safe location outside of the building.

WHAT IS AN EMERGENCY

An emergency is an occurrence or action that endangers the health or safety of employees or presents a risk of significant damage to company property. It may be confined within the building or may be caused by an action from without.

REPORTING THE EMERGENCY AND ALERTING PERSONNEL

The employee or employees first aware of the danger shall report same to the security headquarters by dialing "4555" (the plant emergency telephone extension). All plant personnel in the building shall then be alerted immediately by voice call or the building fire alarm. Fire alarms are located on the first and second floor of each exit and also in the main lobby. The employee first aware of the emergency shall activate Bldg. 100 fire alarm.

Visitors shall be escorted to assembly point by the employee being visited.

EVACUATION

When the call to evacuate is given all personnel shall leave the building by the nearest clear exit, and go directly to the prearranged assembly point. Visitors shall be escorted by the employee or employees being visited. Do NOT under any circumstances use the elevator to exit the building. The primary assembly point for Building 100 is at the open area behind Bldg. 123. Should conditions, for example - possible fume problem, preclude use of this area, the alternate assembly point is under the South Park Bridge southern side near Bldg. 121. Refer to Bldg. 100 Evacuuation Route Map.

Departmental personnel who are members of the plant Emergency Action Squad are to comply with this procedure if only the evacuation alarm sounds. If the evacuation signal is followed by an emergency signal, they are to proceed directly to the area where the emergency exists as indicated by the emergency signal and report to the person in charge of the squads activities.

ASSEMBLY

Personnel shall gather at the chosen assembly area, where each manager or designated representative shall take a roll call and communicate this information to the communications officer. All personnel shall remain at the assembly point until notified by the communications officer (Director of Human Resources) or his designated representative (Manager of Engineering).

DEPARTMENT EVACUATION LEADER

Department	Primary	Alternate
Purchasing	W. Beakman	C. Schade
Human Resources	G. Collins	S. Mroszczak
Maintenance	L. Kaminski	G. Carpenter
Engineering	R. Kovalski	G. Caligure
Traffic	J. Provenzola	J. Casagni
Accounting/Data Processing	L. Schenk	R. Ruppert
Admin. Office/Library	D. Donahue	C. Laschinger

RE-ENTRY INTO BUILDING 100

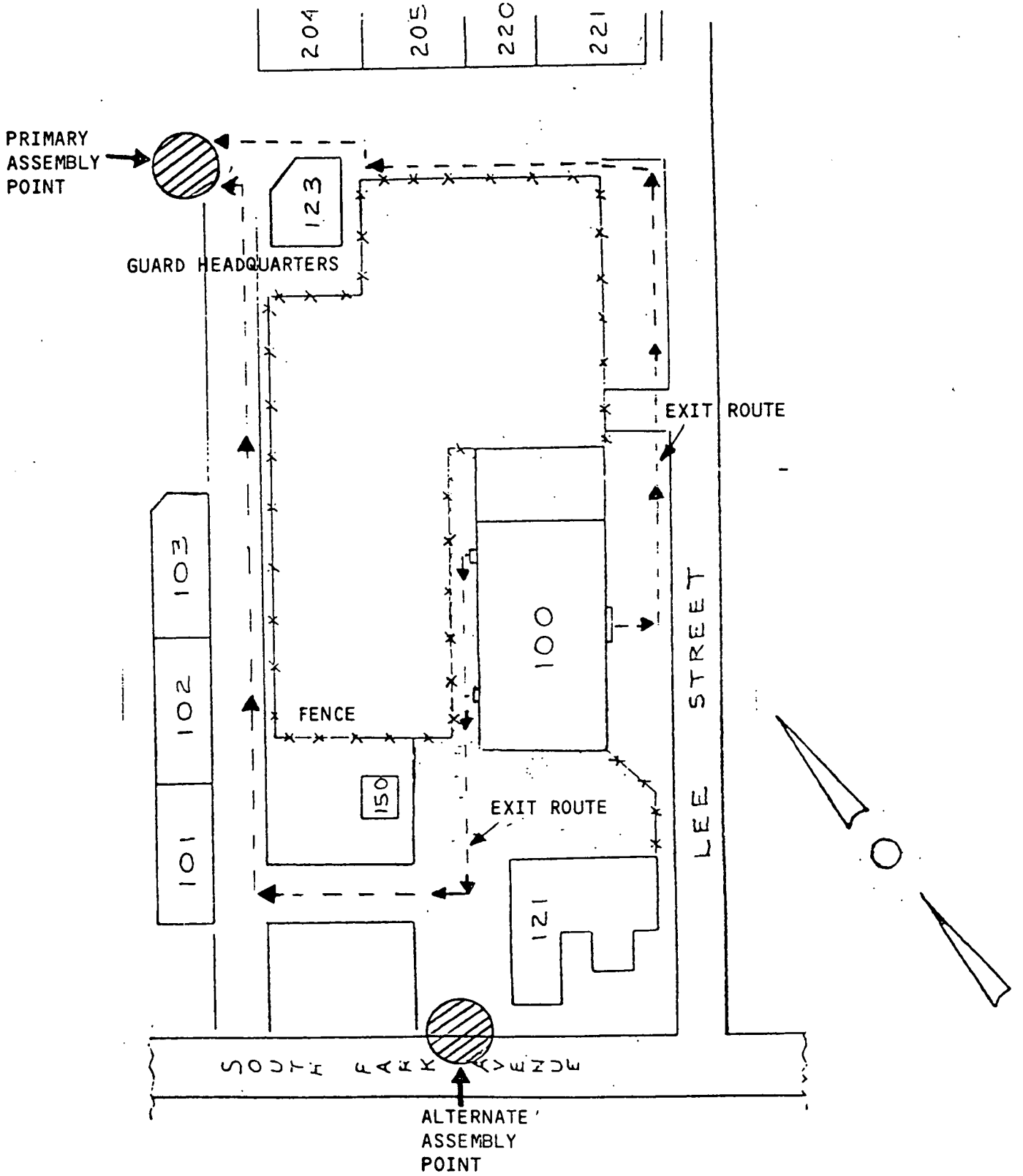
When conditions warrant an "All-Clear" (1-1-1-1 Short blasts) will be given and employees will be allowed to return to Bldg. 100.

If conditions do not return to normal, specific instructions will be relayed as dictated by the circumstances.

PRACTICE DRILLS

Practice drills of this procedure will be arranged periodically by Emergency Preparedness Sub-Committee.

EVACUATION ALARM ASSEMBLY POINT



MAINTENANCE DEPARTMENT

1. Personnel Assignments

   1.1 Departmental Evacuation Coordinator
   Primary J. Marino Alternate L. Kaminski

   1.2 Roll Call Coordinator
   Primary G. Carpenter Alternate J. Moran

   1.3 Group Evacuation Leaders

	Primary	Alternate
Bldg. 100 Offices	L. Kaminski	F. Parker
Instrument Shop & Elec.	M. Griffen	R. St. John
Area E. Maintenance	C. Montgomery	W. Hammer
Area A. Maintenance	G. Pudlewski	P. Krauss
Power House, Machine Shop	R. Januszkiewicz	W. Hammer

2. Departmental evacuation and assembly points for the various plant areas are indicated on the attached maps.

3. Departmental evacuation rules are listed below. All personnel are to follow these rules without deviation.

RULES

1. Upon hearing the evacuation alarm (four long blasts repeated four times) all personnel will proceed to the assembly point for the particular area in which they are working at the time in an orderly, coordinated manner.

2. Personnel assigned two-way radios will bring them with them to the assembly point. However radio silence shall be maintained except by the group leader.

3. Upon reaching the assembly point, NO ONE will leave. The group will be under the direction of the group evacuation leader and all orders generated by him will be followed explicitly.

MAINTENANCE - cont.-

4. Using daily work assignment schedules and the attached form, the group leader will list personnel present and/or accounted for and communicate this information to the roll call coordinator. Using the manning list and absence records, the roll call coordinator shall compile a complete listing of personnel and communicate same to the departmental evacuation coordinator.

5. The departmental evacuation coordinator shall communicate with the disaster control officer on personnel status and follow the instructions of the disaster control officer.

6. At the sound of the "All Clear" signal, (four short blasts repeated four times) group leaders will verify same with the departmental evacuation coordinator and unless orders are issued to the contrary, all personnel will return to their assigned shop areas.

7. Departmental personnel who are members of the plant Emergency Action Squad are to comply with this procedure if only the evacuation alarm sounds. If the evacuation signal is followed by an emergency signal, they are to proceed directly to the area where the emergency exists as indicated by the emergency signal and report to the person in charge of the squads activities. A current listing of Emergency Action Squad personnel shall be furnished to the roll call coordinator by the assistant squad chief.

8. Practice drills of this procedure shall be scheduled at least on an annual basis and coordinated by the Safety Manager. Drills shall include time estimates of the various steps of the procedure which shall be reviewed by the Manager, Maintenance with the Safety Manager. Changes to this procedure will be implemented as deemed necessary.

9. Capital construction personnel will report thru their foreman to group evacuation leader.

EVACUATION PROCEDURE
MAINTENANCE

PERSONNEL ACCOUNTABILITY LISTING

_____
Group Leader

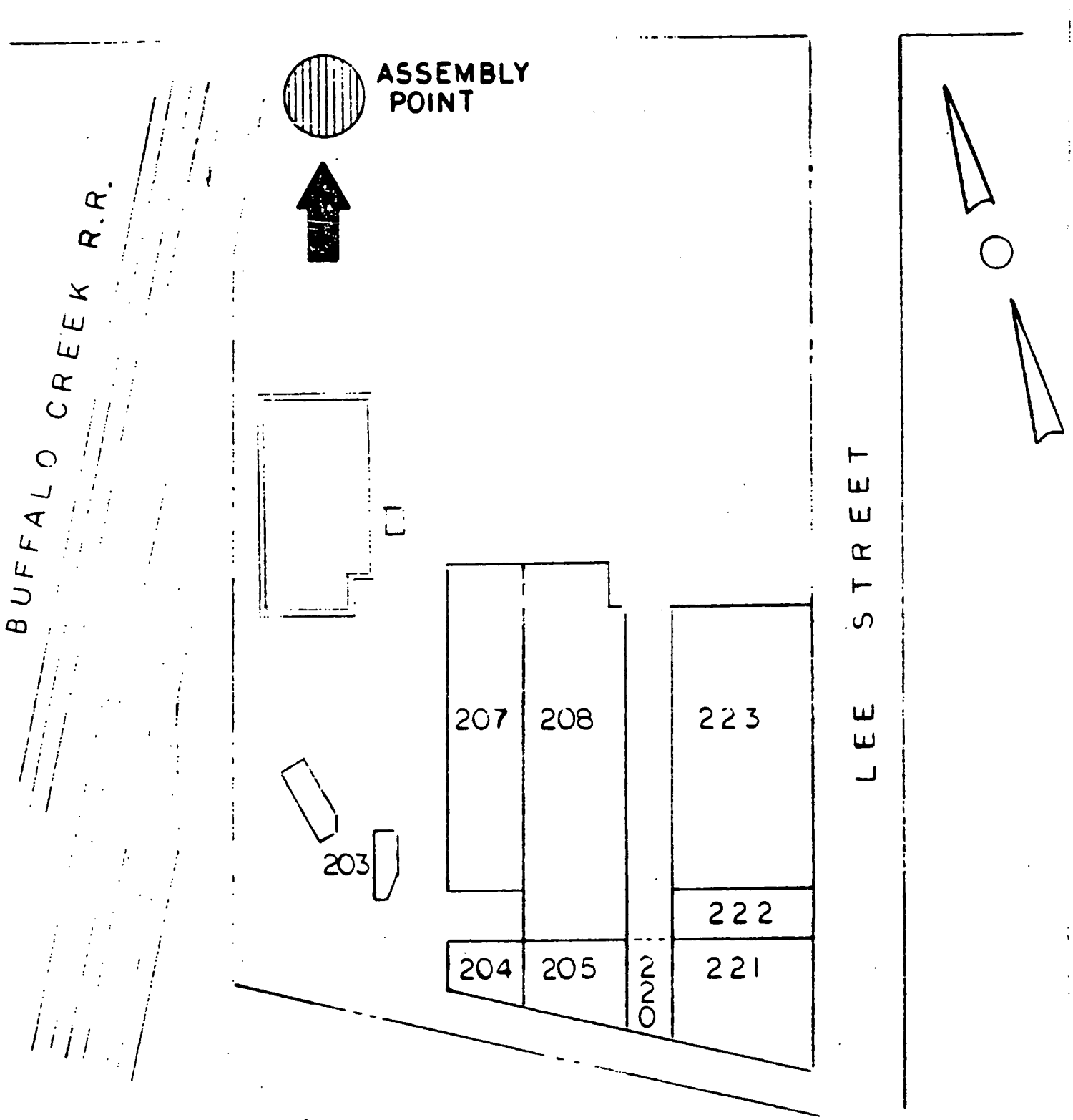
NOTE:

Upon reaching your assigned assembly point, use your daily work schedule and list all personnel as "P" (present) or "A" (absent). List those personnel not assigned to your area who are present as "P". Fither send this list to the roll call coordinator by messenger or communicate it to him by radio.

AREA PEOPLE	A/P	OUT OF AREA PEOPLE	A/P

EVACUATION ALARM ASSEMBLY POINT

PLANT C



EVACUATION PROCEDURE
INDIGO DEPARTMENT

1. Upon being alerted to the need to evacuate by either the plant steam horn signal (4 long blasts, repeated four times) or by personal contact, all operating department personnel in the Indigo Department will put their operations in a safe stand-by condition to the fullest possible extent depending on the circumstances and, using the safest route possible, go to the first floor of Bldg. 46.

2. If Bldg. 46 cannot safely be entered, the alternate assembly point will be the area immediately south of the South Park Avenue Bridge.

3. All personnel are to remain at the assembly point until notified by the communications officer or his designated representative. A roll call shall be taken by a member of supervision or the senior hourly roll person present and furnished to the communications officer upon request.

4. When conditions warrant an "All Clear" (1-1-1-1 Short Blasts) will be given and employees will be allowed to return to their work assignment.

EVACUATION PROCEDURE
BLDG. 54

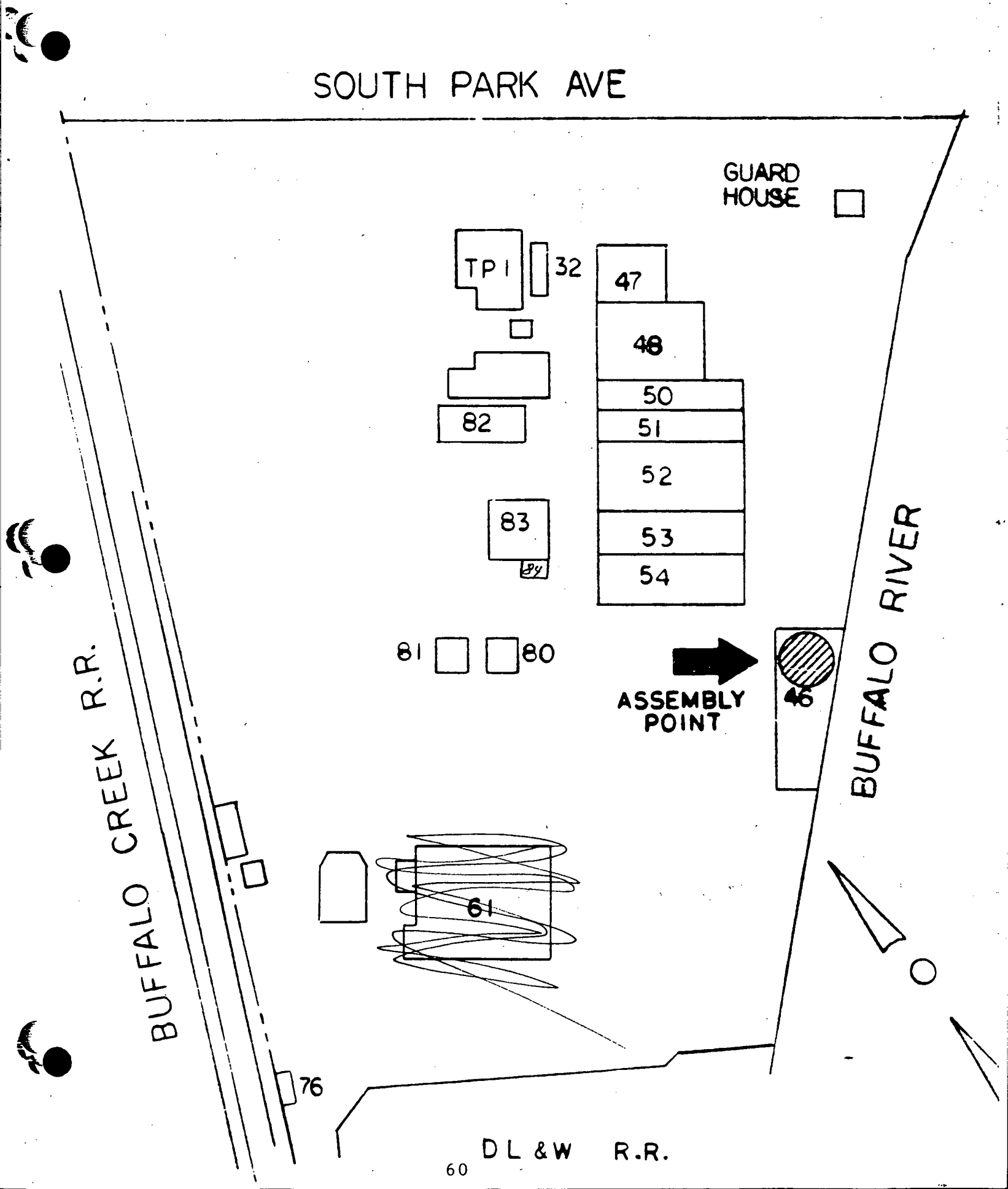
1. Upon being alerted to the need to evacuate by either the plant steam horn signal (4 long blasts, repeated four times) or by personal contact, all operating department personnel in Bldg. 54 will put their operations in a safe stand-by condition to the fullest possible extent depending on the circumstances and, using the safest route possible, go to the first floor of Bldg. 46.

2. If Bldg. 46 cannot safely be entered, the alternate assembly point will be the area immediately south of the South Park Avenue Bridge.

3. All personnel are to remain at the assembly point until notified by the communications officer or his designated representative. A roll call shall be taken by a member of supervision or the senior hourly roll person present and furnished to the communications officer upon request.

4. When conditions warrant an "All Clear" (1-1-1-1 Short Blasts) will be given and employees will be allowed to return to their work assignment.

EVACUATION ALARM ASSEMBLY POINT PLANT A



EVACUATION PROCEDURE
WAREHOUSE DEPARTMENT
BLDGS. 101, 102, 103

1. Upon being alerted to the need to evacuate by either the plant steam horn signal (4 long blasts, repeated four times) or by personal contact, all Warehouse Department personnel will put their operations in a safe stand-by condition to the fullest possible extent depending on the circumstances and, using the safest route possible, assemble in the "Y" area west of Bldg. 123. Outside drivers who may be in the plant at the time shall be escorted to the same assembly point.

2. All personnel are to remain at the assembly point until notified by the communications officer or his designated representative. A roll call shall be taken by a member of supervision or the senior hourly roll person present and furnished to the communications officer upon request.

3. When conditions warrant an "All Clear" (1-1-1-1 Short Blasts) will be given and employees will be allowed to return to their work assignment.

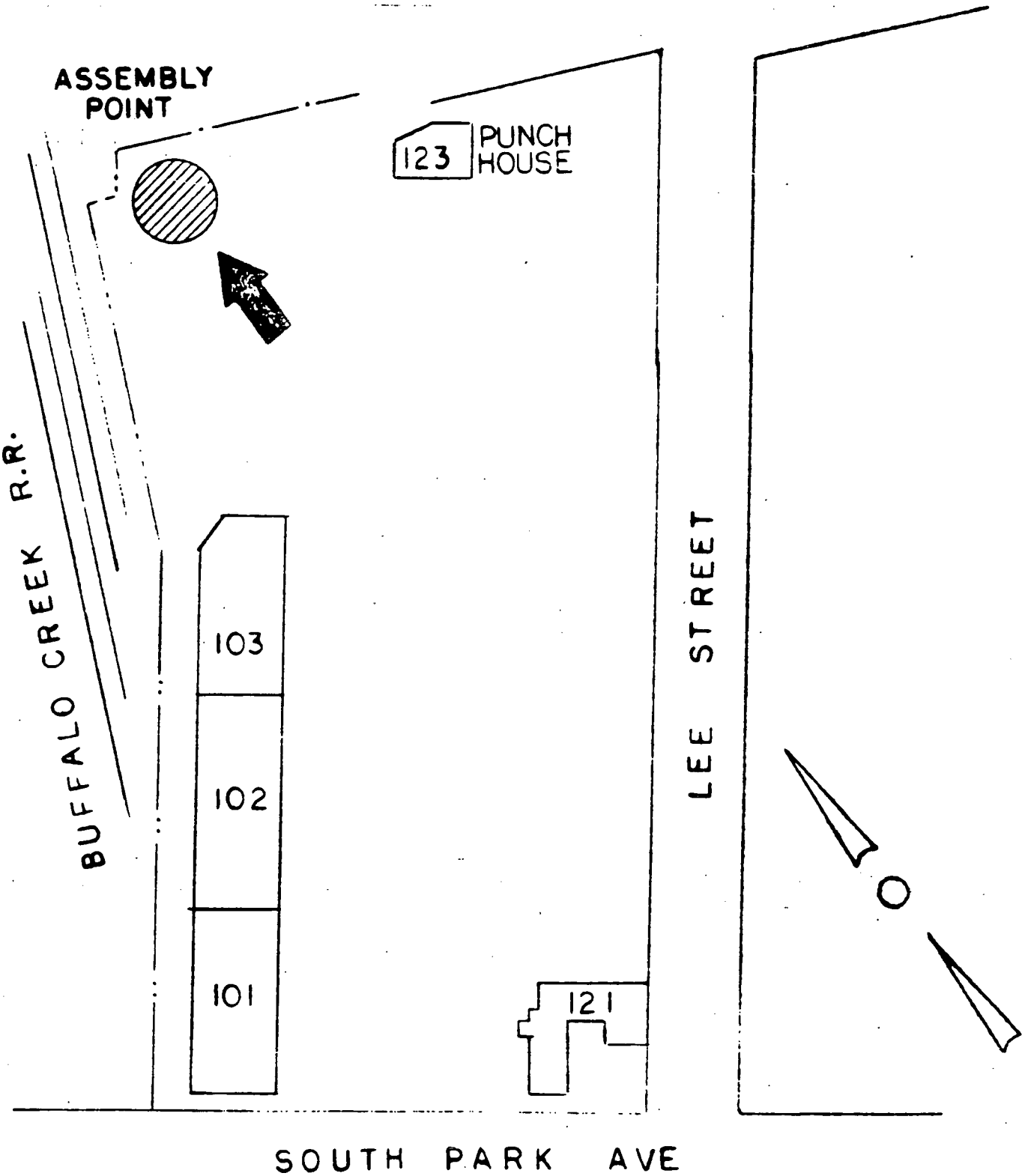
EVACUATION PROCEDURE
MISCELLANEOUS SERVICES DEPARTMENT
BLDG. 123

1. Upon being alerted to the need to evacuate by either the plant steam horn signal (4 long blasts, repeated four times) or by personal contact, all Miscellaneous Services Department personnel will put their operations in a safe stand-by condition to the fullest possible extent depending on the circumstances and, using the safest route possible, assemble in the "Y" area west of Bldg. 123.

2. All personnel are to remain at the assembly point until notified by the communications officer or his designated representative. A roll call shall be taken by a member of supervision or the senior hourly roll person present and furnished to the communications officer upon request.

3. When conditions warrant an "All Clear" (1-1-1-1 Short Blasts) will be given and employees will be allowed to return to Bldg. 123.

EVACUATION ALARM ASSEMBLY POINT
PLANT B



LIQUID NITROGEN

Nitrogen Material Safety Data Sheet

Industrial Gas Division
Air Products and Chemicals, Inc.
P.O. Box 538
Allentown, PA 18105
Tel. (215) 481-4911 · TWX 510-651-3686
CABLE-AIRPROD · TELEX 84-7416

AIR PRODUCTS

EMERGENCY PHONE: 800—523-9374 IN PENNSYLVANIA: 800—322-9092	TRADE NAME AND SYNONYMS Nitrogen, LIN (Liquid only)	CHEMICAL NAME AND SYNONYMS Nitrogen CAS#7727-37-9
ISSUE DATE AND REVISIONS Issued: 13 April 1977 Rev: 4 April 1984	FORMULA N_2 MW: 28.01	CHEMICAL FAMILY Inert gas

HEALTH HAZARD DATA

THRESHOLD LIMIT VALUE
Nitrogen is a simple asphyxiant and has no threshold limit value (TLV).

SYMPTOMS IF INGESTED, CONTACTED WITH SKIN, OR VAPOR INHALED
Nitrogen is odorless and nontoxic, but may produce suffocation by diluting the concentration of oxygen in air below levels necessary to support life. PERSONNEL, **INCLUDING RESCUE WORKERS,** SHOULD NOT ENTER AREAS WHERE THE OXYGEN CONCENTRATION IS BELOW 19%, UNLESS PROVIDED WITH A SELF-CONTAINED BREATHING APPARATUS OR AIRLINE RESPIRATOR. Exposure to oxygen-deficient atmospheres may produce dizziness, nausea, vomiting, loss of consciousness, and death. Death may result from errors in judgement, confusion, or loss of consciousness which prevents self-rescue. At low oxygen concentrations unconsciousness and death may occur in seconds without warning. Extensive tissue damage or burns can result from exposure to liquid nitrogen or cold nitrogen vapors.

TOXICOLOGICAL PROPERTIES
Nitrogen is a simple asphyxiant and constitutes 79% of the air we breathe. Nitrogen does not support life and may produce immediately hazardous atmospheres through the displacement of oxygen. Nitrogen under high pressure can produce narcosis even though oxygen sufficient for life is present.

RECOMMENDED FIRST AID TREATMENT
Persons suffering from lack of oxygen should be moved to areas with normal atmospheres. SELF-CONTAINED BREATHING APPARATUS MAY BE REQUIRED TO PREVENT ASPHYXIATION OF RESCUE WORKERS. Assisted respiration and supplemental oxygen should be given if the victim is not breathing. If cryogenic liquid or cold boil-off gas contacts a worker's skin or eyes, frozen tissues should be flooded or soaked with tepid water (105-115F; 41-46C). DO NOT USE HOT WATER. Cryogenic burns which result in blistering or deeper tissue freezing should be seen promptly by a physician.

FIRE AND EXPLOSION HAZARD DATA

FLASH POINT (Method used)	AUTO IGNITION TEMP	FLAMMABLE LIMITS	LEL	UEL
N/A	N/A	N/A	N/A	N/A

EXTINGUISHING MEDIA	ELECTRICAL CLASSIFICATION
N/A	GROUP N/A

SPECIAL FIRE FIGHTING PROCEDURES
N/A

UNUSUAL FIRE AND EXPLOSION HAZARDS
N/A

PHYSICAL DATA

BOILING POINT (°F.)	FREEZING POINT (°F.)
@ 1 atm. -320.5F (-195.8C)	@ 1 atm -346.0F (-210.0C)
VAPOR PRESSURE (psia)	SOLUBILITY IN WATER
N/A	@ 68F (20C), 1 atm 1.52% by volume

VAPOR DENSITY (lb/cu ft)	SPECIFIC GRAVITY (AIR = 1)	LIQUID DENSITY (lb/cu ft)	SPECIFIC GRAVITY (H_2O = 1)
@ 68F (20C), 1 atm 0.07273	@ 68F (20C), 1 atm 0.967	@ boiling point, 1 atm 50.45	@ boiling point, 1 atm 0.808

APPEARANCE AND ODOR
Both liquid and gaseous nitrogen are colorless and odorless.

DISCLAIMER

Information contained in this data sheet is offered without charge for use by technically qualified personnel at their discretion and risk. All statements, technical information and recommendations contained herein are based on tests and data which we believe to be reliable, but the accuracy or completeness thereof is not guaranteed and no warranty of any kind is made with respect thereto. This information is not intended as a license to operate under or a recommendation to practice or infringe any patent of this Company or others covering any process, composition of matter or use.
Since the Company shall have no control of the use of the product described herein, the Company assumes no liability for loss or damage incurred from the proper or improper use of such product.

Printed in U.S.A. 310-812

REACTIVITY DATA

STABILITY			CONDITIONS TO AVOID
Inert	UNSTABLE		
	STABLE	X	None

COMPATIBILITY (Materials to avoid)
None

HAZARDOUS DECOMPOSITION PRODUCTS
None

HAZARDOUS POLYMERIZATION			CONDITIONS TO AVOID
	MAY OCCUR		
	WILL NOT OCCUR	X	None

SPILL OR LEAK PROCEDURES

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED
Avoid contact of skin with liquid nitrogen or its cold boil-off gas. Flush liquid nitrogen spill with water to disperse. Ventilate enclosed areas to prevent formation of oxygen-deficient atmospheres caused by the evaporation of liquid nitrogen or the release of gaseous nitrogen.

WASTE DISPOSAL METHOD
Allow liquid nitrogen to evaporate in a well ventilated outdoor location remote from work areas. Vent nitrogen gas slowly to a well ventilated outdoor location remote from work areas. Do not attempt to dispose of residual nitrogen in compressed gas cylinders. Return cylinders to Air Products with residual pressure, the cylinder valve tightly closed and valve caps in place.

SPECIAL PROTECTION INFORMATION

RESPIRATORY PROTECTION (Specify type)
Use self-contained breathing apparatus in oxygen-deficient atmospheres. Caution! Respirators will not function. Use may result in asphyxiation.

VENTILATION	LOCAL EXHAUST	SPECIAL
Natural or mechanical where gas is present.	MECHANICAL (General)	OTHER Vents should be situated to avoid higher than normal concentration of nitrogen in work areas.

PROTECTIVE GLOVES
(LIN) Loose-fitting gloves of impermeable materials such as leather. Leather work gloves are recommended when handling compressed gas cylinders.

EYE PROTECTION
(LIN) Chemical goggles or safety glasses. Safety glasses are recommended when handling high-pressure cylinders.

OTHER PROTECTIVE EQUIPMENT
None

SPECIAL PRECAUTIONS*

SPECIAL LABELING INFORMATION
Nitrogen shipments must be in accordance with Department of Transportation (DOT) regulations using DOT "NON-FLAMMABLE GAS" label. Consult DOT regulations for details on the shipping of hazardous materials.

SPECIAL HANDLING RECOMMENDATIONS
Prevent contact of liquid nitrogen or cold boil-off gas with exposed skin. Prevent entrapment of liquid in closed systems. Use only in well ventilated areas. Compressed gas cylinders contain nitrogen at extremely high pressure and should be handled with care. Use a pressure-reducing regulator and pressure relief devices when connecting to lower pressure piping systems. Secure cylinders when in use. Never use direct flame to heat a compressed gas cylinder. Use a check valve to prevent back flow into storage container. Avoid dragging, rolling, or sliding cylinders, even for a short distance. Use a suitable hand truck. For additional handling recommendations on compressed gas cylinders, consult Compressed Gas Association Pamphlet P-1.

SPECIAL STORAGE RECOMMENDATIONS
Store liquid containers and cylinders in well ventilated areas. Keep cylinders away from sources of heat. Storage should not be in heavy traffic areas to prevent accidental knocking over or damage from passing or falling objects. Valve caps should remain on cylinders not connected for use. Segregate full and empty cylinders. Storage areas should be free of combustible material. Replace the cylinder cap when the cylinder is not in use. Avoid exposure to areas where salt or other corrosive chemicals are present. See Compressed Gas Association Pamphlet P-1 for additional storage recommendations.

SPECIAL PACKAGING RECOMMENDATIONS
Gaseous nitrogen containers meet DOT specifications or American Society of Mechanical Engineers (ASME) codes. Liquid nitrogen is stored in vacuum-insulated containers meeting DOT specifications or ASME codes.

OTHER RECOMMENDATIONS OR PRECAUTIONS
Liquid nitrogen is a cryogenic liquid. Materials of construction must be selected for compatibility with extremely low temperatures. Avoid use of carbon steel and other materials which become brittle at low temperatures. Compressed gas cylinders should not be refilled except by qualified producers of compressed gases. Shipment of a compressed gas cylinder filled without the permission of the owner is a violation of Federal Law. If oxygen-deficient atmospheres are suspected or can occur, use oxygen monitoring equipment to test for oxygen deficient atmospheres.

*Various Government agencies (i.e., Department of Transportation, Occupational Safety and Health Administration, Food and Drug Administration and others) may have specific regulations concerning the transportation handling, storage or use of this product which will not be reflected in this data sheet. The customer should review these regulations to ensure that he is in full compliance.

LIQUID HYDROGEN

Air Products and Chemicals, Inc.
Box 538, Allentown, PA 18105
Tel. (215) 395-4911 · TWX 510-651-3686
CABLE-AIRPROD · TELEX 84-7416

Industrial Gas Division

Hydrogen Material Safety Data Sheet

	TRADE NAME AND SYNONYMS: Hydrogen	
EMERGENCY PHONE: 800—523-9374 IN PENNSYLVANIA: 800—322-9092	CHEMICAL NAME AND SYNONYMS: Hydrogen	
ISSUE DATE AND REVISIONS: 1 June 1978	FORMULA: H_2	CHEMICAL FAMILY: Flammable Gas

HEALTH HAZARD DATA

THRESHOLD LIMIT VALUE
Hydrogen is a simple asphyxiant and has no threshold limit value (TLV).

SYMPTOMS IF INGESTED, CONTACTED WITH SKIN, OR VAPOR INHALED
Hydrogen is nontoxic and classified as a simple asphyxiant. Symptoms of anoxia occur only when gas concentrations are within the flammable range and the mixture has not ignited. Do not enter areas within the flammable range due to the immediate fire and explosion hazard. Contact of skin with liquid hydrogen or cold gas vapors can cause cryogenic (extreme low temperature) burns and freeze tissues.

TOXICOLOGICAL PROPERTIES
Hydrogen is nontoxic and classified as a simple asphyxiant, but it is extremely flammable. The amount of hydrogen gas necessary to reduce oxygen concentrations below life support levels is well within the flammable range. Do not enter areas containing flammable mixtures due to the immediate fire and explosion hazard.

RECOMMENDED FIRST AID TREATMENT
If cryogenic liquid or cold boil-off gas contacts a worker's skin or eyes, frozen tissues should be flooded or soaked with tepid water (105-115°F; 41-46°C). DO NOT USE HOT WATER. Cryogenic burns which result in blistering or deeper tissue freezing should be seen promptly by a physician. First degree burns (reddening only, as sunburn) or second degree burns (blistering) which are the result of fire exposure and are localized to a portion of an extremity or other small area of the body may be immersed in cool water for 10-20 minutes to relieve pain. Do not immerse the whole body in a cold bath. All thermal injuries except the most minor and localized burns should be referred promptly for medical care. Burned areas should be covered with the cleanest available material, such as a clean sheet, prior to transport. Do not use burn ointments or greasy materials on burns which show more than localized reddening. Persons suffering from lack of oxygen should be moved to areas with normal atmosphere. Assisted respiration and supplemental oxygen should be given if the victim is not breathing.

FIRE AND EXPLOSION HAZARD DATA

FLASH POINT (Method used)	AUTO IGNITION TEMP	FLAMMABLE LIMITS	LEL	UEL
N/A (Gas)	1075°F (579.4°C)	in air	4.0%	75%

EXTINGUISHING MEDIA	ELECTRICAL CLASSIFICATION GROUP
Dry chemical, carbon dioxide, or halogenated extinguishing agent.	Class I, Group B

SPECIAL FIRE FIGHTING PROCEDURES
Shut off source of hydrogen. When possible, allow fire to burn itself out. Spray water on adjoining equipment to keep it cool.

UNUSUAL FIRE AND EXPLOSION HAZARDS
Can burn with almost invisble flame of low thermal radiation. People have unknowingly walked into hydrogen flames. Easily ignited; minimum ignition energy is low (0.02MJ) and flammable range is wide. Flame propagates at rapid rate. Potential explosion hazard from reignition if fire is extinguished without shutting off hydrogen source. Hydrogen gas is buoyant and can accumulate in the upper sections of enclosed spaces.

DISCLAIMER

Information contained in this data sheet is offered without charge for use by technically qualified personnel at their discretion and risk. Statements, technical information and recommendations contained herein are based on tests and data which we believe to be reliable, but the accuracy or completeness thereof is not guaranteed and no warranty of any kind is made with respect thereto. This information is not intended as a license to operate under or a recommendation to practice or infringe any patent of this Company or others covering any process, composition of matter or use.

Since the Company shall have no control of the use of the product described herein, the Company assumes no liability for loss or damage incurred from the proper or improper use of such product.

Printed in U.S.A.
310-805

PHYSICAL DATA

BOILING POINT (°F.) @ 1 atm.	-422.99°F (-252.8°C)
FREEZING POINT (°F) @ 1.044 psia	-434.5°F (-259.2°C)
VAPOR PRESSURE (psia) N/A	SOLUBILITY IN WATER @ 60°F (15°C), 1 atm: 0.019 vol./vol. H_2O.

VAPOR DENSITY (lb / cu ft) @ 70°F (21°C), 1 atm	0.005209	SPECIFIC GRAVITY (AIR = 1) @ 70°F (21°C) 1 atm	0.06952
LIQUID DENSITY (lb / cu ft) @ boiling point	4.418	SPECIFIC GRAVITY (H_2O = 1) @ boiling point	0.0708

APPEARANCE AND ODOR
Both liquid and gaseous hydrogen are colorless and odorless.

REACTIVITY DATA

STABILITY			CONDITIONS TO AVOID
	UNSTABLE		
	STABLE	XX	Sources of ignition, sparks, flames, hot objects.

INCOMPATIBILITY (Materials to avoid)
Oxidizing materials. Some steels are susceptible to hydrogen attack or embrittlement at high temperature and pressure.

HAZARDOUS DECOMPOSITION PRODUCTS

HAZARDOUS POLYMERIZATION			CONDITIONS TO AVOID
	MAY OCCUR		
	WILL NOT OCCUR	XX	None

SPILL OR LEAK PROCEDURES

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED
DO NOT ENTER areas containing flammable mixtures of hydrogen in air. Avoid contact of skin with liquid hydrogen or cold boil-off gas. Ventilate enclosed areas to prevent formation of flammable or oxygen deficient atmospheres. See "VENTILATION" below. Eliminate all potential sources of ignition. Move a leaking compressed gas cylinder out of doors if leak is small. Consult Air Products for additional assistance.

WASTE DISPOSAL METHOD
Do not attempt to dispose of residual gaseous hydrogen in cylinders. Return cylinders to Air Products with positive residual pressure, cylinder valves tightly closed, and valve cap in place. Liquid hydrogen should be disposed of only in a well ventilated outdoor location remote from work areas. Disposal sites should be remote from open flames or sources of ignition. Consult Air Products for assistance.

SPECIAL PROTECTION INFORMATION

RESPIRATORY PROTECTION (Specify type)
Oxygen-deficient atmospheres are in the flammable range. DO NOT ENTER.

VENTILATION		
ural or mechanical where vapor is present.	LOCAL EXHAUST	SPECIAL Mechanical must meet National Electric Code (NEC) requirements for Class I, Group B
	MECHANICAL (General)	OTHER

PROTECTIVE GLOVES
(Liquid) Loose-fitting of impermeable material such as leather.

EYE PROTECTION
Safety glasses are recommended when handling compressed gas cylinders. Use safety glasses or goggles when handling liquid.

OTHER PROTECTIVE EQUIPMENT
None

SPECIAL PRECAUTIONS*

SPECIAL LABELING INFORMATION
Hydrogen shipment must be in accordance with Department of Transportation (DOT) regulations using the DOT "FLAMMABLE GAS" label. Consult DOT regulations for details on the shipping of hazardous materials.

SPECIAL HANDLING RECOMMENDATIONS
Prevent contact of liquid or cold gaseous hydrogen with exposed skin. Prevent entrapment of liquid in closed systems. Use only in well-ventilated areas. Compressed gas cylinders contain hydrogen at extremely high pressure and should be handled with care. Use a pressure-reducing regulator when connecting to lower pressure piping systems. Chain cylinders when in use. Never use direct flame to heat a compressed gas cylinder. Use a check valve to prevent back flow into storage container. Avoid dragging, rolling, or sliding cylinders, even for a short distance. Use a suitable hand truck. For additional handling recommendations on compressed gas cylinders, consult Compressed Gas Association Pamphlet P-1.

SPECIAL STORAGE RECOMMENDATIONS
Store liquid containers and cylinders in well ventilated areas. Keep cylinders away from sources of heat. Storage should not be in heavy traffic areas to prevent accidental knocking over or damage from passing or falling objects. Valve caps should remain on cylinders not connected for use. Segregate full and empty cylinders. Storage areas should be free of combustible material. Avoid exposure to areas where salt or other corrosive chemicals are present. Cylinder storage of hydrogen should be segregated from oxidizers such as oxygen, fluorine, etc. See Compressed Gas Association Pamphlet P-1 for additional storage recommendations.

SPECIAL PACKAGING RECOMMENDATIONS
Gaseous hydrogen containers meet DOT specifications or American Society of Mechanical Engineers (ASME) codes. Liquid hydrogen is stored in vacuum-insulated containers meeting DOT specifications or ASME codes.

OTHER RECOMMENDATIONS OR PRECAUTIONS
Liquid hydrogen in exposed piping can actually cause air to condense and liquefy. The nitrogen in this liquid can evaporate more rapidly, leaving an oxygen enriched liquid behind. Utilize oxygen compatible insulating materials and minimize exposed piping surface areas. Use only metals and materials compatible with extremely low temperatures. Avoid use of carbon steel and other metals which become brittle at low temperatures.

*Various Government agencies (i.e., Department of Transportation, Occupational Safety and Health Administration, Food and Drug Administration and others) may have specific regulations concerning the transportation handling, storage or use of this product which will not be reflected in this data sheet. The customer should review these regulations to ensure that he is in full compliance.

HYDROGEN - EMERGENCY DISPOSAL

Leaks of flammable gases pose a special problem. Adequate ventilation is a must and all possible sources of ignition must be immediately removed. All personnel not involved in correcting the problem must evacuate the area. The cylinder should be removed to an outdoor area and warnings should be posted to prevent personnel from entering the area with cigarettes or open flames.

After the cylinder is placed in an adequately vented area, attach an appropriate control valve to the cylinder valve outlet (if at all possible, the gas should be vented through a stack constructed of any available tubing, the vent stack should be approximately 5-6 ft. in length). *Crack the valve slowly and adjust the gas discharge to a moderate rate using the control valve. When the cylinder is empty, close the valve, tag the cylinder as defective, and return it to the supplier.

The best procedure for disposal of flammable gases would be to burn the gas in a controlled burning unit.

If the gas is burning and not causing other damage, it is advisable to allow the fire to burn until the source of fuel can be shut off. Remember, it is wiser to allow this to burn than to put out the fire and face the possibility of an explosion later.

*NOTE: Excerise caution when opening cylinder valve. Hydrogen has been known to ignite when the valve is opened quickly.

Liquid Hydrogen

General

Hydrogen is colorless as a liquid. Its vapors are colorless, odorless, tasteless, and highly flammable.

Liquid hydrogen is noncorrosive, and therefore, special materials of construction are not required. However, because of its extremely cold temperature, equipment must be designed and manufactured of material which is suitable for extremely low-temperature operation. Vessels and piping should be designed to the American Society of Mechanical Engineers (ASME) Code and the American National Standards Institute (ANSI) Pressure Piping Code or Department of Transportation (DOT) Codes for the pressure and temperatures involved.

The molecular symbol for hydrogen is H_2.

Toxicity

Hydrogen gas is odorless and nontoxic, but may produce suffocation by diluting the concentration of oxygen in air below levels necessary to support life. THE AMOUNT OF HYDROGEN GAS NECESSARY TO PRODUCE OXYGEN-DEFICIENT ATMOSPHERES IS WELL WITHIN THE FLAMMABLE RANGE.

Flammability

The wide flammability range and the small amount of energy required to ignite air/hydrogen mixtures necessitates special handling of hydrogen to minimize possible damaging reactions. Care should be taken to eliminate sources of ignition such as sparks from electrical equipment, static electricity sparks, open flames or any hot object in excess of 900F (482C). An unconfined hydrogen/air mixture will burn when ignitied and, under certain conditions, can explode.

Manufacture

Hydrogen is produced by the steam reforming of natural gas, the electrolysis of water, the dissociation of ammonia, and is taken as a by-product of petroleum distillation and chlorine manufacture. Purified gaseous hydrogen is then compressed, cooled by outside refrigeration, expanded, and cooled to a sufficiently low temperature to form liquid hydrogen. Catalytic action is employed to convert the liquid to its stable para form.

Uses

Liquid hydrogen is used in large volumes in the space program as a primary rocket fuel for combustion with oxygen or fluorine, and as a propellent for nuclear powered rockets and space vehicles. Liquid hydrogen is vaporized into the gaseous state, the form in which it is commonly used in large volumes. Gaseous hydrogen is widely used in the chemical industry to synthesize ammonia and in the hydrogenation of fats and oils. In the metallurgical industry, hydrogen is used to reduce metal oxides and prevent oxidation in heat treating certain metals and alloys. Hydrogen is also used by semiconductor manufacturers.

Containers

Liquid hydrogen is normally stored in tanks from which point it is vaporized. On the limited occasions when liquid hydrogen is used, it is stored in special dewars or special liquid cylinders.

Properties

Molecular Weight	2.016
Boiling Point @ 1 atm	−423.0F (−252.8C)
Freezing Point @ 1 atm	−434.5F (−259.2C)
Critical Temperature	−399.8F (−239.9C)
Critical Pressure	188 psia (12.8 atm)
Density, Liquid @ B.P., 1 atm	4.423 lbs./cu.ft.
Density, Gas @ 68F (20C), 1 atm	0.005229 lbs./cu.ft.
Specific Gravity, Gas (Air = 1) @ 68F (20C), 1 atm	0.0696
Specific Gravity, Liquid @ B.P., 1 atm	0.0710
Specific Volume @ 68F (20C), 1 atm	191.3 cu. ft./lb.
Latent Heat of Vaporization	389 Btu/lb.mole
Flammable Limits @ 1 atm in air	4.00% - 74.2% (by Volume)
Flammable Limits @ 1 atm in oxygen	4.65% - 93.9% (by Volume)
Detonable Limits @ 1 atm in air	18.2% - 58.9% (by Volume)
Detonable Limits @ 1 atm in oxygen	15% - 90% (by Volume)
Autoignition Temperature @ 1 atm	932F (500C)
Expansion Ratio, Liquid to Gas, B.P. to 68F (20C)	1 to 848

Tanks

Tanks are usually cylindrical in shape and placed in a horizontal position. However, some vertical, cylindrical tanks and spherical tanks are in use. Tanks are mounted at fixed locations. The unit measure of capacity of tanks is the gallon. Standard tank sizes range from 1500 gallons to 20,000 gallons. Tanks are vacuum insulated. Safety relief valves protect the tanks designed to ASME specifications for the pressures and temperatures involved. Figure 1 illustrates a typical horizontal tank installation.

Filling and Transfer

Hydrogen is rarely used as a liquid. It is normally vaporized and used as a gas. Withdrawal of liquid from a tanker, tank, dewar, or liquid cylinder requires the use of a closed system, with proper safety relief devices, which can be evacuated and/or purged to eliminate the possibility of creating a flammable atmosphere or explosive mixture of liquid air and liquid hydrogen. Purging must be done with helium since liquid hydrogen can solidify other gases such as nitrogen and cause plugging and possible rupture of the transfer line or storage vessel.

Transfer lines must be vacuum insulated to minimize product loss through vaporization or the formation of liquid air on the lines with subsequent oxygen enrichment. All equipment must be electrically grounded and bonded before transferring liquid.

Shipment

Liquid hydrogen is transported by liquid semitrailers with a capacity of 12,000 to 13,000 gallons. These over-the-road tankers are basically of the same design as the stationary tanks but in addition must meet the requirements of the Department of Transportation. The stationary tanks are filled from these tankers. DOT regulations prohibit the shipment of liquid hydrogen by common carrier. Paragraph 173.316 of the current DOT Tariff restricts the transport of liquid hydrogen to private and contract carriers only.

Safety Considerations

The hazards associated with handling liquid hydrogen are fire, explosion, asphyxiation, and exposure to extremely low temperatures. The potential for forming and igniting flammable mixtures containing hydrogen may be higher than for other flammable gases because:

(1) Hydrogen readily migrates through small openings and through torturous paths.

(2) The minimum ignition energy for flammable mixtures containing hydrogen is extremely low.

In addition, hydrogen burns with an almost invisible flame, and personnel may be injured by the flame because it is difficult visually to detect. The fire and explosion hazards can be controlled by appropriate design and operating procedures that prevent the formation of combustible fuel-oxidant mixtures and by removing or otherwise inerting potential sources of ignition (electric spark, static electricity, open flames, etc.) in the area where the hydrogen will be used. Careful evacuation and purge operations should be used to prevent the formation of flammable or explosive mixtures. Adequate ventilation will help reduce the possible formation of flammable mixtures in the event of a hydrogen leak or spill and will also eliminate the potential hazard of asphyxiation. Protective clothing should be worn to prevent exposure to extremely cold liquid hydrogen and cold hydrogen vapors.

Air will condense at liquid hydrogen temperatures, and can become an oxygen-enriched liquid due to the vaporization of nitrogen. Oxygen-enriched air increases the combustion rate of flammable and combustible materials.

Purging

Gaseous and liquid hydrogen systems must be purged of air, oxygen, or other oxidizers prior to admitting hydrogen to the systems, and purged of hydrogen before opening the system to the atmosphere. Purging should be done to prevent the formation of flammable mixtures and can be accomplished in several ways.

(1) Evacuate the hydrogen system and break the vacuum with nitrogen or hydrogen.

(2) Pass nitrogen through the system to purge it and follow with hydrogen.

(3) Pressurize the system with nitrogen and vent to the atmosphere as often as necessary before introducing hydrogen.

(4) Use helium as the purge gas on cold systems since nitrogen will solidify at liquid hydrogen temperatures.

Any purge method should be repeated as often as required to be certain a flammable mixture cannot be formed upon introducing hydrogen or air to the system. Caution: Vacuum-jacketed storage containers cannot be evacuated.

Buildings

Liquid hydrogen is normally vaporized into its gaseous state and piped into buildings for usage. For storage of liquid hydrogen in a building refer to the most recent edition of the National Fire Protection Association Pamphlet *Liquefied Hydrogen Systems at Consumer Sites* (NFPA No. 50B). The following items pertain to a building in which gaseous hydrogen is being used.

(1) Provide adequate ventilation, particularly in roof areas where hydrogen might collect. Forced ventilation may be necessary in some applications.

(2) The atmosphere in areas in which hydrogen gas may be vented and collect should be tested with a portable or continuous flammable gas analyzer.

(3) Provide an explosion venting surface or vents, taking care to vent a pressure wave to areas where people or other equipment will not become involved. Explosion vents may not be required where small quantities of hydrogen are involved.

MINIMUM DISTANCE (FEET) FROM LIQUEFIED HYDROGEN SYSTEMS TO EXPOSURES*

Type of Exposure	Capacity (gallons) Liquefied Hydrogen Storage		
	39.63 (150 l.) up to 3,500	3,501 up to 15,000	15,001 up to 30,000
1. Buildings			
a. Fire-Resistive Construction**	5	5	5
b. Noncombustible; Limited Combustible Construction**	25	50	75
c. Other types of construction**	50	75	100
2. Wall Openings, Air Compressor Intakes, Inlets for Air-conditioning or Ventilating Equipment	75	75	75
3. Flammable and combustible liquids (Class I, II, IIIA) - Above ground and Vent or Fill Openings if Below Ground	50	75	100
4. Between Stationary Liquefied Hydrogen Containers	5	5	5
5. Flammable Gas Storage (excluding hydrogen)	50	75	75
6. Liquid Oxygen Storage and Other Oxidizers	75	75	75
7. Combustible Solids	50	75	100
8. Open Flames, Smoking, and Welding	50	50	50
9. Places of Public Assembly	75	75	75
10. Public Ways, Railroads, and Property Lines	25	50	75
11. Protective Structures	5	5	5

*Distances listed are per the 1978 edition of NFPA 50B.

**Refer to NFPA No. 220, "Standard Types of Building Construction" for definitions of construction types.

NOTE. The distances in Nos. 1b, 1c, 3, 5, 6, 7, and 10 may be reduced where protective structures to safeguard the liquefied hydrogen storage system are located between the liquefied hydrogen storage installation and the exposure. Fire walls equal to the height of the top of the container would be one such protective structure. Ventilation and confinement of product shall be considered where protective structures are provided. Distances specified in Nos. 1a and 11 facilitates maintenance and enhances ventilation.

(4) Buildings should be electrically grounded.

(5) Electrical equipment must conform to the existing National Electrical Codes. Electrical equipment not conforming must be located outside the electrical area classified as hazardous. All electrical equipment must be grounded.

(6) Building materials should be noncombustible.

(7) "No Smoking, No Open Flames" or other appropriate signs must be posted in hazard areas, and at entrances to those areas.

Outdoor Storage Tank Requirements

(1) Location - General Requirements

a. The storage containers should be located so that they are readily accessible to mobile supply equipment at ground level and to authorized personnel, and where they are not exposed to electric power lines, flammable liquid lines, flammable gas lines, or lines carrying oxidizing materials.

b. It is advisable to locate the liquefied hydrogen container on ground higher than flammable liquid storage or liquid oxygen storage. Where it is necessary to locate the liquefied hydrogen container on ground that is lower than adjacent flammable liquid storage or liquid oxygen storage, suitable protective means (such as by diking, diversion curbs, or grading) should be taken.

c. Storage sites should be fenced and posted to prevent entrance by unauthorized personnel. Sites should also be placarded as follows: "LIQUEFIED HYDROGEN - FLAMMABLE GAS - NO SMOKING - NO OPEN FLAMES."

d. Weeds or similar combustibles should not be permitted within 25 feet of any liquefied hydrogen equipment.

(2) Location - Specific Requirements

a. The minimum distance in feet from liquefied hydrogen systems of indicated storage capacity located outdoors to any specified exposure should be in accordance with the table found herein.

b. Roadways and yard surfaces located below liquefied hydrogen piping, from which liquid air may drip, shall be constructed of noncombustible materials.

c. If protective walls are provided, they shall be constructed of noncombustible materials.

d. Electrical wiring and equipment located within three feet of a point where connections are regularly made and disconnected, shall be in accordance with Article 501 of the National Electrical Code, NFPA No. 70, for Class 1, Group B, Division 1 locations.

e. Electrical wiring and equipment located beyond three feet but within 25 feet of a point where connections are regularly made and disconnected or within 25 feet of a liquid hydrogen storage container, shall be in accordance with Article 501 of the National Electrical Code, NFPA No. 70, for Class 1, Group B, Division 2 locations. This requirement does not apply to electrical equipment which is installed on mobile, supply trucks or tank cars from which the storage container is filled.

f. The liquefied hydrogen container and associated piping shall be electrically bonded and grounded.

g. Adequate lighting shall be provided for nighttime transfer operations.

Personnel Protection

(1) Personnel must be thoroughly familiar with the properties and safety precautions before being allowed to handle hydrogen and/or associated equipment.

(2) Prevent skin from contacting frosted lines, liquid air that may be dripping from cold lines or vent stacks, vaporizer fins, and vapor leaks. Cold burns may occur from short contact with any of these.

(3) Two persons should be present when liquid hydrogen is being used, transferred, or a container is moved. This does not apply where specially trained employees of the liquid hydrogen supplier, who routinely handle liquid hydrogen, are involved.

(4) Chemical goggles, protective clothing, and loose fitting gloves of impermeable material should be used when handling liquid hydrogen.

Air Products and Chemicals, Inc.
Box 538, Allentown, PA 18105
Telephone 215/481-4911
TWX 510-651-3686 · Telex 84-7416

First Aid

Persons suffering from lack of oxygen should be moved to areas with normal atmosphere. SELF-CONTAINED BREATHING APPARATUS MAY BE REQUIRED TO PREVENT ASPHYXIATION OF RESCUE WORKERS. Assisted respiration and supplemental oxygen should be given if the victim is not breathing. Caution: The amount of hydrogen gas necessary to produce oxygen-deficient atmospheres is well within the flammable range; fire and explosion are the primary hazards associated with hydrogen/air atmospheres.

Extensive tissue damage or burns can result from exposure to liquid hydrogen or cold hydrogen vapors. Flush affected areas with large volumes of tepid water (105-115F [41-46C]) to reduce freezing. Loosen any clothing which may restrict circulation. Do not apply heat. Cover affected area with a sterile protective dressing or with clean sheets if area is large, and protect area from further injury. Seek medical attention promptly.

Note to Physician

Frozen tissues should be treated promptly by immersion in a water bath at a temperature between 105-115F (41-46C). Avoid the use of dry heat.

Frozen tissues are painless and appear waxy with a pallid yellow color. Tissues become painful and edematous upon thawing and the pale color turns to pink or red as circulation of blood is restored. Potent analgesics are often indicated. Tissues which have been frozen show severe, wide-spread cellular injury and are highly susceptible to infections and additional trauma. Therefore, rapid rewarming of tissues in the field is not recommended if transportation to a medical facility will be delayed.

If the body temperature is depressed, the patient must be warmed gradually. Shock may occur during the correction of hypothermia. Cardiac dysrhythmias may be associated with severe hypothermia.

Fire Fighting

Hydrogen will burn with an almost invisible flame. Most hydrogen fires will have the flame characteristic of a torch or jet and will originate at the point where the hydrogen is discharging. If a leak is suspected in any part of a hydrogen system, it is good protection to hold a large square of paper before you and approach the suspected leak so that any invisible flame will strike the paper before striking you.

The only effective way to fight a hydrogen fire is to shut off the flow of gas. If it is necessary to extinguish the flame in order to get to a place where the flow of hydrogen can be shut off, a dry powder extinguisher is recommended. Carbon dioxide extinguishers, modified by sawing off the fog nozzle, may be used to blow out the fire rather than smother it. However, if the fire is extinguished without stopping the flow of gas, an explosive mixture may form, creating a more serious hazard than the fire itself, should reignition occur from the hot surfaces or other sources.

The usual fire fighting practice is to prevent the fire from spreading and let it burn until the hydrogen is consumed. Dry powder fire extinguishers should be available in the area. A fire blanket should be conveniently located. An adequate water supply should be available to keep surrounding equipment cool in the event of a hydrogen fire. The local fire department should be advised of the nature of the products handled and made aware of the best known methods for combatting hydrogen fires.

SULFURIC ACID (OIL OF VITRIOL)

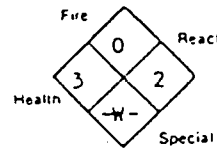
MATERIAL — Sulfuric Acid
UN N° — 1830 or 1832
CAS N° — 7664-93-9
CIL N° — GCD-0052-828

Material Safety Data Sheet

Emergency Tel. No — Detroit, Mich. (313) 862-4747; Toronto, Ont. (416) 226-6117

HAZARD RATING: NFPA

4 - EXTREME
3 - HIGH
2 - MODERATE
1 - SLIGHT
0 - INSIGNIFICANT
* - CHRONIC HEALTH HAZARD - SEE SECTION 6



Section I. Identification of Product

TRADE NAME & SYNONYMS: Sulfuric Acid; Oil of Vitriol; Commercial Grade 66° Be (93.19%, 98/99% H_2SO_4); Electrolytic	CHEMICAL NAME & SYNONYMS: Sulfuric Acid Grade 1.835 (93.19%); C.P. Sulfuric Acid (95.5-96.5%)
CHEMICAL AND PHYSICAL STATE: Strong acid; corrosive liquid	MOLECULAR FORMULA: H_2SO_4

SECTION II Physical Properties

APPEARANCE AND ODOUR: Commercial H_2SO_4 is a clear to amber, heavy, oily liquid having a sharp penetrating SO_2 odour. Electrolytic grade and C.P. acid is clear, oily and odourless.

BOILING POINT (°C): 93.19%: 276°C; C.P.: 290°C; 98%: 330°C	MELTING POINT (°C) - FREEZING POINT (°C): 93.19%: -29.5°C; C.P.: -24.3°C; 98%: -1.1°C
VAPOUR PRESSURE (MM HG): 93.19%: 0.0018 mmHg @ 20°C; C.P.: 0.001 mmHg @ 20°C; 98%: 0.001 mmHg @ 20°C	SPECIFIC GRAVITY (WATER = 1 AT 4°C): @ 15°C/15°C 93.19%: 1.8354 C.P.: 1.84 98%: 1.8437
BULK DENSITY: --	VAPOUR DENSITY (AIR = 1): Not applicable
SOLUBILITY IN WATER: Miscible in all proportions	OTHER SOLVENTS: Alcohol

Section III Fire and Explosion Hazard Data

FLASH POINT (°C) METHOD: Non-flammable	AUTOIGNITION TEMPERATURE (°C): --
FLAMMABLE LIMITS (% BY VOL. IN AIR)	LOWER: — UPPER:
WOULD ANY MATERIAL SATURATED WITH THIS PRODUCT BE SUBJECT TO SPONTANEOUS COMBUSTION?	MATERIALS: ☐ YES ☒ NO

FIRE EXTINGUISHING DATA: Dry chemical

SPECIAL FIREFIGHTING PROCEDURES: Fires involving small amounts of combustibles may be smothered with suitable dry chemical. Wate applied directly to this material results in evolution of heat and causes spattering.

UNUSUAL FIRE AND EXPLOSION HAZARDS: A self-contained breathing apparatus should be worn in a fire involving the material. Toxic gases or vapours (e.g., Sulfuric Acid fumes, Sulfur Dioxide & Carbon Monoxide) may be released due to thermal decomposition. Hydrogen Gas can accumulate to explosive concentrations inside steel tanks.

Section IV Reactivity Data

STABILITY	UNSTABLE		CONDITIONS TO AVOID: None
	STABLE	XX	

INCOMPATIBILITY (MATERIALS TO AVOID): Contact of acid with organic materials (such as Chlorates, Carbides, Fulminates & Picrates) may cause fire & explosions. Contact of acid with metals may form toxic Sulfur Dioxide fumes & flammable Hydrogen Gas.

HAZARDOUS DECOMPOSITION PRODUCTS: Toxic gases & vapours (e.g., Sulfur Dioxide, Sulfuric Acid fumes) may be released when Sulfuric Acid decomposes.

HAZARDOUS POLYMERIZATION	MAY OCCUR		CONDITIONS TO AVOID
	WILL NOT OCCUR	XX	

SHOLD LIMIT VALUE (TLV-TWA) mist or spray) 1 mg/m^3	LC_{50} SULFURIC ACID .... P. 2 LD_{50} oral-rat: 2140 mg/kg
EFFECTS OF EXPOSURE WHEN: —INHALED	Causes severe irritation of respiratory tract & increased respiratory rate & erosion of teeth. May cause pulmonary edema, bronchitis.
—IN CONTACT WITH EYES	Causes severe eye ulceration and conjunctivitis. Permanent eye damage may result.
—IN CONTACT WITH SKIN	Severe irritant. May cause dermatitis and deep chemical burns.
—INGESTED	Causes ulceration and scarring of digestive tract.
EMERGENCY AND FIRST AID PROCEDURES —INHALATION	Remove to fresh air. If not breathing, give artificial respiration. Give oxygen by properly trained personnel if breathing is difficult. Keep patient warm & at rest. Obtain medical attention.
—EYES	Flush eyes with water for at least 20 minutes holding eyelids open. Obtain medical attention.
—SKIN	Remove contaminated clothing. Flush affected areas with water for at least 20 minutes. Obtain medical advice.
—INGESTION	If conscious, dilute with 2 glasses of water or milk; do not induce vomiting.

Section VI — Special Protection Information

VENTILATION REQUIREMENTS	Local exhaust ventilation preferred.	
RESPIRATORY PROTECTION	Air-purifying respirator for concentrations up to 10 times TLV. Air supply respirator for higher concentrations.	
PROTECTIVE GLOVES	Impermeable gloves	EYE PROTECTION Tight-fitting goggles & face shield
OTHER PROTECTIVE EQUIPMENT	Impermeable clothing. Safety showers & eyewash fountains should be installed in storage & handling areas.	

Section VII — Special Requirements

PRECAUTION IN HANDLING AND STORING	Store in a dry, well-ventilated location, keep temperatures above freezing point of material. Do not store near combustibles; oxidizers or metallic powders or bases.
OTHER PRECAUTIONS	Keep away from ignition sources. Liquid Sulfuric Acid will attack some forms of rubber, plastics and coatings. Always add acid to water -- not water to acid.

Section VIII — Spill or Leak Procedures

STEPS TO BE TAKEN IN EVENT OF SPILL OR RELEASE. IN ALL CASES NOTIFY APPLICABLE GOVERNMENT AUTHORITY IF SPILL IS SIGNIFICANT	Remove all ignition sources. Ventilate area. Notify pollution control authorities. Stop & contain leak or spill. Collect into containers for reclaim or disposal.
ENVIRONMENTAL EFFECTS	Harmful to aquatic life in very low concentrations. May be dangerous if it enters water intake; Fish toxicity critical concentration=10 mg/l 7.34 mg/l/48 hrs - Lymnaea Palustris - 0-100% mortality
NEUTRALIZING CHEMICALS	Lime, Limestone, Sodium Carbonate, Sodium Bicarbonate, Dilute Sodium Hydroxide, Dilute Aqua Ammonia
WASTE DISPOSAL	Consult federal, state & local regulations on chemical waste disposal. May be possible to neutralize, absorb and dispose of in a secure sanitary landfill site.

Section IX — References

Eco Research, Montreal, 1977. C-I-L Technical Bulletin, Sulfuric Acid.

AX, N.I., Dangerous Properties of Industrial Materials, 4th Ed. (1978).

C-I-L Chemicals, Inc.
800 Marion Ave.,
River Rouge, Michigan 48218

SODIUM (METALLIC)

DU PONT

MATERIAL SAFETY DATA SHEET

IDENTIFICATION

NAME
Sodium

GRADE
Regular; Low Calcium

SYNONYMS
Sodium Metal

CAS NAME
Sodium

I.D. NOS./CODES
NIOSH Registry No. VY0686000

MANUFACTURER/DISTRIBUTOR
E. I. du Pont de Nemours & Co. (Inc.)

ADDRESS
Wilmington, DE 19898

CHEMICAL FAMILY
Alkali metal

FORMULA
Na

CAS REGISTRY NO.
7440-23-5

PRODUCT INFORMATION
Phone (800) 441-9442
Medical Emergency Phone
(800) 441-3637

TRANSPORTATION EMERGENCY PHONE
CHEMTREC (800) 424-9300

PHYSICAL DATA

BOILING POINT, 760 MM HG
881°C (1618°F)

SPECIFIC GRAVITY
0.97 at 20°C (68°F)

VAPOR DENSITY
Not applicable

pH INFORMATION
Reacts with water to form sodium hydroxide (high pH) and hydrogen gas.

MELTING POINT
97.8°C (208°F)

VAPOR PRESSURE
1 mmHg at 493°C (920°F)

SOLUBILITY IN WATER
Reacts violently with water

EVAPORATION RATE (BUTYL ACETATE=1)
Not applicable

FORM
Solid

APPEARANCE
Metallic

COLOR
In inert atmosphere: pinkish silvery when fresh cut.
In air: white to gray

ODOR
None

HAZARDOUS COMPONENTS

MATERIAL(S)	APPROXIMATE %
Sodium	100

HAZARDOUS REACTIVITY

INSTABILITY
Stable

INCOMPATIBILITY
Reacts violently with any materials containing water and many materials containing oxygen, halides, or active hydrogen. Reaction with water gives sodium hydroxide and hydrogen gas, which may explode. Burning produces sodium oxide fumes.

DECOMPOSITION
Will not occur.

POLYMERIZATION
Will not occur.

FIRE AND EXPLOSION DATA

FLASH POINT Not applicable

METHOD Not applicable

AUTOIGNITION TEMPERATURE
120 to 125°C (248 to 257°F)

FLAMMABLE LIMITS IN AIR, % BY VOL.
LOWER Not determined
UPPER Not determined

AUTODECOMPOSITION TEMPERATURE
Not applicable

FIRE AND EXPLOSION HAZARDS
Flammable solid. Reacts violently with water releasing hydrogen gas, which will ignite and explode. Sodium oxide fumes form dense white smoke and are irritating.

EXTINGUISHING MEDIA
Dry soda ash (preferred) or Class D fire extinguisher. Dry salt or sand is less effective, but can be used.

SPECIAL FIRE FIGHTING INSTRUCTIONS

DO NOT use water. Do not use CO_2, soda-acid, or chlorinated fire extinguishing agents such as carbon tetrachloride. Stay upwind and use self-contained breathing apparatus if needed. Sodium melts and burns on its surface. Reduce fire by diking to limit sodium surface, then smothering with soda ash.

HEALTH HAZARD INFORMATION

PRINCIPAL HEALTH HAZARDS (Including Significant Routes, Effects, Symptoms of Over-Exposure, and Medical Conditions Aggravated by Exposure)

Causes severe caustic burns.

Sodium is very corrosive to animal skin or eyes by reactive formation of sodium hydroxide. Toxic effects described in animals from exposure include the effects of the thermal reaction with water and direct chemical corrosion by sodium hydroxide.

Human health effects of over-exposure may initially include: skin burns or ulceration; eye corrosion with corneal or conjunctival ulceration; or irritation of the upper respiratory passages.

CARCINOGENICITY

Not listed as a carcinogen by IARC, NTP, OSHA, ACGIH, or Du Pont.

EXPOSURE LIMITS (PEL (OSHA), TLV (ACGIH), AEL (DU PONT), ETC.)

Exposure limits for sodium have not been established by OSHA or ACGIH. Du Pont recommends 1 mg/m^3. The OSHA 8-hour Time Weighted Average (TWA) and the ACGIH TLV®-TWA for caustic soda (sodium hydroxide), the reaction product, is 2 mg/m^3 (this is a ceiling limit for ACGIH).

SAFETY PRECAUTIONS

Persons handling sodium should be thoroughly familiar with its hazards and proper first aid procedures.
Do not get in eyes, on skin, or on clothing, and avoid any contact with water.

FIRST AID

If fumes from sodium reactions are inhaled, remove to fresh air immediately. If not breathing, give artificial respiration, preferably mouth-to-mouth. If breathing is difficult, give oxygen. Call a physician.

In case of contact, immediately remove sodium and flush eyes or skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes. Call a physician. Burn or wash clothing and shoes if contaminated with sodium.

If swallowed, do not induce vomiting. Give large quantities of water. Call a physician immediately. Never give anything by mouth to an unconscious person.

PROTECTION INFORMATION

GENERALLY APPLICABLE CONTROL MEASURES

Good general ventilation should be provided to keep fume concentrations below the exposure limits and to prevent the accumulation of hydrogen gas.

PERSONAL PROTECTIVE EQUIPMENT

Solid Sodium: Sodium bricks can be handled safely using chemical splash goggles and DRY moleskin mitts. Mitts should be oversized for easy removal and should extend up the arm. Wear a long sleeve shirt. A full face shield and a Du Pont NOMEX® Aramid Fiber or other flame proof apron are also desirable.

Molten Sodium: When liquid sodium is handled or there is danger of spillage, full protective flame proof clothing should be available and used as appropriate. This includes: hard hat with brim; chemical splash goggles; full length face shield; fire resistant (NOMEX® Aramid Fiber) long underwear, pants and shirt (or coveralls), neck shroud, spats, apron; and heavy duty work shoes. A self-contained breathing apparatus is needed if large amounts of sodium oxide smoke are present; a toxic dust disposable respirator can be used for smaller amounts.

DISPOSAL INFORMATION

SPILL, LEAK OR RELEASE

Cover with DRY soda ash, shovel into a dry metal container and cover again with soda ash, and dispose of promptly. Avoid putting wet sodium in a covered container because a hydrogen explosion may occur. Wear proper protective equipment. Comply with Federal, State, and local regulations on reporting releases.

WASTE DISPOSAL

Comply with federal, state, and local regulations. If approved, may be burned in an incinerator equipped with a scrubber. Small amounts of sodium can be disposed of by weathering, by steaming (which requires special instructions), or by burning in open air, if approved. Considerable white smoke will develop when burning even small amounts of sodium. Sodium disposal, and disposal of empty drums, should not be attempted by inexperienced people. Contact Du Pont for technical information.

SHIPPING INFORMATION

DOT (172.101)	DOT/IMO (172.102)
PROPER SHIPPING NAME Sodium, Metal	PROPER SHIPPING NAME Sodium, Metal
HAZARD CLASS Flammable Solid	HAZARD CLASS Flammable Solid, 4.3
UN NO. 1428	UN NO. 1428

DOT LABEL(S)
Flammable Solid
Dangerous When Wet

DOT PLACARD (TI/TC)
Flammable Solid
Dangerous When Wet

IMO (PAGE 4175)

PROPER SHIPPING NAME Sodium, Metal

HAZARD CLASS 4.3

UN NO. 1428

IMO LABEL(S) Dangerous When Wet

IATA/ICAO

PROPER SHIPPING NAME Sodium

HAZARD CLASS 4.3

UN NO. 1428

LABEL(S) Dangerous When Wet

PACKAGING GROUP NO. II

OTHER INFORMATION

REPORTABLE QUANTITY 1000 lb/454 kg

SHIPPING CONTAINERS
Tank cars, tank trucks, drums. Samples: fused, in 1-Qt. tin cans; 2 1/2-lb. bricks in 5-gal pails.

STORAGE CONDITIONS
Store in segregated area of fire resistant watertight building without sprinklers, steam, water lines, skylights, or potential for flooding. Ventilate to avoid hydrogen accumulation. Keep drums covered to prevent caustic formation from moisture in air. Keep from possible contact with water. Nitrogen purge open drums before resealing. Keep drums tightly closed. Do not store with water containing materials. Do not store with combustibles or flammables as fire fighting problems would be compounded. Use only clean, dry utensils in handling.

For further information, see Du Pont "Properties, Uses, Storage and Handling" Bulletin.

DATE OF LATEST REVISION/REVIEW: 7/85
PERSON RESPONSIBLE FOR MSDS: J. C. WATTS, Du Pont Co., C&P Dept., Chestnut Run, Wilmington, DE 19898, (302) 999-4946

CAUSTIC POTASH (LIQUID) (POTASSIUM HYDROXIDE)

Industrial Chemicals Group
Diamond Shamrock Corporation
351 Phelps Court
P.O. Box 2300
Irving, Texas 75061
214/659-7000

Material Safety

Diamond Shamrock

GENERAL INFORMATION Liquid Caustic Potash is a clear, corrosive liquid with no distinct odor.

Data Sheet

CAUSTIC POTASH—LIQUID

Slightly Reactive 1

Noncombustible 0

High Health Hazard 3

Ratings based on NIOSH "Identification System for Occupationally Hazardous Materials" (1974)

DEPARTMENT OF TRANSPORTATION INFORMATION
PROPER SHIPPING NAME: Caustic Potash-Liquid
I.D. NUMBER: UN 1814
HAZARD CLASS: Corrosive Material
HAZARDOUS SUBSTANCE: RQ-1,000

I PRODUCT IDENTIFICATION

Manufacturer's Name
DIAMOND SHAMROCK CORPORATION

Regular Telephone No. Contact Local Sales Office
Emergency Telephone No. 216/357-7070

Address
Industrial Chemicals Technical Center
P.O. Box 191
Painesville, Ohio 44077

Product Name
Caustic Potash-Liquid

Synonyms
Potassium Hydroxide; KOH

II HAZARDOUS INGREDIENTS

Material or component	CAS No.+	%	Hazard Data
Potassium Hydroxide	1310-58-3	45	PEL* = None TLV** = 2 mg/m^3 Ceiling Value
Water		55	

+Chemical Abstract Service Number
*OSHA Permissible Exposure Limit
**ACGIH Threshold Limit Value, 1982

III PHYSICAL DATA

Boiling Point, 760 mm Hg
133°C; 271°F (45%)

Melting Point
Not Applicable

Freezing Point
-29°C (-20°F)

Specific Gravity (H_2O=1)
1.45 @ 15.6°C

Vapor Pressure
39 mm Hg @ 60°C

Vapor Density (Air=1)
Not Applicable

Solubility in H_2O, % by Wt.
Completely Soluble

% Volatiles by Vol.
Not Volatile

Evaporation Rate (Butyl Acetate=1)
Not Applicable

Appearance and Order
Clear with no odor

Density at 20°C:
Not Available

Viscosity:
3.7 Centipoises - (45%)

pH
0.01 moles/liter has pH 12.0

IV FIRE AND EXPLOSION DATA

DEVELOP EMERGENCY ACTION PLAN

Flash Point (Test Method)
None

Autoignition Temperature
Nonflammable

Flammable Limits in Air, % by Vol.

Lower
Nonflammable

Upper
Nonflammable

Extinguishing Media
Caustic Potash-Liquid is not combustible.

Special Fire Fighting Procedures
Avoid direct contact of Caustic Potash-Liquid with water.

Unusual Fire and Explosion Hazard
None

V HEALTH HAZARD INFORMATION

Health Hazard Data

Potassium Hydroxide: Acute Oral LD_{50} = 365 mg/kg (Rat)

Routes of Exposure

Inhalation

Airborne concentrations of dust, mist, or spray may cause damage to the upper-respiratory tract and even to the lung tissue proper which could produce chemical pneumonia, depending upon severity of exposure.

Skin Contact

Caustic Potash is destructive to tissues contacted and produces severe burns.

Skin Absorption

See "Skin Contact" above.

Eye Contact

Caustic Potash is destructive to eye tissues on contact. Will cause severe burns that result in damage to the eyes and even blindness.

Ingestion

Caustic Potash, if swallowed, can cause severe burns and complete tissue perforation of mucous membranes of the mouth, throat, esophagus, and stomach.

Effects of Overexposure

Acute Overexposure

Corrosive to all body tissues with which it comes in contact.

Chronic Overexposure

The chronic local effect may consist of multiple areas of superficial destruction of the skin or of primary irritant dermatitis. Similarly, inhalation of dust, spray, or mist may result in varying degrees of irritation or damage to the respiratory tract tissues and an increased susceptibility to respiratory illness.

Emergency and First Aid Procedures

Eyes:

OBJECT IS TO FLUSH MATERIAL OUT IMMEDIATELY THEN SEEK MEDICAL ATTENTION. IMMEDIATELY flush eyes with large amounts of water for at least 15 minutes, holding lids apart to ensure flushing of the entire surface. Washing eyes within 1 minute is essential to achieve maximum effectiveness. Seek medical attention immediately.

Skin:

Wash contaminated areas with plenty of water. Remove contaminated clothing and footwear and wash clothing before reuse. Discard footwear which cannot be decontaminated. Seek medical attention immediately.

Inhalation:

Get person out of contaminated area to fresh air. If breathing has stopped, resuscitate and administer oxygen if readily available. Seek medical attention immediately.

Ingestion:

NEVER give anything by mouth to an unconscious person. If swallowed, DO NOT INDUCE VOMITING. Give large quantities of water. If available, give several glasses of milk. If vomiting occurs spontaneously, keep airway clear. Seek medical attention immediately.

Notes to Physician

None

VI REACTIVITY DATA

Conditions Contributing to Instability

Under normal conditions, the material is stable.

Incompatibility

Avoid direct contact with water. Caustic Potash-Liquid may be added slowly to water or acids with dilution and agitation to avoid a violent reaction. When handling Caustic Potash, avoid contact with aluminum, tin, zinc, and alloys containing these metals. Do not mix with strong acids without dilution and agitation to prevent violent or explosive reaction. Avoid contact with leather or wool.

Hazardous Decomposition Products

None

Conditions Contributing to Hazardous Polymerization

Material is not known to polymerize.

VII SPILL OR LEAK PROCEDURES

Steps to be Taken if Material is Released or Spilled

Leaks should be stopped. Spills should be contained and cleaned up immediately. Spills should be removed by using a vacuum truck. Neutralize remaining traces of material with any dilute inorganic acid such as hydrochloric, sulfuric, nitric, phosphoric, and acetic acid. The spill area should then be flushed with water followed by liberal covering of sodium bicarbonate. All clean-up material should be removed and placed in approved containers, labeled, and stored in a safe place to await proper treatment or disposal. Spills on areas other than pavement, e.g., dirt or sand, may be handled by removing the affected soils and placing in approved containers. Persons performing clean-up work should wear adequate personal protective equipment and clothing.

Caution: Caustic Potash may react violently with acids and water.

Waste Disposal Method

The materials resulting from clean-up operations may be hazardous wastes and, therefore, subject to specific regulations. Package, store, transport, and dispose of all clean-up materials and any contaminated equipment in accordance with all applicable Federal, State, and local health environmental regulations. Shipments of waste materials may be subject to manifesting requirements per applicable regulations. Appropriate disposal will depend on the nature of each waste material and should be performed by competent and properly permitted contractors. Ensure that all responsible Federal, State, and local agencies receive proper notification of disposal.

VIII INDUSTRIAL HYGIENE CONTROL MEASURES

Ventilation Requirements

Use adequate local exhaust ventilation.

Note: Where carbon monoxide may be generated, special ventilation may be required.

Specific Personal Protective Equipment

Respiratory (Specify in Detail)

Respiration protection is not required under normal use.

Use NIOSH/MSHA approved respirators where dust or mist may be generated.

Eye

Face shield and goggles or chemical goggles should be worn.

Gloves

Rubber gloves should be worn. Gloves may be decontaminated by washing with mild soap and water.

Other Clothing and Equipment

Protective clothing to minimize skin contact should be worn. Chemically-resistant safety shoes. Wash contaminated clothing with soap and water and dry before reuse. Safety showers and eyewash stations should be provided in all areas in which Caustic Potash is handled.

IX SPECIAL PRECAUTIONS

Precautionary Statements

DANGER!

CAUSES SEVERE BURNS TO SKIN AND EYES.

DO NOT get in eyes, on skin, on clothing.

Avoid breathing dust, mist, or spray.

DO NOT take internally.

Use with adequate ventilation and employ respiratory protection when exposure to dust, mist, or spray is possible.

When handling, wear chemical splash goggles, face shield, rubber gloves, and protective clothing.

Wash thoroughly after handling.

Avoid contact with strong acids to prevent violent or explosive reactions.

Keep container closed.

First Aid:

In case of contact:

For eyes: Immediately flush with plenty of water for at least 15 minutes, holding eyelids apart to ensure flushing of the entire eye surface. Seek medical attention immediately.

For skin: Wash with plenty of water. Remove contaminated clothing and footwear. Wash clothing before reuse and discard footwear which cannot be decontaminated. Seek medical attention immediately.

If inhaled: Remove person out of contaminated area to fresh air. If breathing has stopped, artificial respiration should be started. Oxygen may be administered, if available. Seek medical attention immediately.

If swallowed: DO NOT induce vomiting. Give large quantities of water. If available, give several glasses of milk. NEVER give anything by mouth to an unconscious person. Seek medical attention immediately.

In Case of Spill or Leak: Leaks should be stopped. Spills, after containment, should be shoveled up and removed to chemical waste area or removed by vacuum truck, if liquid. Neutralize residue with dilute acid, flush spill area with water followed by liberal covering of sodium bicarbonate. Dispose of wash water according to Federal, State, and local regulations.

Other:

Special instructions for dissolving caustic soda:

When making solution, always add slowly to liquid surface with constant stirring. Never add the liquid to the Caustic Potash.

Always start with lukewarm liquid (80°-100°F). Never start with hot or cold liquid.

If Caustic Potash becomes concentrated in one area, or if added too rapidly, or if added to hot or cold liquid, a rapid temperature increase can result in DANGEROUS boiling and/or spattering, which may cause an immediate VIOLENT ERUPTION.

For Industrial Use Only

Other Handling and Storage Requirements

STORAGE AND DISPOSAL

Storage

Considerable heat is generated when water is added to Caustic Potash; therefore, when making solutions, always add the Caustic Potash to the water with constant stirring. The water should always be lukewarm (80°-100°F). Never start with hot or cold water. If Caustic Potash becomes concentrated in one area, or if added too rapidly or added to hot or cold water, a rapid temperature increase can result in DANGEROUS BOILING and/or spattering or may cause an immediate VIOLENT ERUPTION. Caustic Potash can react violently or explosively with acids and many organic chemicals.

Caustic Potash reacts with reducing sugars such as fructose, lactose, maltose, galatose, levulose, and arabinose to form carbon monoxide. While the potential for worker exposure to carbon monoxide may be small, a potential does exist during cleaning of certain dairy and possibly other industry equipment.

Returnable containers should be shipped in accordance with supplier's recommendations. Return shipments should comply with all Federal, State, and DOT regulations. All residual Caustic Potash should be removed from containers prior to disposal.

More information on the hazards and handling of Caustic Potash appear in Diamond Shamrock Corporation's Potash Handbook EC-CP-1b.

Disposal

The materials resulting from clean-up operations may be hazardous wastes and, therefore, subject to specific regulations. Package, store, transport, and dispose of all clean-up materials and any contaminated equipment in accordance with all applicable Federal, State, and local health environmental regulations. Shipments of waste materials may be subject to manifesting requirements per applicable regulations. Appropriate disposal will depend on the nature of each waste material and should be performed by competent and properly permitted contractors. Ensure that all responsible Federal, State, and local agencies receive proper notification of disposal.

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RF:042283/mta

CAUSTIC SODA (LIQUID) (SODIUM HYDROXIDE)

M A T E R I A L S A F E T Y D A T A S H E E T PAGE: 1

DOW CHEMICAL U.S.A. MIDLAND MICHIGAN 48640 EMERGENCY PHONE: 517-636-4400

EFFECTIVE DATE: 07 NOV 79 PRODUCT CODE: 15216

PRODUCT NAME: CAUSTIC SODA SOLUTION 50% MSD: 0101

INGREDIENTS (TYPICAL VALUES-NOT SPECIFICATIONS)	%
SODIUM HYDROXIDE	50
WATER	BALANCE

SECTION 1 PHYSICAL DATA

BOILING POINT: 293F, 145C APPROX. : SOL. IN WATER: WATER SOLUTION
VAP PRESS: 1.5 MMHG, 0.2 KPA @ 20C: SP. GRAVITY: @ 20C (DENS.) 1.52 G/ML
VAP DENSITY (AIR=1): ---- : % VOLATILE BY VOL: LOW (WATER)

APPEARANCE AND ODOR: COLORLESS TO SLIGHTLY COLORED LIQUID, NO ODOR.

SECTION 2 FIRE AND EXPLOSION HAZARD DATA

FLASH POINT: NONE : FLAMMABLE LIMITS
METHOD USED: NOT APPLICABLE : LFL: NOT APPLIC. UFL: NOT APPLIC.

EXTINGUISHING MEDIA: NON-COMBUSTIBLE.

SPECIAL FIRE FIGHTING EQUIPMENT AND HAZARDS: IN WATER SOLUTION CAUSTIC CAN REACT WITH AMPHOTERIC METALS (SUCH AS ALUMINUM) GENERATING HYDROGEN WHICH IS FLAMMABLE AND/OR EXPLOSIVE WHEN IGNITED.

SECTION 3 REACTIVITY DATA

STABILITY: PRODUCT ABSORBS CARBON DIOXIDE FROM THE AIR.

INCOMPATIBILITY: WATER AND ACID. PRODUCT IS STRONG CAUSTIC ALKALI. MAY REACT VIOLENTLY OR EXPLOSIVELY WITH ACID, A NUMBER OF ORGANIC COMPOUNDS, AMPHOTERIC METALS (SUCH AS ALUMINUM), AND HEATED WATER.

HAZARDOUS DECOMPOSITION PRODUCTS: NONE.

HAZARDOUS POLYMERIZATION: WILL NOT OCCUR.

SECTION 4 SPILL, LEAK, AND DISPOSAL PROCEDURES

ACTION TO TAKE FOR SPILLS (USE APPROPRIATE SAFETY EQUIPMENT): ONLY TRAINED AND PROPERLY PROTECTED PERSONNEL SHOULD UNDERTAKE SPILL CLEAN UP. ACTING CAUTIOUSLY, DILUTE AND NEUTRALIZE WITH DILUTE ACID.

(CONTINUED ON PAGE 2)

W CHEMICAL U.S.A. MIDLAND MICHIGAN 48640 EMERGENCY PHONE: 517-636-4400

ECTIVE DATE: 07 NOV 79 PRODUCT CODE: 15216
CT (CONT'D): CAUSTIC SODA SOLUTION 50% MSD: 0101

SECTION 4 SPILL, LEAK, AND DISPOSAL PROCEDURES (CONTINUED)

ACTION TO TAKE FOR SPILLS (USE APPROPRIATE SAFETY EQUIPMENT): (CONTINUED)
PREFERABLY ACETIC ACID.

DISPOSAL METHOD: DISPOSAL OF CAUSTIC SODA MUST MEET ALL FEDERAL, STATE AND LOCAL REGULATIONS. CONTACT THE DOW CHEMICAL COMPANY FOR ADDITIONAL INFORMATION.

SECTION 5 HEALTH HAZARD DATA

INGESTION: MOST SERIOUS EFFECT IS CORROSION OF TISSUES. LOWEST LETHAL DOSE IN RABBIT IS 500 MG/KG CAUSTIC.

EYE CONTACT: SEVERE BURN AND POSSIBLE BLINDNESS.

SKIN CONTACT: BURNS, FREQUENTLY DEEP ULCERATION AND ULTIMATE SCARRING.

SKIN ABSORPTION: NOT LIKELY A PROBLEM.

INHALATION: ACGIH TLV AND OSHA GUIDE IS 2 MG/CU METER DUSTS AND MISTS, BASED ON SODIUM HYDROXIDE.

EFFECTS OF OVEREXPOSURE: DUSTS OR CONCENTRATED MIST MAY CAUSE DAMAGE TO UPPER RESPIRATORY TRACT & EVEN TO THE LUNGS PROPER, RANGES FROM MILD IRRITATION TO SEVERE PNEUMONITIS. MAIN EFFECT-TISSUE DAMAGE.

SECTION 6 FIRST AID

EYES: IMMEDIATE AND CONTINUOUS IRRIGATION WITH FLOWING WATER AT LEAST 30 MINUTES IS IMPERATIVE. PROMPT MEDICAL CONSULTATION ESSENTIAL.

SKIN: SKIN BURN LIKELY. IMMEDIATE AND CONTINUOUS AND THOROUGH WASHING IN FLOWING WATER FOR 30 MINUTES IS INDICATED. REMOVE CLOTHING IMMEDIATELY. CALL PHYSICIAN AND/OR TRANSPORT TO MEDICAL FACILITY. DESTROY CONTAMINATED SHOES. WASH CLOTHING BEFORE REUSE.

INHALATION: REMOVE TO FRESH AIR IF EFFECTS OCCUR. CALL PHYSICIAN AND/OR TRANSPORT TO MEDICAL FACILITY.

INGESTION: CORROSIVE. DO NOT INDUCE VOMITING. GIVE LARGE AMOUNTS OF WATER OR MILK IF IMMEDIATELY AVAILABLE AND TRANSPORT TO MEDICAL FACILITY.

NOTE TO PHYSICIAN:
EYES: MAY CAUSE SEVERE CORNEAL INJURY OR BURN. MAY CAUSE IMPAIRMENT OF VISION. STAIN FOR EVIDENCE OF CORNEAL INJURY. IF CORNEA IS BURNED, INSTILL ANTIBIOTIC STEROID PREPARATION FREQUENTLY. CONSULT

(CONTINUED ON PAGE 3)

DW CHEMICAL U.S.A. MIDLAND MICHIGAN 48640 EMERGENCY PHONE: 517-636-4400

EFFECTIVE DATE: 07 NOV 79 PRODUCT CODE: 15216
PRODUCT (CONT'D): CAUSTIC SODA SOLUTION 50% MSD: 0101

SECTION 6 FIRST AID (CONTINUED)

NOTE TO PHYSICIAN: (CONTINUED)
OPHTHALMOLOGIST.
SKIN: MAY CAUSE SEVERE BURNS. IF BURN IS PRESENT, TREAT AS ANY THERMAL BURN.
RESPIRATORY: MAY CAUSE SEVERE IRRITATION. ADMINISTER OXYGEN IF AVAILABLE. BRONCHODILATORS, EXPECTORANTS, AND ANTITUSSIVES MAY BE OF HELP.
ORAL: MAY CAUSE STRICTURE. IF LAVAGE IS PERFORMED, SUGGEST ENDOTRACHEAL AND/OR ESOPHAGOSCOPIC CONTROL.
GENERAL: CONSULT STANDARD LITERATURE. TREATMENT BASED ON THE SOUND JUDGMENT OF THE PHYSICIAN AND THE INDIVIDUAL REACTIONS OF THE PATIENT.

SECTION 7 SPECIAL HANDLING INFORMATION

VENTILATION: RECOMMEND CONTROL OF MISTS TO SUGGESTED GUIDE.

RESPIRATORY PROTECTION: NIOSH APPROVED RESPIRATORY PROTECTION REQUIRED IN ABSENCE OF PROPER ENVIRONMENTAL CONTROL. IF REQUIRED USE AN APPROVED DUST OR MIST RESPIRATOR.

PROTECTIVE CLOTHING: CLEAN, BODY-COVERING CLOTHING. IN ADDITION, IMPERVIOUS GLOVES, BOOTS, APRON, GAUNTLETS, FACE SHIELD AND A WIDE-HAT IN ADDITION TO RECOMMENDED EYE PROTECTION DEPENDING UPON THE EXTENT AND SEVERITY OF EXPOSURE LIKELY.

EYE PROTECTION: CHEMICAL WORKERS GOGGLES. FULL FACE SHIELD TO PROTECT FACE. MAINTAIN EYE WASH FOUNTAIN AND SAFETY SHOWER AT OR NEAR STATION.

SECTION 8 SPECIAL PRECAUTIONS AND ADDITIONAL INFORMATION

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORAGE: PREVENT EYE AND SKIN CONTACT. DO NOT BREATHE DUSTS OR MISTS. AVOID STORING NEXT TO STRONG ACIDS. DISSOLVING IN WATER AND OTHER SUBSTANCES GENERATES EXCESSIVE HEAT, SPATTERING, AND MISTS. SOLUTIONS OF GREATER THAN 45% ARE VISCOUS AND VERY SLIPPERY.

ADDITIONAL INFORMATION: REVISIONS 11/7/79 -- CONSISTENCY PROGRAM - ALL SECTIONS CHANGED SLIGHTLY.

LAST PAGE

CONSULT THE DOW CHEMICAL COMPANY FOR FURTHER INFORMATION.

ANILINE OIL (LIQUID)

DUPONT

MATERIAL SAFETY DATA SHEET

IDENTIFICATION

NAME
Aniline

SYNONYMS
Aniline Oil; Aminobenzene; Phenylamine

CAS NAME
Benzenamine

MANUFACTURER/DISTRIBUTOR
E. I. du Pont de Nemours & Co. (Inc.)

ADDRESS
Wilmington, DE 19898

CHEMICAL FAMILY
Aromatic Amine

FORMULA
$C_6H_5NH_2$

CAS REGISTRY NO.
62-53-3

PRODUCT INFORMATION PHONE
(800) 441-9442

MEDICAL EMERGENCY PHONE
(800) 441-3637

TRANSPORTATION EMERGENCY PHONE
CHEMTREC (800) 424-9300

PHYSICAL DATA

BOILING POINT, 760 mm Hg
184.4°C (364°F)

SPECIFIC GRAVITY
1.02

VAPOR DENSITY
3.22 (Air=1)

pH INFORMATION
Weak Base

FORM
Liquid

COLOR
Colorless when freshly distilled. Darkens to yellow to brown on exposure to light and air.

MELTING POINT
-6°C (21°F)

VAPOR PRESSURE
1.0 mmHg at 34.8°C (94.6°F)

SOLUBILITY IN WATER
3.6% at 18°C (64°F)

EVAPORATION RATE (BUTYL ACETATE=1)
<1

APPEARANCE
Oily

ODOR
Sweet, Amine-like

HAZARDOUS COMPONENTS

MATERIAL(S)	APPROXIMATE %
Aniline	100

HAZARDOUS REACTIVITY

INSTABILITY
Stable at normal temperatures and conditions of storage.

INCOMPATIBILITY
Strong oxidizing agents including nitric acid, perchloric acid, ozone, sodium or potassium peroxide, etc., may cause aniline to burn spontaneously.

DECOMPOSITION
Hexachloromelamine and trichloromelamine react violently with aniline and if brought together in confined conditions, will explode or catch fire and emit toxic fumes.

POLYMERIZATION
Will not occur.

FIRE AND EXPLOSION DATA

FLASH POINT 70°C (158°F) METHOD TCC

AUTOIGNITION TEMPERATURE
615°C (1139°F)

FLAMMABLE LIMITS IN AIR, % BY VOL.
LOWER 1.3
UPPER 11.0

AUTODECOMPOSITION TEMPERATURE
Not available

FIRE AND EXPLOSION HAZARDS
OSHA Class III A Combustible Liquid. Water and hot aniline may produce steam - spattering toxic aniline. Poisonous aniline vapors are given off at high temperatures and can form explosive mixtures in air.

EXTINGUISHING MEDIA
Small fires: Dry chemical, carbon dioxide (CO_2).
Large fires: Water spray, fog, or "Alochol" foam.

SPECIAL FIRE FIGHTING INSTRUCTIONS
Isolate hazard and evacuate area. Stay upwind; avoid smoke and fumes. Fight fire from maximum distance. Wear full protective clothing with positive pressure breathing apparatus. Use water spray to cool containers. Run-off water from fire control may cause pollution.

HEALTH HAZARD INFORMATION

PRINCIPAL HEALTH HAZARDS (Including Significant Routes, Effects, Symptoms of Over-Exposure, and Medical Conditions Aggravated by Exposure)

May be fatal if swallowed, inhaled, or absorbed through skin. Causes cyanosis. Causes irritation. May cause cancer - based on tests with laboratory animals.

Inhalation 4-hour LC50: 839 ppm in rats
Skin absorption LD50: 840 mg/kg in rabbits
Oral LD50: 440 mg/kg in rats

The compound is an eye and skin irritant. Toxic effects described in animals from exposure include methemoglobinemia; and liver, spleen, and bone marrow effects. Tests in bacterial or mammalian cell cultures demonstrate no mutagenic activity. Tests in animals demonstrate no embryotoxic activity.

In two separate chronic studies in rats, aniline was shown to produce an increased incidence of splenic tumors. There was no evidence of compound induced carcinogenicity in mice. Du Pont concludes that a 2 ppm airborne exposure limit and the prevention of skin contact provide a substantial margin of safety from the carcinogenic dose in rats, and would prevent any toxic effects due to methemoglobinemia.

Human health effects of overexposure may initially include: nonspecific discomfort, such as nausea, headache, or weakness; temporary nervous system depression with anaesthetic effects such as dizziness, headache, and confusion. Higher exposures may lead to these effects: reduction of the blood's oxygen carrying capacity with cyanosis (bluish discloration), weakness, or shortness of breath by formation of methemoglobin, abnormal liver function as detected by laboratory tests; abnormal blood forming system function with anemia; red blood cell destruction; and nervous system effects such as incoordination, and loss of consciousness. Skin permeation can occur in amounts capable of producing effects of systemic toxicity. There are no reports of human sensitization. Epidemiologic studies do not demonstrate a significant risk of human cancer from exposure to this compound. Individuals with preexisting diseases of the central nervous system, cardiovascular system, liver, or bone marrow may have increased susceptibility to the toxicity of excessive exposures.

CARCINOGENICITY

Not listed as a carcinogen by IARC, NTP, OSHA, or ACGIH. For information from Du Pont, see the "Principle Health Hazards" section.

EXPOSURE LIMITS (PEL (OSHA), TLV (ACGIH), AEL (DU PONT), ETC.)

OSHA 8-hour Time Weighted Average TWA = 5ppm; 19 mg/m^3. ACGIH TLV®-TWA = 2 ppm; 10 mg/m^3. Both of these limits carry a "skin" notation indicating that aniline liquid and vapor are capable of penetrating the skin. Control of inhalation alone may not be sufficient to prevent absorption of an excessive dose. Du Pont recommends that the ACGIH limit be observed when aniline is used.

SAFETY PRECAUTIONS

Do not breathe vapor.
Do not get in eyes, on skin, on clothing.
Wash thoroughly after handling.

FIRST AID

If swallowed, induce vomiting immediately by giving two glasses of water and sticking finger down throat. Call a physician. Never give anything by mouth to an unconscious person.

If inhaled, remove to fresh air immediately. If not breathing, give artificial respiration, preferably mouth-to-mouth. If breathing is difficult, give oxygen. Call a physician.

In case of contact, immediately flush eyes or skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes. Call a physician. Wash clothing before reuse and discard contaminated shoes.

NOTE TO PHYSICIAN

Absorption of this product into the body leads to the formation of methemoglobin which, in sufficient concentration, causes cyanosis. In case of skin absorption, symptoms may be delayed. Since reversion to methemoglobin to hemoglobin occurs spontaneously after termination of exposure, moderate degrees of cyanosis need be treated only by supportive measures such as bed rest and oxygen inhalation. Thorough cleansing of the entire contaminated area of the body including scalp and nails is of utmost importance. If cyanosis is severe, intravenous injection of methylene blue, 1 mg/kg of body weight, may be of value. Cyanocobalamin (Vitamin B-12), 1 mg intramuscularly, will speed recovery. Intravenous fluids and blood transfusions may be indicated in very severe exposures.

PROTECTION INFORMATION

GENERALLY APPLICABLE CONTROL MEASURES

Use in a totally closed system. Good ventilation should be provided to keep vapor concentrations below the exposure limits.

PERSONAL PROTECTIVE EQUIPMENT

Have available and wear as appropriate: chemical splash goggles; rubber gauntlet gloves, boots, and apron; hard hat with brim; full length face shield; complete rubber suit with hood and breathing air supply.

DISPOSAL INFORMATION

AQUATIC TOXICITY

The compound is moderately toxic (96-hr. LC50 = 1 - 50 mg/L). The 96-hr. LC50, large mouth bass embryos/larvae, is 12-33 mg/L.

SPILL, LEAK OR RELEASE

Evacuate area and keep personnel upwind and far removed from spill. Contain spill with sand or earth dam. Soak up with sand, earth, or other noncombustible absorbant and transfer to a covered metal container for disposal. Flush area with water; water spray may be used to control and disperse vapors. Comply with Federal, State, and local regulations on reporting releases.

WASTE DISPOSAL

Comply with Federal, State, and local regulations. If approved, may be incinerated or transferred to a licensed disposal contractor. Very dilute solutions are biodegradable by specially acclimated bacteria. If regulations permit, can be placed in a licensed hazardous waste landfill if on an approved absorbant.

SHIPPING INFORMATION

DOT (172.101)

PROPER SHIPPING NAME
Aniline Oil, Liquid

HAZARD CLASS
Poison B

UN NO. 1547

DOT LABEL(S) Poison

DOT PLACARD (TT/TC) Poison

IMO (PAGE 8151)

PROPER SHIPPING NAME
Aniline Oil

HAZARD CLASS 6.1

UN NO. 1547

IMO LABEL(S)
Poison

DOT/IMO (172.102)

PROPER SHIPPING NAME
Aniline Oil

HAZARD CLASS
Poison B, 6.1

UN NO. 1547

FLASH POINT 70°C (158°F)

IATA/ICAO

PROPER SHIPPING NAME
Aniline

HAZARD CLASS 6.1

UN NO. 1547

LABEL(S)
Poison

PACKAGING GROUP NO. II

OTHER INFORMATION

REPORTABLE QUANTITY 1000 lb./454 kg

SHIPPING CONTAINERS
Tank cars, tank trucks, and samples in 1 pt., 1 qt., 1 gal. cans

STORAGE CONDITIONS
Outside storage preferred, or well ventilated inside storage.

Keep containers tightly closed. Keep away from heat, sparks, or flame. Do not store with strong oxidizers, flammable, or other corrosive materials.

ADDITIONAL INFORMATION AND REFERENCES

For further information, see Du Pont Aniline Properties, Uses, Storage, and Handling Bulletin.

DATE OF LATEST REVISION/REVIEW: 8/85
PERSON RESPONSIBLE FOR MSDS: J. C. Watts, Du Pont Co., C&P Dept., Chestnut Run, Wilmington, DE 19898, (302) 999-4946

AMMONIA, AQUA (AMMONIUM HYDROXIDE)

Form Approved
Budget Bureau No. 44-R1387
Approval Expires April 30, 1971

Rev. 1969

U.S. DEPARTMENT OF LABOR

WORKPLACE STANDARDS ADMINISTRATION

Bureau of Labor Standards

000-1134-100-05

MATERIAL SAFETY DATA SHEET

SECTION I

MANUFACTURER'S NAME: JONES CHEMICALS, INC.	EMERGENCY TELEPHONE NO.: (716)-538-2311
ADDRESS (Number, Street, City, State, and ZIP Code): 100 Sunny Sol Blvd., Caledonia, NY 14423	
CHEMICAL NAME AND SYNONYMS: Ammonium Hydroxide Solution	TRADE NAME AND SYNONYMS: Aqua Ammonia
CHEMICAL FAMILY	FORMULA: $NH_4OH + H_2O$

SECTION II HAZARDOUS INGREDIENTS

PAINTS, PRESERVATIVES, & SOLVENTS	%	TLV (Units)	ALLOYS AND METALLIC COATINGS	%	TLV (Units)
PIGMENTS			BASE METAL		
CATALYST			ALLOYS		
VEHICLE			METALLIC COATINGS		
SOLVENTS			FILLER METAL PLUS COATING OR CORE FLUX		
ADDITIVES			OTHERS		
OTHERS					

HAZARDOUS MIXTURES OF OTHER LIQUIDS, SOLIDS, OR GASES	%	TLV (Units)
Ammonia Gas (dissolved in H_2O to form NH_4OH) % wt.	29	50ppm

SECTION III PHYSICAL DATA

BOILING POINT (°F.)	Ammonia volatile above 78°F Mixture boils at 212°F	SPECIFIC GRAVITY (H_2O=1)	0.8974
VAPOR PRESSURE (mm Hg.)	584	PERCENT VOLATILE BY VOLUME (%)	29 wt %
VAPOR DENSITY (AIR=1)	Less than 1	EVAPORATION RATE (Ether = 1)	less than 1
SOLUBILITY IN WATER	Complete		
APPEARANCE AND ODOR	Colorless liquid, pungent odor		

SECTION IV FIRE AND EXPLOSION HAZARD DATA

FLASH POINT (Method used)	None	FLAMMABLE LIMITS: Ammonia gas	Lel: 16 / Uel: 25
EXTINGUISHING MEDIA	This product non-combustible		
SPECIAL FIRE FIGHTING PROCEDURES	None		
UNUSUAL FIRE AND EXPLOSION HAZARDS	Ammonium Hydroxide non-combustible and non-explosive, but Ammonia vapors released from solution can form an explosive mixture with air as described above.		

SECTION V HEALTH HAZARD DATA

THRESHOLD LIMIT VALUE: See Section II

EFFECTS OF OVEREXPOSURE: Irritation of eyes and throat.

EMERGENCY AND FIRST AID PROCEDURES: Flush contacted area with water for at least 15 minutes.

Consult physician.

SECTION VI REACTIVITY DATA

			CONDITIONS TO AVOID
STABILITY	UNSTABLE		
	STABLE	X	

INCOMPATABILITY (Materials to avoid): Strong acids

HAZARDOUS DECOMPOSITION PRODUCTS

			CONDITIONS TO AVOID
HAZARDOUS POLYMERIZATION	MAY OCCUR		
	WILL NOT OCCUR	X	

SECTION VII SPILL OR LEAK PROCEDURES

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED: Avoid physical contact and inhalation of vapors. Dilute with large quantities of water.

WASTE DISPOSAL METHOD: Diluted solution can be disposed of as waste water unless prohibited by law.

SECTION VIII SPECIAL PROTECTION INFORMATION

RESPIRATORY PROTECTION (Specify type): Not needed under normal conditions

VENTILATION	LOCAL EXHAUST	Sufficient to keep NH_3 concentration at less than 50 PPM.	SPECIAL
	MECHANICAL (General)		OTHER

PROTECTIVE GLOVES: Rubber Gloves

EYE PROTECTION: Gas-tight goggles

OTHER PROTECTIVE EQUIPMENT

SECTION IX SPECIAL PRECAUTIONS

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORING: Keep away from strong acids. Refer to MCA Safety Data Sheet SD-13 for more detailed information concerning safe handling and use of this product.

OTHER PRECAUTIONS

METHANOL (METHYL ALCOHOL)

MATERIAL SAFETY DATA SHEET

TENNECO POLYMERS, INC.
P. O. BOX 2511
HOUSTON, TX 77001

MATERIAL Methanol

MSDS NO. 110 DATE 4/84

I. MATERIAL IDENTIFICATION

MATERIAL / TRADE NAME Methanol

SYNONYMS Methyl Alcohol, Wood Alcohol, Carbinol

CHEMICAL FAMILY / FORMULA Alcohols/CH_3OH

CAS NO. 67-56-1

24 HOUR EMERGENCY TELEPHONE
TENNECO 713 479-3411
CHEMTREC 800 424-9300

HAZARD RATING*

1	HEALTH
3	FIRE
0	REACTIVITY

0 LEAST 3 HIGH
1 SLIGHT 4 EXTREME
2 MODERATE * NFPA 704

II. INGREDIENTS

COMPOSITION	%	TOXICITY DATA
Methyl Alcohol	99.9	8 hr TWA 200ppm (260mg/m^3) (skin) Human Eye-5ppm Oral-LDLo 340mg/kg Inhalation-TCLo 86000mg/m^3 (irratator) Rat - Oral LD_{50} 13gm/kg

III. PHYSICAL DATA

BOILING POINT, 760mm/Hg	148°F (64.5°C)	SOLUBILITY IN H_2O, % BY WEIGHT	Totally miscible
SPECIFIC GRAVITY, H_2O = 1	0.791	EVAPORATION RATE, BUTAL ACETATE = 1	4.6
VAPOR PRESSURE, mm/Hg	96 @ 68°F (20°C)	Molecular Weight	32.04
VAPOR DENSITY, AIR = 1	1.11	Melting Point	-144°F (-97.8°C)
VOLATILES, % BY VOLUME	100		

APPEARANCE AND ODOR Clear, colorless liquid with characteristic alcohol odor. Less pure grades may have a pungent, oily odor.

IV FIRE AND EXPLOSION DATA

FLASH POINT AND TEST METHOD	AUTO IGNITION TEMPERATURE	FLAMMABILITY LIMITS IN AIR, % BY VOLUME
54°F (12.2°C) TCC	867°F (464°C)	LOWER 6 UPPER 36.5

EXINGUISHING MEDIA Dry chemical, alcohol type foam, CO_2. Water may be ineffective. Use water spray to cool fire exposed containers. Use alcohol resistant foam to extinguish large fires or to blanket spill to reduce vapors.

SPECIAL FIRE FIGHTING PROCEDURES Class IB flammable liquid. Avoid water streams which may splash and spread flamming liquid. Vapors are heavier than air and may flow along surfaces to distant ignition sources and flash back. Fire fighters should use self-contained breathing equipment and protective clothing for fires in enclosed areas.

UNUSUAL FIRE AND EXPLOSION HAZARDS Reacts violently to oxidizers. Keep away from heat, sources of ignition. Burns with a clear, almost invisible flame, especially hard to see in strong sunlight.

MSDS NO. 110	MATERIAL Methanol

V. REACTIVITY DATA

STABILITY	HAZARDOUS POLYMERIZATION
[X] STABLE [ ] UNSTABLE	[ ] MAY OCCUR [X] WILL NOT OCCUR

CONDITIONS AND MATERIALS TO AVOID

Avoid strong oxidizing agents, excessive heat, sources of ignition.

HAZARDOUS DECOMPOSITION PRODUCTS

carbon monoxide, carbon dioxide

VI. OCCUPATIONAL EXPOSURE LIMITS

OSHA TLV - 200ppm 8 hr TWA (260mg/m^3) Skin
ACGIH(1984)ABOS "Skin" notation

VII. HEALTH INFORMATION

Methanol is a poisonous chemical that can affect the body through inhalation, skin absorption or ingestion.

Inhalation causes dizziness, nausea, visual impairment, respiratory failure, muscular incoordination, and narcosis.

Ingestion can produce blindness, dizziness, headache and in amounts of 100-250ml can be fatal.

Skin contact causes irritation, dryness, dermatitis and erythema. Eye contact causes irritation.

Toxic effects from repeated over exposure to methanol are accumulative and effect the central nervous system, especially the optic nerve. These symptons may linger for several days after exposures.

VII. EMERGENCY AND FIRST AID PROCEDURES

Skin - wash with soap and water immediately after contact. Remove contaminated clothing immediately. Launder before reuse.

Eyes - Flush with large amounts of water for 15 minutes, getting under eyelids. Contact physician if irritation persists.

Inhalation - remove to fresh air. Restore breathing if necessary. Administer oxygen if breathing difficulty persists and contact physician for advice.

Ingestion - Drink large amounts of water, milk or sodium bicarbonate to dilute material in stomach. Induce vomiting if victim is conscious. Consult physician for additional advice and treatment.

MSDS NO.	MATERIAL
110	Methanol

IX. EMPLOYEE PROTECTION

RESPIRATORY PROTECTION

Provide adequate ventilation or exhaust to meet TLV requirements. Air supplied or self-contained breathing equipment recommended for exposures above TLV.

PROTECTIVE CLOTHING

Rubber gloves and rubber protective aprons or clothing required to prevent skin contact. Goggles or face shield should be used to protect face and eyes from splashing.

OTHER PROTECTIVE MEASURES

Eye wash and safety shower should be provided in area of use.

X. ENVIRONMENTAL PROTECTION

SPILL CLEAN-UP PROCEDURE

Eliminate all ignition sources. Stop spill or leak if it can be done safely. Contain spill to smallest area possible. Use absorbent materials to soak up small spills. Larger spills should be recovered for reuse or disposal. Spills in critical areas can be diluted with water to reduce fire hazard during cleanup.

Do not allow to material to enter sewers, drains or waterways.

WASTE DISPOSAL

Waste materials should be disposed of by a licensed solvent waste disposal company.

Federal, state and local regulations msut be followed.

ENVIRONMENTAL HAZARDS

Aquatic toxicity rating - TLm 96: over 1000 ppm.

XI. SPECIAL PRECAUTIONS

Store in closed containers in cool place.

No smoking allowed in areas of use or storage.

Use explosion-proof electrical fixtures.

Containers should be electrically grounded/bonded during material transfer to prevent static spark.

Corrosive to lead and aluminum.

MSDS NO. 110 | MATERIAL Methanol

XII. TRANSPORTATION REQUIREMENTS

DOT SHIPPING NAME - Methanol or methyl alcohol

DOT I.D. NO. - UN1230

DOT CLASSIFICATION - Flammable liquid

UN HAZARD CLASS - UN1230

IMCO class - 3.2

XIII. OTHER REGULATORY CONTROLS

None determined

TENNECO POLYMERS INC.
P. O. BOX 2511
HOUSTON, TX 77001
A TENNECO COMPANY

DATE PREPARED August, 1985

APPROVED BY E. Wayne Drusch
TENNECO OIL PROCESSING & MARKETING
(713) 757-3113

ETHANOL (ETHYL ALCOHOL)

Grand

U.S. DEPARTMENT OF LABOR
Occupational Safety and Health Administration

MATERIAL SAFETY DATA SHEET

2/25/85

Required under USDL Safety and Health Regulations for Ship Repairing, Shipbuilding, and Shipbreaking (29 CFR 1915, 1916, 1917)

SECTION I

Manufacturer's Name: PUBLICKER INDUSTRIES INC. 777 W. Putnam Ave. Greenwich, Con. 06830
Emergency Phone: (215) 334-9300 (Phila.)

Address: PLANT: 3223 S. Delaware Avenue, Phila., PA 19148

CHEMICAL NAME AND SYNONYMS	TRADE NAME AND SYNONYMS
SPECIALLY DENATURED ALCOHOL, FORMULA 29	Alcohol #29
CHEMICAL FAMILY: Alcohol Aldehyde	FORMULA: CH_3CH_2OH; CH_3CHO

SECTION II HAZARDOUS INGREDIENTS

PAINTS, PRESERVATIVES, & SOLVENTS	%	TLV (Units)	ALLOYS AND METALLIC COATINGS	%	TLV (Units)
PIGMENTS			BASE METAL		
CATALYST			ALLOYS		
VEHICLE ETHYL ALCOHOL			METALLIC COATINGS		
SOLVENTS			FILLER METAL PLUS COATING OR CORE FLUX		
ADDITIVES ANILINE			OTHERS		
OTHERS ETHYL ACETATE					

HAZARDOUS MIXTURES OF OTHER LIQUIDS, SOLIDS, OR GASES	%	TLV (Units)
Determination of the physical data for denatured alcohol has not been completed yet. Use data for Annydrous-		
Ethyl alcohol given below.		

SECTION III PHYSICAL DATA

BOILING POINT (F.)	173°	SPECIFIC GRAVITY (H_2O=1)	0.8160
VAPOR PRESSURE (mm Hg.) @ 68°	44	PERCENT VOLATILE BY VOLUME (%)	100
VAPOR DENSITY (AIR=1)	1.59	EVAPORATION RATE (_____ =1)	
SOLUBILITY IN WATER	complete		
APPEARANCE AND ODOR	Clear, colorless liquid: characteristic odor - pungent		

SECTION IV FIRE AND EXPLOSION HAZARD DATA

FLASH POINT (Method used)		FLAMMABLE LIMITS	LEL	UEL
Closed cup	48°F		4.3	19

EXTINGUISHING MEDIA

SPECIAL FIRE FIGHTING PROCEDURES
CO_2 or dry chemical extinguisher: large spill, use water spray or alcohol foam

Water in straight hose stream will scatter & spread fire and should not be used.

UNUSUAL FIRE AND EXPLOSION HAZARDS
Keep away from heat, spark, and open flame. Keep container closed and in

ventilated area. All electrical equipment must be explosion-proof.

SECTION V HEALTH HAZARD DATA

THRESHOLD LIMIT VALUE: 200 PPM - Daily 8-hour exposure

EFFECTS OF OVEREXPOSURE: Irritation of eyes, nose and throat; Dangerous to eyes

EMERGENCY AND FIRST AID PROCEDURES: Avoid contacting liquid with eyes, skin, clothing. Flush with water in case of contact. Avoid inhalation of vapor. If breathing affected by vapor inhalation, remove to fresh air. Call Physician. Administer oxygen. SPEED IS OF PRIMARY IMPORTANCE.

SECTION VI REACTIVITY DATA

STABILITY	UNSTABLE		CONDITIONS TO AVOID
	STABLE	X	

INCOMPATABILITY *(Materials to avoid)*: OXIDIZING MATERIALS

HAZARDOUS DECOMPOSITION PRODUCTS: CARBON MONOXIDE

HAZARDOUS POLYMERIZATION	MAY OCCUR		CONDITIONS TO AVOID
	WILL NOT OCCUR	X	

SECTION VII SPILL OR LEAK PROCEDURES

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED: Large spills on ground resulting from container rupture or accident, if not contained by diking, should be generously diluted with water spray. Avoid flushing directly into stream or sewer. Contained spills should be recovered to the extent possible for proper waste disposal.

WASTE DISPOSAL METHOD: If custom disposal service not available, large quantities may be burned in a combustion chamber by a competent Engineer. Small quantities may be poured upon sand or dirt contained by a shallow pan and cautiously burned, local codes permitting.

SECTION VIII SPECIAL PROTECTION INFORMATION

RESPIRATORY PROTECTION *(Specify type)*: Where high concentration of vapor exists, all-purpose canister recommended.

VENTILATION	LOCAL EXHAUST: From floor and low spaces	SPECIAL: Prefer explosion windows
	MECHANICAL *(General)*: Floor mounted fan or blower	OTHER: Explosion-proof equipment

PROTECTIVE GLOVES: Rubber or other approved material	EYE PROTECTION: CHEMICAL SAFETY GOGGLES

OTHER PROTECTIVE EQUIPMENT: RUBBER GLOVES, APRONS, BOOTS, FACE SHIELD

SECTION IX SPECIAL PRECAUTIONS

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORING: Follow State and Municipal Codes as well as requirements of Insurance Carrier. Consult CHEMICAL SAFETY GUIDES, published by M.C.A.

OTHER PRECAUTIONS: Employees must be well trained in proper handling techniques. Consult pertinent bulletins published by M.C.A. on MATERIALS HANDLING.

CYANIDE (SODIUM)

ICI Americas Inc.

MATERIAL SAFETY DATA SHEET

FOR HAZARDOUS PRODUCTS USED IN PLACES OF EMPLOYMENT

#M2945-D

section 1 name & product

manufacturer's name		emergency phone no. (24 hours)
(a) ICI Americas Inc.		(b) 302/575-3000
street address	for latest data, consult manufacturer.	date this form written
(c) Concord Pike & Murphy Rd.		(d) 3/31/81
city, state, zip code		signature of certifying company official
(e) Wilmington, DE 19897		(f)

chemical name, trade name, and synonyms

(g) SODIUM CYANIDE

formula of primary component(s)

(h) Sodium Cyanide

section 2 ingredients	%	TLV (units)
CAS #000143339		
Sodium Cyanide (NaCN) *Expressed as CN. 1980 ACGIH TLV Tables	100	5 mg/M^3 (skin)
DOT Shipping Description: Sodium Cyanide, Solid, Poison B, 6.1/UN #1689 Aqueous solution strongly alkaline, decomposes rapidly on standing		
(not specification values)		

section 3 physical data

2 boiling point (°F.)	300.2° or (149°C)	6 specific gravity	Not applicable
3 vapor pressure (mmHg at 20°C)	1.0 at 817°C	7 % volatile by volume	Not applicable
4 vapor density (air = 1)	Not applicable	8 color and odor	White, slight almond odor
5 solubility in water	Readily	9 physical state	Solid (granules, flakes, or eggs

section 4 fire and explosion hazard data

10 flash point (and method used): Not applicable

11 flammable limits (STP): L.F.L. Not applicable; U.F.L. Not applicable

12 extinguishing media: [XX] water fog [ ] foam [ ] alcohol foam [ ] CO_2 [ ] dry chemical [ ] other "~~Do Not Use~~"

13 special fire fighting protective equipment

Self contained breathing apparatus and complete protective clothing (rubber coat and gloves, boots and helmet).

14 unusual fire and explosion hazards

HCN gas has flash point of - 17.8°C (closed cup) or - 0.04°F. HCN produces an explosive mixture in air, if formed, eliminate ignition sources. Do not use carbon dioxide type extinguishers. See #18.

section 5 reactivity data

			16 conditions to avoid
15 stability	normal conditions	Yes	HCN gas is released in contact with acid, acid fumes, or moist air. (CO_2 from moist air may cause acid hydrolysis to form HCN.)
	fire conditions	Yes	See #18.

17 incompatibility (materials to avoid): [ ] water [XX] acid [ ] base [ ] corrosive [XX] oxidizing material Can react violently with oxidizing agents such as nitric acid, nitrate and peroxides. [XX] other Strong reducing agent

18 hazardous decomposition products

Reacts with acids to produce HCN gas. (TLV of HCN-C 10 ppm, skin, 1980 ACGIH Addition

19 hazardous polymerization			20 conditions to avoid
	may occur		
	will not occur	X	

Am 8269 Rev. 1/81

MATERIAL SAFETY DATA SHEET (continued) SODIUM CYANIDE

section 6 health hazard data

21 oral ingestion Oral ingestion of 1-2 mg/kg in man, as in a variety of experimental animals, is likely to cause death.

22 eye contact

Corrosive.

23 skin contact

Corrosive.

24 skin absorption

Can produce acute symptoms by skin absorption.

25 inhalation (TLV or suggested control figure)

5 mg/cum of air for cyanide expressed as CN. ACGIH TLV (1980)

26 effects of overexposure

At 270 ppm HCN is immediately fatal; at 181 ppm HCN is fatal after 10 min.

27 first aid procedures Speed is essential. Always have on hand a Cyanide First Aid Kit. Rescuers must wear eye, skin and respiratory protection. If inhaled, carry patient to fresh air, have him lie down. Remove contaminated clothing but keep patient warm. If breathing has stopped, use artificial respiration. (Do not use mouth-to-mouth method.) (See 27 opposite page for more first aid procedures.)

section 7 spill or leak procedures

28 steps to be taken in case material is released or spilled Sweep up spilled material and return to container or use immediately. Wear eye protection, protective clothing and respiratory protection during cleanup. Never flush this product into public sewers or drainage ditches.

29 disposal method

Spills can be covered with a strong calcium hypochlorite solution and then flushed away to a sanitary sewer with plenty of water. (See Section 36 for detoxifying procedure) In no case should cyanide waste come in contact with acid solutions.

section 8 special protection information Highly toxic hydrocyanic acid gas can be released.

30 ventilation	local exhaust	special
	Yes, at point of exposure to maintain workplace conc. below TLV.	
	mechanical (general)	other
	If needed	Recommend air monitoring. Local exhaust for HCN liberation

31 respiratory protection (specify type) If needed, use MSHA-NIOSH approved respirator for substance with TLV not less than 0.05 mg/M^3 for dusts. Caution, do not use respirators beyond their capabilities. (See 31 opposite page for more respiratory protection.)

32 protective clothing Rubber aprons and boots. Rubber gauntlets (dry) should be used. Wash hands after handling.

33 eye protection ☐ safety glasses with side shields ☒ chemical workers goggles ☐ gas tight goggles or equivalent ☒ other Full face shield, in addition, if in solutic and splashing possible.

34 other protective equipment ALL contact with skin and clothing should be avoided. Upgrade #32, if necessary. Recommend safety shower and eye wash station near exposure area.

section 9 special precautions or other comments

35 precautions to be taken in handling and storing Store in dry, cool ventilated areas. Keep containers closed when not in use. Do not store where NaCN will be exposed to acid or acid vapors liberated by spillage or leakage from other containers. Protect from reducing and oxidizing agents. Protect against physical damage. Handling: Some ammonia will accumulate in the drum headspace but will quickly dissipate upon opening the drum. (See 35 opposite page.)

36 other precautions NaCN is harmful to aquatic life in very low conc. Metal drums may corrode if they are stored for a long time in a damp place. Eating, smoking and drinking should not be permitted where cyanides are present. See 36 opposite page for further precautions.

37 references 1980 ACGIH TLV Tables; ICI Ltd. information sheet; MSDS or NL/TM-6981/VI, Oak Ridge Nat. Lab., Sept. 1979.

section 6 health hazard data

27 first aid procedures (continued)

Start treatment immediately with amyl nitrite pearl while calling a physician. Break an amyl nitrite pearl in a cloth and hold lightly under nose for 15 seconds. Repeat 5 times at about 15-second intervals. In case of contact, immediately flush contacted area, i.e. eyes or skin with plenty of water for at least 15 minutes and call a physician. If swallowed: Break an amyl nitrite pearl in a cloth and hold lightly under nose for 15 seconds. If patient is conscious, give emetic (drink 1 or 2 glasses of water and induce vomiting by touching back of throat with finger or blunt object) repeat until vomit is clear. Repeat inhalation of amyl nitrite 5 times at about 11-second intervals. Use artificial respiration (not mouth-to-mouth) if breathing has stopped. Never give anything by mouth to an unconscious person.

section 8 special protection information

31 respiratory protection (continued)

Should HCN be suspected of being released either through NaCN decomposition or contact with acids, supplied air with full face mask or self-contained breathing apparatus should be used for respiratory protection, if needed. At present, organic chemical cartridges will not afford respiratory protection for HCN.

section 9 special precautions or other comments

35 precautions to be taken in handling and storing (continued)

Open in well ventilated area and avoid inhalation of NH_3.

36 other precautions (continued)

Container Disposal:

Do not reuse, distribute, make available or furnish empty container except when refilled with the same product. Decontaminate any cyanide remaining in empty container.

a. Wear full protective clothing, eye protection, and respiratory protection during the detoxifying procedure.

b. Add hot water to dissolve and dilute residual cyanide.

c. Add dilute sodium hypochlorite to the container (ten liters of a sodium hypochlorite solution containing 14/15% available chlorine is necessary to destroy 1 Kg of 100% sodium cyanide.)

d. Stir mixture and allow to stand for 15 minutes.

e. Test with starch iodide paper to assure a pH of 11 or more which indicates an excess of sodium hypochlorite and is necessary for rapid detoxification.

f. Allow mixture to stand for another 30 minutes before pouring into a sanitary sewer.

g. Flush drum with water. After treating residue, destroy empty container by perforating or crushing and dispose of in accordance with local, state, and federal pollution guidelines.

h. Disposal of sodium cyanide waste and its containers are subject to the Resource Conservation and Recovery Act (RCRA), 40 CFR Part 261.33(e). The EPA Hazardous Waste Number for sodium cyanide is P-106.

CYANIDE (POTASSIUM)

DU PONT

MATERIAL SAFETY DATA SHEET

W. WITZLEBEN

JUL 20 1984

IDENTIFICATION

Name
Potassium Cyanide

Grade

Synonyms
Cyanide of Potassium

CAS Name
Potassium Cyanide

I.D. Nos./Codes
NIOSH Registry No: TS876000
Wiswesser Code: KACN

Manufacturer/Distributor
E. I. du Pont de Nemours & Co.(Inc.)

Address
Wilmington, DE 19898

Chemical Family
Alkali Metal Cyanide

Formula
KCN

CAS Registry No.
151-50-8

Du Pont Registry No.

Product Information Phone
(302)774-2421

Transportation Emergency Phone
Chemtrec (800)424-9300
Du Pont Cyanide HOTLINE
(For emergencies ONLY)
(901)357-1546

PHYSICAL DATA

Boiling Point, 760 mm Hg
Not available

Specific Gravity
1.52

Vapor Density
Not volatile

% Volatiles by Vol.
0

Melting Point
634.5°C (1174°F)

Vapor Pressure
Negligible

Solubility in Water
41.7% at 25°C (77°F)

Evaporation Rate (Butyl Acetate =1)

Form	Appearance	Color	Odor
Solid	Crystalline	White	None (but can have ammonia or HCN odor if damp)

pH Information
10.8 in ~saturated aqueous solution

Octanol/Water Partition Coefficient

E-66391 Date: 4/84

HAZARDOUS COMPONENTS

Material(s)	Approximate %
Potassium Cyanide	100

HAZARDOUS REACTIVITY

Instability
Very stable when dry.

Incompatibility
Large amounts of highly toxic, flammable hydrogen cyanide (HCN) gas will be evolved from contact with acids. Reacts violently with strong oxidizing agents. Water or weak alkaline solution can produce dangerous amounts of HCN in confined areas.

Decomposition
Moisture will cause slow decomposition, releasing poisonous HCN and ammonia gases.

Polymerization
Will not occur.

FIRE AND EXPLOSION DATA

Flash Point Method Autoignition Temperature
Will not burn

Flammable Limits in Air, % by Vol.
Lower
Upper Will not burn

Fire and Explosion Hazards
Will not burn. Potassium cyanide will not be destroyed in an ordinary fire involving combustible materials such as paper and wood.

Extinguishing Media
Water on fires near potassium cyanide. Do not use carbon dioxide (CO_2) which will react with potassium cyanide to produce hydrogen cyanide if moisture is present.

Special Fire Fighting Instructions
Potassium cyanide dissolves readily in water, therefore cyanide solution run-off may occur if containers are opened. Run-off should be contained to avoid environmental or safety problems. Contained cyanide solution can be detoxified with hypochlorite.

E-66391 Date: 4/84

HEALTH HAZARD INFORMATION

Exposure Limits

OSHA 8-hour Time Weighted Average (TWA) and ACGIH TLV® TWA=5 mg/m^3, as CN. Both carry a "skin" notation indicating that cyanide may penetrate the skin (especially if broken). Control of vapor or dust inhalation alone may not be sufficient to prevent absorption of an excessive dose.

Significant Routes and Effects of Exposure

May be fatal if inhaled, absorbed through the skin or swallowed. Contact with acid rapidly liberates dangerous amounts of HCN gas. Contact with water or weak alkalies can liberate smaller but still dangerous amounts of HCN gas. Causes eye burns. May irritate skin.

Safety Precautions

Do not breathe dust or HCN gas. Do not get in eyes; avoid contact with skin or clothing. Do not carry foodstuffs, beverages, or tobacco where contamination with cyanide is possible. Wash thoroughly after handling. Wash contaminated clothing before reuse.

First Aid and Medical Treatment

Actions to be taken in case of cyanide exposure should be planned and practiced before beginning work with cyanides (in most cases, cyanide poisoning causes a deceptively healthy pink to red skin color; however, if a physical injury or lack of oxygen is involved, the skin color may be bluish).

Treatment for cyanide poisoning can be provided in two ways, "First Aid" and "Medical Treatment". Both require immediate action to prevent further harm or death. First aid using amyl nitrite and oxygen is generally given by a layman before medical help arrives. Medical treatment involves intravenous injections and must be administered by qualified medical personnel. Even if a doctor or nurse is present, the need for fast treatment dictates using first aid treatment with amyl nitrite and oxygen while medical treatment materials for intravenous injection are being prepared. Experience shows that first aid given promptly is usually the only treatment needed.

Medical treatment is given if the victim does not respond to first aid. It provides a larger quantity of antidote including sodium thiosulfate to chemically destroy cyanide in the body. However, even under optimum conditions, amyl nitrite can be administered faster and should be used even if medical treatment follows.

Amyl nitrite and medical treatment kits for cyanide poisoning are available, with doctor's prescription, from pharmacies.

A. FIRST AID - DIRECTIONS FOR GIVING AMYL NITRITE ANTIDOTE AND OXYGEN

1. CONSCIOUS: For inhalation and/or absorption if the victim is alert, oxygen may be all that is needed. But if he is not fully conscious or shows signs of poisoning, follow paragraph A-2 below. For swallowing, see below paragraph C, FIRST AID - SWALLOWING CYANIDE.

2. UNCONSCIOUS BUT BREATHING: Break an amyl nitrite ampule in a cloth and hold lightly under the victim's nose for 15 seconds, then take away for 15 seconds. Repeat 5-6 times. If necessary, use a fresh ampule every 3 minutes until the victim regains consciousness (usually 1-4 ampules). Give oxygen to aid recovery.

3. NOT BREATHING:
   a. Give artificial respiration, preferably with an oxygen resuscitator. Give amyl nitrite antidote by placing a broken ampule inside the resuscitator face piece, being careful that the ampule does not enter the victim's mouth and cause choking.
   b. If using manual artificial respiration, give amyl nitrite antidote as in paragraph A-2 above except keep the first amyl nitrite ampule under the nose with replacement every 3 minutes.

4. AMYL NITRITE NOTES:
   a. Amyl nitrite is highly volatile and flammable; do not smoke or use around source of ignition.
   b. If treating poison victim in a windy or drafty area, provide something - a rag, shirt, wall, drum, cupped hands, etc. - to prevent the amyl nitrite vapors from being blown away. Keep the ampule upwind from the nose. The objective is to get amyl nitrite into the victim's lungs.
   c. Rescuers should avoid amyl nitrite inhalation so they won't become dizzy and lose competence.
   d. Do not overuse. Amyl nitrite dilates the blood vessels and lowers blood pressure. While excessive use might put the victim in shock, this has not occurred in practice at Du Pont plants and we are not aware of any death from treatment with amyl nitrite. (See below paragraph E, MEDICAL TREATMENT).

B. FIRST AID - INHALATION OF CYANIDE - Carry victim to fresh air. Lay victim down. Administer amyl nitrite antidote and oxygen (Paragraph A). Remove contaminated clothing. Keep patient quiet and warm. Call a physician.

C. FIRST AID - SWALLOWING CYANIDE

1. CONSCIOUS: Immediately give patient one pint of 1% sodium thiosulfate solution (or plain water) by mouth and induce vomiting with finger in throat. Repeat until vomit fluid is clear. Never give anything by mouth to an unconscious person. Call a physician.

2. UNCONSCIOUS: Follow first aid procedure as in paragraphs A-2 and A-3 (and/or medical treatment in paragraph E) and call a physician. If the victim revives, then proceed with paragraph C-1.

D. FIRST AID - SKIN OR EYE CONTACT (SKIN ABSORPTION)

1. EYE CONTACT: Immediately flush eyes with plenty of water, remove contaminated clothing, and keep victim quiet and warm. Call a physician.

2. SKIN CONTACT: Wash skin to remove the cyanide while removing contaminated clothing, including shoes. Do not delay. Skin absorption can occur from cyanide dust, solutions, or HCN vapor. Absorption is slower than inhalation, usually measured in minutes compared to seconds for inhalation.

   Follow paragraph A if treatment is needed, but even severe skin contact may not require treatment if 1) no inhalation or swallowing has occurred and 2) the cyanide is promptly washed from the skin and contaminated clothing removed. If skin contact is prolonged, HCN poisoning may occur with nausea, unconsciousness, and then death possible if source of cyanide intake is not removed and treatment provided. Even after washing the skin, the victim should be watched for at least 1-2 hours because absorbed cyanide can continue to work into the bloodstream. Wash clothing before reuse and destroy contaminated shoes.

E. MEDICAL TREATMENT

Medical treatment is normally provided by a physician, but might be provided by a professionally trained "qualified medical person" where a need exists and where state and local laws permit.

While preparing for sodium nitrite and sodium thiosulfate injections, use amyl nitrite and oxygen as outlined in paragraph A. When ready and if the victim is not responding to first aid, first inject the solution of sodium nitrite (10 mL of a 3% solution) intravenously at the rate of 2.5 mL/minute, then immediately inject the sodium thiosulfate (50 mL of a 25% solution) at the same rate, taking care to avoid extravasation.

This is a fairly lengthy treatment (24 minutes) since a total of 10 + 50, or 60 mL is injected at a rate of 2.5 mL/minute. Consideration should be given to the size and condition of the victim as treatment is proceeding. It is not essential that full quantities be given just because treatment was started. Injections can be stopped at any point if recovery is evident.

Watch patient continuously for 24-48 hours if cyanide exposure was severe. If there is any return of symptoms during this period, repeat this treatment using one-half the amounts of sodium nitrite and sodium thiosulfate solutions. Caution should be used to avoid overuse of medical treatment chemicals as the prescribed dose is about 1/3 the lethal dose for an average individual.

If signs of excessive methemoglobinemia develop (i.e., blue skin and mucous membranes, vomiting, shock and coma), 1% methylene blue solution should be given intravenously. A total dose of 1 to 2 mg/kg of body weight should be administered over a period of five to ten minutes and should be repeated in one hour if necessary. In addition, oxygen inhalation will be helpful. Transfusion of whole fresh blood may be considered if there has been mechanical injury with external or internal bleeding and simultaneous cyanide exposure.

Du Pont's experience in treating cyanide poison cases is that first aid procedures using amyl nitrite and oxygen were effective and the only treatment needed in most cases. Medical treatment using intravenous injections, was used in a few cases. Both procedures have been successful.

PROTECTION INFORMATION

Ventilation

Good ventilation should be provided to keep dust and HCN gas below exposure limits.

Personal Protective Equipment

Recommended Minimum Protection - chemical splash goggles and rubber gloves (butyl preferred). Have available and use as appropriate:

- Face shields; rubber suits, aprons, and boots.
- Disposable respiratrs (if dusty conditions exist).
- Self-contained breathing air supply (in case of emergency).
- HCN detector.
- First Aid and Medical Treatment supplies*, including oxygen resuscitators.

* See Du Pont Sodium Cyanide Storage and Handling Bulletin for list of supplies.

DISPOSAL INFORMATION

Aquatic Toxicity

Highly toxic to marine life.

Spill, Leak or Release

Sweep up and shovel into a covered container or plastic bag pending transfer to a disposal facility. Keep spillage dry. Flush spill area with a dilute solution of sodium or calcium hypochlorite. Comply with Federal, State, and local regulations on reporting releases.

Waste Disposal

Comply with Federal, State, and local regulations. Do not flush cyanide into sewers which may contain an acid. Detoxify with sodium hypochlorite, calcium hypochlorite, or hydrogen peroxide; flush to waste treatment system; or call a licensed disposal contractor.

SHIPPING INFORMATION

Transportation

DOT Hazard Class.*: Poison B

IMO Class.: 6.1

DOT Shipping Name*: Potassium Cyanide, Solid

UN No.: 1680
NA No.:

RQ Quantity*: 10 lb/4.54 kg

Shipping Containers

100 lb and 200 lb steel drums.

Storage Conditions

Store in properly labeled containers in dry, ventilated, secured areas. Keep containers closed and contents dry. Do not store with acids or acid salts, weak alkalis, or oxidizing agents. Do not handle or store food, beverages, or tobacco in cyanide areas. Do not store near combustibles or flammables because of cyanide solution run-off from water used for fire fighting.

*49 CFR 172.101, Hazardous Materials Table

ADDITIONAL INFORMATION AND REFERENCES

For further information, see Du Pont Sodium Cyanide Storage and Handling Bulletin.

E-66391 Date: 4/84

BUTADIENE

SECTION I PRODUCT IDENTIFICATION & EMERGENCY INFORMATION

PRODUCT NAME
Butadiene

CHEMICAL NAME
1,3-Butadiene

CHEMICAL FAMILY
Diolefins

PRODUCT APPEARANCE
Colorless gas or liquid with mild aromatic odor.

EMERGENCY TELEPHONE NUMBERS: EXXON CHEMICAL AMERICAS 713-870-6000
CHEMTREC 800-424-9300

SECTION II HAZARDOUS COMPONENTS OF MIXTURES

THE PRECISE COMPOSITION OF THIS MIXTURE IS PROPRIETARY INFORMATION. A MORE COMPLETE DISCLOSURE WILL BE PROVIDED TO A PHYSICIAN OR NURSE IN THE EVENT OF A MEDICAL EMERGENCY.

Not applicable for this product.

For additional information see Section III.

SECTION III HEALTH INFORMATION AND PROTECTION

FIRST AID & NATURE OF HAZARD

INHALATION:
Using proper respiratory protection, immediately remove the affected victim from exposure. Administer artificial respiration if breathing is stopped. Keep at rest. Call for prompt medical attention.
High vapor concentrations are irritating to the eyes and the respiratory tract, may cause headaches and dizziness, are anesthetic and may have other central nervous system effects.
Asphyxiant if allowed to accumulate in confined spaces to concentrations that reduce oxygen below safe breathing levels.
May cause liver disorder (e.g. jaundice) and/or damage.

SKIN CONTACT:
In case of cold burns caused by rapidly expanding gas or vaporizing liquid, get prompt medical attention.
Exposure to rapidly expanding gas or vaporizing liquid may cause frostbite ("cold" burn).
No hazard in normal industrial use.

EYE CONTACT:
First aid is normally not required.
No hazard in normal industrial use.

INGESTION:
First aid is not applicable.
No hazard in normal industrial use.

ACUTE TOXICITY DATA IS AVAILABLE UPON REQUEST

OCCUPATIONAL EXPOSURE LIMIT; EXXON RECOMMENDS:
100 ppm for 1,3 Butadiene.

CX 1038

PERSONAL PROTECTION

Where contact may occur, wear chemical resistant gloves, impervious arm protection, a chemical apron, and a face shield .
For open systems where contact is likely, wear chemical resistant gloves, a chemical jacket, rubber boots, and a face shield.
Where concentrations in air may exceed the limits given in this Section and engineering, work practice or other means of exposure reduction are not adequate, NIOSH/MSHA approved respirators may be necessary to prevent overexposure by inhalation.

VENTILATION

The use of local exhaust ventilation is recommended to control process emissions near the source. Laboratory samples should be stored and handled in a lab hood. Provide mechanical ventilation of confined spaces.
See respiratory protection recommendations.
Use explosion-proof ventilation equipment.

CHRONIC EFFECTS

Animal results indicate that inhalation of butadiene for long periods of time at and above the current ACGIH Threshold Limit Value (1000 ppm) caused an increase in a variety of tumors. Additionally, a high incidence of lung and kidney changes occurred when animals were exposed to levels eight times greater than the TLV. Animal results also indicate that butadiene may be capable of affecting the developing fetus at very high concentrations.

CHRONIC TOXICITY DATA IS AVAILABLE UPON REQUEST

SECTION IV FIRE & EXPLOSION HAZARD

FLASHPOINT DEG. F : 0 METHOD: TCC NOTE: Less Than
FLAMMABLE LIMITS-LEL: 2.0 UEL: 12.0
AUTOIGNITION TEMPERATURE DEG. F : 815 NOTE: Approximately

GENERAL HAZARD

Extremely Flammable, material will readily ignite at ambient temperatures.
Flammable Gas, can readily form flammable mixtures at or above the flashpoint.
If thermally decomposed, flammable/toxic gases may be released.
Unstable, material will vigorously polymerize, decompose, condense or will become self-reactive under conditions of shocks of pressure or temperature.
Static Discharge, material can accumulate static changes which can cause an incendiary electrical discharge.
Auto-refrigeration, drains can become plugged and valves may become inoperable because of the formation of ice due to expanding vapors or vaporizing liquids.

FIRE FIGHTING

Use water spray to cool fire exposed surfaces and to protect personnel.
Shut off "fuel" to fire. If a leak or spill has not ignited, use water spray to disperse the vapors.
Do not extinguish flames at leak because possibility of uncontrolled explosive reignition exists. Cut off fuel and/or allow fire to burn out.
Extinguish small residual fires with dry chemical powder or water spray.
Try to cover liquid spills with foam.
Respiratory and eye protection required for fire fighting personnel.

Remove compressed gas cylinders from fire area if possible.

HAZARDOUS COMBUSTION PRODUCTS

No unusual

SECTION V SPILL CONTROL PROCEDURE

LAND SPILL

Eliminate sources of ignition. Prevent additional discharge of material, if possible to do so without hazard. For small spills implement cleanup procedures; for large spills implement cleanup procedures and, if in public area, keep public away and advise authorities. Also, if this product is an EPA hazardous substance (See Section X, Page 4) notify the U.S. EPA if appropriate.
Vapors/dust can be harmful/fatal. Warn occupants of downwind areas.
Allow to evaporate.
Consult an expert on disposal of recovered material and ensure conformity to local disposal regulations.

WATER SPILL

Eliminate sources of ignition. Vapors/dust can be harmful/fatal. Warn occupants and shipping in downwind areas.
Allow to evaporate from surface.
Consult an expert on disposal of recovered material and ensure conformity to local disposal regulations.

SECTION VI NOTES

CAS NUMBER: 000106990

SECTION VII TYPICAL PHYSICAL & CHEMICAL PROPERTIES

GRAVITY REF. TEMP., ° F 0.63 @ 59.9 TO 59.9	VAPOR PRESSURE, mmHg at ° F 1291.629 @ 50 433.093 @ 0
SOLUBILITY IN WATER, WT. % at ° F 0.04 @, 100	VISCOSITY OF LIQUID, cST at ° F 0.36 @ 0
SP. GRAVITY OF VAPOR, at 1 ATM AIR=1 1.88 @ 15.5 Deg.C	FREEZING MELTING POINT/RANGE, ° F -164.2
EVAPORATION RATE, n-BU ACETATE=1 Not Available	BOILING POINT/RANGE, ° F 24.8

SECTION VIII REACTIVITY DATA

STABILITY? Unstable	HAZARDOUS POLYMERIZATION OCCUR? Will occur
CONDITIONS TO AVOID INSTABILITY Must be inhibited to prevent peroxide formation; avoid oxygen, water, open flames, sparks, heat	CONDITIONS TO AVOID HAZARDOUS POLYMERIZATION Must be inhibited to prevent polymerization; avoid exposure to air to prevent unstable polymer or explosive peroxide formation.

MATERIALS AND CONDITIONS TO AVOID INCOMPATIBILITY
Air, oxidizing agents, acetylide forming metals, ether, caustics, amines alkanolamines, halogenated compds., alcohols, glycols, glycol, moisture, ethers, phenols, alkylene oxides, ammonia, halogens, acid anhydrides

HAZARDOUS DECOMPOSITION PRODUCTS
Polymerization can generate sufficient heat to cause sudden explosion.

SECTION IX TRANSPORT & STORAGE

ELECTROSTATIC ACCUMULATION HAZARD
Yes, use proper grounding procedure

STORAGE TEMPERATURE, ° F Ambient	LOADING/UNLOADING TEMPERATURE, ° F Ambient
STORAGE/TRANSPORT PRESSURE, mmHg 1 atmosphere or above	VISCOSITY AT LOADING/UNLOADING TEMPERATURE, cST 0.36 @ 0

SECTION X HAZARD CLASSIFICATION

U.S. DOT CLASSIFICATION Flammable Gas	EPA HAZARDOUS SUBSTANCE AMOUNT LBS. Not applicable

OTHER

REFERENCE NUMBER	DATE PREPARED	SUPERCEDES ISSUE DATE
HDHA-L-00001	MAY 17, 1985	

FOR ADDITIONAL PRODUCT INFORMATION CONTACT YOUR TECHNICAL SALES REPRESENTATIVE
FOR ADDITIONAL HEALTH/SAFETY INFORMATION CALL 713-870-6885

EX1083

SODAMIDE

MATERIAL SAFETY DATA SHEET

Information on this form is furnished soley for the purpose of compliance with State and Federal Regulations and shall not be used for any other purpose. Use or dissemination of all or any part of this information for any other purpose may result in a violation of law or constitute grounds for legal action.

BUFFALO COLOR CORPORATION
One Garret Mountain Plaza
West Paterson, New Jersey 07424

Product Code: No Code No.
Date: 3/12/85
Supercedes: New

Emergency Phone No. 201-881-1700 (Chemtrec 800-424-9300)
716-827-4500

SECTION 1 - IDENTITY

Trade/Common Names: Sodamide

Chemical Name/Synonyms: Sodium Amide

Chemical Formula: $NaNH_2$ Molecular Weight: 39.01

Chemical Family: Amine

SECTION 2 - COMPONENTS

Name	Conc.	CAS No.	RTECS No.
Sodamide	ca 93 %	7782-92-5	VY2775000
Sodium Hydride	ca 7 %	7440-23-5	VY0686000
Sodium Metal	Trace	26628-22-8	VY8050000

SECTION 3 - PHYSICAL DATA

Boiling Point: NA Volatilizes ca 400° C Melting Point: 208° - 210° C

Vapor Pressure: NF n-Octanol/H_2O Partition Coefficient: NA

Vapor Density: NA Bulk Density: ca 86.5 lb/ft^3

Solubility: Soluble in water. Reacts violently.

Physical Appearance and Odor: Grey to olive (white when pure). Ammoniacal odor. Yellowish to brownish color indicates oxidation products which may be explosive. Such material should be safely disposed as soon as possible.

SECTION 4 - FIRE AND EXPLOSION HAZARD DATA

Flash Point: NA Flammable Limits: LFL: NA UFL: NA

Extinguishing Media: Anhydrous (dry) sodium carbonate (soda ash), salt or sand. Dry chemical fire extinguishers should be propelled by nitrogen, not by carbon dioxide. Note: Extinguishing media must not contain water in any form (i.e. dampness, or as a hydrate).

SECTION 4 - FIRE AND EXPLOSION HAZARD DATA

Special Fire Fighting Procedures & Equipment: DO NOT USE WATER. Do not use carbon dioxide, soda acid or chlorinated extinguishing agents. Personnel should wear "Nomex" or fireproof coats, face shields, leather gloves and self-contained breathing apparatus or ammonia respirators.

Unusual Fire & Explosion Hazards: Sodamide is dangerous when exposed to moisture in any form. Sodamide when in contact with air or moisture spontaneously catches fire.

Hazardous Incomplete Combustion Products: When heated to decomposition Sodamide emits toxic fumes of ammonia and sodium oxide. Complete decomposition at 500 - 600° C produces sodium metal, nitrogen, and hydrogen.

SECTION 5 - REACTIVITY DATA

Stability: Unstable. Decomposition Temp. 500° - 600° C

Conditions to Avoid: Any exposure to air or moisture.

Incompatability (Materials to Avoid): Water, ethanol, acid, alkali, trichloromethane. Reacts violently with water, cold acid and alkali. Reacts explosively with trichloromethane. Oxidizes in dry air to sodium azide and polyoxodinitrites.

Hazardous Decomposition Products: Sodium azide, polyoxodinitrites. When heated to decomposition emits toxic fumes of ammonia and sodium oxide.

Hazardous polymerization will occur under the following conditions: Will not occur.

SECTION 6 - SPILL OR LEAK PROCEDURES

Steps To Be Taken If Material Is Spilled Or Released:
Prevent all contact with water. Sodamide when in contact with air or moisture spontaneously catches fire. Smother with anhydrous (dry) sodium carbonate (soda ash). Personnal should wear "Nomex" or fireproof coats, face shields, leather gloves, self contained breathing apparatus, or ammonia respirators.

Disposal Methods: Shovel sodium carbonate (soda ash)/Sodamide mixture into separate leakproof drums. Cover but do not seal tightly. Pressure may buildup and must be allowed to escape. Dispose of as reactive waste according to Federal Regulations. (See Section 11)

Notification of Concerned Agencies:

Manufacturing Areas: Spill to Waterway: Contact Plant Environmental Control Department.
Spills to Waste Treatment Facility: Alert Treatment Plant Operator and Environmental Control Department.

On Highway: Call Chemtrec 800-424-9300.
Request Highway Patrol to notify the local Environmental Agency.

SECTION 7 - HEALTH HAZARD DATA

Classification (Poison, Irritant, etc.)(29CFR 1910.1200): Corrosive

Toxicity and Sensitivity Data: Oral LD_{50} NF; Dermal LD_{50} NF; Skin irritation RBT NF; Eye irritation RBT NF.

Carcinogenicity: OSHA Regulated: No NTP Listed: No IARC Listed: No

Mutagenicity/Teratogenicity: NF

Toxic Properties: Sodamide is corrosive to skin and eyes. Dust amd aerosols highly irritating to respiratory tract. Fumes from burning Sodamide can be lethal (probably due to acute ammonia poisoning). Corrosive if swallowed.

Primary Route(s) of Entry: Skin, eyes, respiratory tract.

Permissible Exposure Limits:
OSHA Standard: None
ACGIH TLV (year): None
Buffalo Color Limit Value: 1.0 mg/m^3

Signs and Symptoms of Exposure:
- Eyes: Pain, tearing corneal burns, severe eye damage.
- Skin: Redness, blistering, sores, necrosis.
- Lungs: Irritation of upper resp. tract, coughing, pneumonitis, difficult breathing.
- Ingestion: Pain, nausea, collapse, (however swallowing Sodamide is highly improbable because of immediate reactivity). Burns of mouth and tongue if ingestion is attempted.

Medical Conditions which may be aggravated by exposure; Chronic pulmonary conditions.

SECTION 8 - EMERGENCY AND FIRST AID

Inhalation: Remove to fresh air. Support breathing with artificial respiration if necessary. Get prompt medical attention.

Skin/Eye Contact: Flush eyes or skin with plenty of water for at least 15 minutes. For eyes or skin burns get medical attention.

Ingestion: Get prompt medical attention for burns.

SECTION 9 - SPECIAL PROTECTION INFORMATION

Respiratory Protection: Self contained breathing apparatus or ammonia respirator if concentration exceeds Exposure Limit Value. (See Section 7)

Eye Protection: Safety glasses with side shields. Full face shield if there is any possibility of eye contact.

Ventilation: Provide adequate ventilation to keep concentration below exposure limit with use of local exhaust where needed. (See Section 7)

SECTION 9 - SPECIAL PROTECTION INFORMATION

Protective Clothing: Appropriate, clean clothing to prevent skin contact including long sleeved shirt, buttoned at wrist, and impervious gloves. (In case of fire or spill see Section 4 and 6.)

Personal Hygiene: Shower at the end of each work shift.

SECTION 10 - SPECIAL PRECAUTIONS

Handling and Storage:
Destroy in a safe manner off-color, (yellowish to brownish) decomposing stocks. Meticulously keep water and air away from stored material. Avoid formation of azide and polyoxonitrites from contact with moist air. Handle with adequate ventilation.

SECTION 11 - SUPPLEMENTAL INFORMATION

Shipping Information:	U.S. DOT	International
Labels Required:	Flammable Solid Dangerous When Wet	Dangerous When Wet
Placards Required:	Flammable Solid/W	Flammable Solid/W
Reportable Quantity:	NA	NA
Hazard Identification Number:	UN 1425	UN 1425
Hazard Class:	4.3	4.3
Hazard Classification:	Sodium Amide	Sodium Amide
Freight Classification:	Chemicals N.O.I.	Chemicals N.O.I.

U.S. EPA Hazardous Waste Information:

Hazardous Waste Code: D003 R
Hazardous Waste Class: Reactive

For further information contact: Carol Laschinger, 716-827-4549

Abreviations: NA = Not Applicable
NK = Not Known
NF = Not Found
ca = Approximately

PROPANE

BUFFALO COLOR CORPORATION
BUFFALO PLANT

MATERIAL SAFETY DATA SHEET

CODE NO: MSD 5832

NAME OF PRODUCT: Propane LPG

VENDOR/MANUFACTURER: Mobile Oil Corp.

BCC APPROVAL DATE FOR MSDS: 5/20/85

SPECIAL CONDITIONS FOR APPROVAL:

MSDS and procedure for handling should be gone over very carefully with personnel handling.

(Power, Service Dept.)

MATERIAL SAFETY DATA SHEET

Rec'd 1/25

Required under USDL Safety and Health Regulations for Ship Repairing, Shipbuilding, and Shipbreaking (29 CFR 1915, 1916, 1917)

SECTION I

MANUFACTURER'S NAME: MOBIL OIL CORP.	EMERGENCY TELEPHONE NO.: (716) 827-5111
ADDRESS (Number, Street, City, State, and ZIP Code): 635 ELK STREET, BUFFALO, NEW YORK 14210	
CHEMICAL NAME AND SYNONYMS: PROPANE	TRADE NAME AND SYNONYMS: Propane LPG
CHEMICAL FAMILY: Hydrocarbon	FORMULA: C_3H_8

SECTION II - HAZARDOUS INGREDIENTS

PAINTS, PRESERVATIVES, & SOLVENTS	%	TLV (Units)	ALLOYS AND METALLIC COATINGS	%	TLV (Units)
PIGMENTS			BASE METAL		
CATALYST			ALLOYS		
VEHICLE			METALLIC COATINGS		
SOLVENTS			FILLER METAL PLUS COATING OR CORE FLUX		
ADDITIVES			OTHERS		
OTHERS					

HAZARDOUS MIXTURES OF OTHER LIQUIDS, SOLIDS, OR GASES	%	TLV (Units)
Liquid product is under pressure. Vaporized product is extremely flammable, but not toxic. Hazards are danger of fire or explosion or of asphyxiation from displacement of air. Product may contain up to 5% propylene (C_3H_6) and 2.5% butane (C_4H_8).		

SECTION III - PHYSICAL DATA

BOILING POINT (°F.)	- 47°	SPECIFIC GRAVITY (H_2O=1) (liquid)	0.51
VAPOR PRESSURE (mm Hg.) 100°F, psig	208	PERCENT, VOLATILE BY VOLUME (%)	100%
VAPOR DENSITY (AIR=1)	1.5	EVAPORATION RATE (_____ =1)	rapid
SOLUBILITY IN WATER	neg.		
APPEARANCE AND ODOR	Colorless liquid or gas; 0.26 ppm stench added as warning odor.		

SECTION IV - FIRE AND EXPLOSION HAZARD DATA

FLASH POINT (Method used)	- 160°F	FLAMMABLE LIMITS: Autoignition 850°F	Lel 2.0 / Uel 11.1
EXTINGUISHING MEDIA	Water fog, CO_2, dry powder		
SPECIAL FIRE FIGHTING PROCEDURES	Keep tanks exposed to fire cool with water spray. Approach leaking tank that is not burning cautiously from up-wind. Guard against ignition sources and vapor accumulatio		
UNUSUAL FIRE AND EXPLOSION HAZARDS	High pressure and rapid volatilization may result in rapid dispersal, formation of explosive mixture. Vapor may accumulate in low areas. Ventilate closed areas cautiously.		

RECEIVED
BUFFALO COLOR PURCHASING
DEC 31 1984

(Continued on reverse side)

Propane LPG

SECTION V - HEALTH HAZARD DATA

THRESHOLD LIMIT VALUE
None established. Simple asphyxiant if air is displaced. Suggest 500 ppm TLV.

EFFECTS OF OVEREXPOSURE
Frostbite from exposure to evaporating liquid. No acute toxicity on contact.
Anaesthetic if inhaled in high concentration

EMERGENCY AND FIRST AID PROCEDURES
Remove patient from threatened area to fresh air. Administer artificial respiration if needed. Get medical attention for frostbite. If eyes are involved flush with copious amounts of water for 15 min., get medical attention if symptoms persist.

SECTION VI - REACTIVITY DATA

STABILITY	UNSTABLE		CONDITIONS TO AVOID Rapidly escaping liquid or vapor may generate
	STABLE	X	static charge, causing ignition.

INCOMPATABILITY *(Materials to avoid)*
Strong oxidizing agents (chlorine, liquid oxygen, peroxides).

HAZARDOUS DECOMPOSITION PRODUCTS
None. (Combustion may form carbon monoxide.)

HAZARDOUS POLYMERIZATION	MAY OCCUR		CONDITIONS TO AVOID
	WILL NOT OCCUR	X	

SECTION VII - SPILL OR LEAK PROCEDURES

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED
Remove sources of ignition. Evacuate personnel. Shut off flow if possible. Ventilate area or stay up-wind. For transportation spill notify authorities and get emergency help. In closed area, check for combustible vapor before resuming normal activity.

WASTE DISPOSAL METHOD
Vaporization negates any other method for disposal of spills. Contained liquid that has been contaminated may be burned in suitable furnace or incinerator.

SECTION VIII - SPECIAL PROTECTION INFORMATION

RESPIRATORY PROTECTION *(Specify type)*
Self-contained breathing apparatus may be needed in emergencies.

VENTILATION	LOCAL EXHAUST As necessary to prevent vapor accumulation.	SPECIAL Explosion-proof
	MECHANICAL *(General)*	OTHER

PROTECTIVE GLOVES To prevent frostbite in emergency.	EYE PROTECTION To prevent liquid contact in emergency.

OTHER PROTECTIVE EQUIPMENT
Flash-protection suit in extreme emergency.

SECTION IX - SPECIAL PRECAUTIONS

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORING
Store away from heat and sources of ignition. Avoid handling where vapors could accumulate in sewers, trenches, or low areas.

OTHER PRECAUTIONS
Avoid rapid release in draining lines or breaking connections, to avoid static charge which could cause ignition. Avoid rough handling of containers.

INDIGO 20% PASTE

buffalo COLOR CORPORATION

MATERIAL SAFETY DATA SHEET

BUFFALO COLOR CORPORATION
One Garret Mountain Plaza
West Paterson, New Jersey 07424

Product Code: 088-2050
Date: 10/16/85
Supersedes: 6/22/84

Emergency Phone No. 201-881-1700 (Chemtrec 800-424-9300)
716-827-4500

SECTION 1 - IDENTITY

Trade/Common Names: Indigo NACCO(R) 20% Paste; Indigo

Chemical Name/Synonyms: 3-H-Indol-3-one,2-(1,3-dihydro-3-oxo-2H-indol-2-ylidene)-1,2,dihyro-; Indigotin; CI Vat Blue 1 (CI-73000)

Chemical Formula: $C_{16}H_{10}N_2O_2$ Molecular Weight: 262.26

Chemical Family: Indigoid

SECTION 2 - COMPONENTS

Name	% Str.	CAS No.	RTECS No.
Indigo	20 ± 0.5	482-89-3	Not listed
Alkalinity as Sodium Hydroxide	5 ± 1	1310-73-2	WB4900000
Water	Balance		

SECTION 3 - PHYSICAL DATA

Boiling Point: NA
Vapor Pressure: NA
Vapor Density: (air = 1): NA
Solubility in Water: Insoluble

Melting Point: <-5.°C
n-Octanol/H_2O Partition Coefficient: (of Indigo Powder)
Log 10 (PC) at least 3.7

Density: @ 25°C 1.12 - 1.13 g/ml
9.4 lbs/gal

Physical Appearance and Odor: Thin, dark blue aqueous paste. Mild ammoniacal odor.

SECTION 4 - FIRE AND EXPLOSION HAZARD DATA

Flash Point: NA Flammable Limits: NA

Extinguishing Media: Water, carbon dioxide, dry chemical.

Special Fire Fighting Procedures & Equipment: Respiratory protection against combustion products.

Unusual Hazard: Paste is strongly caustic. Avoid skin and eye contact.

Hazardous Incomplete Combustion Products: Not known. Probably carbon monoxide, oxides of nitrogen, organic acids, aniline, ammonia, hydrogen. Also, hot alkali.

SECTION 5 - REACTIVITY DATA

Stability: At ambient temperatures: Stable.
At elevated temperatures: Unstable. May react with alkali present.

Incompatability - Materials to Avoid: Acid, strong oxidizers.

Conditions to Avoid: Product is in the form of a water paste. Evaporation will occur at elevated temperatures. If allowed to dry out, product can catch fire at temperatures above 100°C due to residual alkali present. Product will reduce to "leuco" form when in the presence of reducing agents such as sodium hydrosulfite, but will reoxidize in air to the original (blue) form.

Hazardous polymerization will occur under the following conditions: Will not occur.

SECTION 6 - SPILL OR LEAK PROCEDURES

Steps To Be Taken If Material Is Spilled :
Clean up spills promptly. Avoid contact. Causes burns. (See Section 8, 9 & 10) Absorb spills using "Speedy-Dry" or similar absorbent. Sweep and pick up for disposal. Hose area down with water.

Disposal Methods: Deposit absorbent material saturated with Indigo in a separate, labeled, leak-proof container and take to an approved treatment, storage or disposal facility.

Notification of Concerned Agencies:

Manufacturing Areas: Spills to Waterway: Contact plant Environmental Control Department.
Spills to Waste Treatment Facility: Alert Treatment Plant Operator and Environmental Control Department.

On Highways: Call Chemtrec 800-424-9300
Request Highway Patrol to notify local Environmental Agency.

SECTION 7 - HEALTH HAZARD DATA

Classification (Poison, Irritant, etc.)(29CFR 1910.1200): Eye Hazard, (High pH).

SECTION 7 - HEALTH HAZARD DATA

Toxicity and Sensitivity Data:

Ingestion Oral LD_{50}: In rat (males): ca 5000 mg/kg (Mortality 2/5; 0/5 by 3rd day)
In rat (females): <5000 mg/kg (mortality 5/5; 2/5 by 3rd day)
In rat (6% NaOH): <5000 mg/kg (mortality 10/10; 6/10 by 3rd day)
Absorption Dermal LD_{50}: On rbt: >2000 mg/kg

Inhalation LC_{50}: In rat: >80 mg/m^3 x 4 hours. (mortality control 0/10).
Irritation: Skin (RBT): Same as 6% NaOH.
Eyes (RBT): About same as 6% NaOH.

Reproductive Toxicity: Ames test (D&C Blue 6) negative with and without activation.

Teratogenicity (D&C Blue 6): no effect @ 500 mg/kg/d in rat and rabbit (per os).

3-Generation Dietary (D&C Blue 6): no effect @ 500 mg/kg in rat.

Carcinogenicity: OSHA Regulated: No NTP Listed: No IARC Listed: No

Primary Route(s) of Entry: Eyes, skin, inhalation.

Permissible Exposure Limits:

OSHA Standard:	Not listed (as Indigo) 2.0 mg/m^3 (as NaOH) TWA
ACGIH TLV (1985-86):	Not listed (as Indigo) 2.0 mg/m^3 (as NaOH) ceiling
Buffalo Color Limit Value:	5.0 mg/m^3 (as Indigo) TWA 1.0 mg/m^3 (as NaOH) TWA

Signs and Symptoms of Exposure (Progressive):

Eyes: Prompt and strong irritation, tearing, corneal damage.
Skin: Erythema, rash, edema on prolonged exposure (pH >12).
Aerosol Inhalation: Irritation of respiratory tract, coughing, difficult breathing.
Ingestion: Not known. Probably severe irritation from sodium hydroxide content.
Primary hazard is irritation by any route from sodium hydroxide content.
Indigo (as dyestuff) is relatively non-toxic.

Medical Conditions which may be aggravated by exposure: Inhalation of aerosols of Indigo Paste may aggravate pre-existing emphysema, other pulmonary disorders and cataracts of the eye.

SECTION 8 - EMERGENCY AND FIRST AID

Skin/Eye Contact: Flush skin or eyes immediately with plenty of water for at least 15 min. while removing contaminated clothing including shoes.

Inhalation: Remove person to fresh air.

Ingestion: If person is conscious give water to dilute the alkali. Do not induce vomiting.

Get prompt medical attention in all cases involving contact.
Wash contaminated clothing before reuse. Discard contaminated shoes.

Note to Physician: If inhaled observe for delayed edema of lungs.

SECTION 9 - SPECIAL PROTECTION INFORMATION

Respiratory Protection: Dust respirator if concentration exceeds permissible exposure limit. (See Buffalo Color Limit above.)

Eye Protection: Safety glasses with side shields. Full face shield if there is any possibility of splashing or eye contact.

Ventilation: Should be sufficient to keep concentration below exposure limit value with use of local exhaust where aerosols may form. (See Buffalo Color Limit Value above.)

Protective Clothing: Appropriate, clean clothing to prevent skin contact including long sleeved shirt, buttoned at wrist, and impervious gloves. Remove contaminated clothing and shoes immediately. Wash contaminated clothing before reuse. Discard contaminated shoes.

Personal Hygiene: Shower at completion of each work shift.

SECTION 10 - SPECIAL PRECAUTIONS

Handling and Storage: Very irritating to eyes, mucous membranes, mouth, throat, respiratory tract and digestive tract. Contact causes alkali burns. Do not get in eyes, on skin or clothing. Avoid breathing vapor or mist.

Use with adequate ventilation. Keep container closed.

SECTION 11 - SUPPLEMENTAL INFORMATION

Shipping Information:	U.S. DOT	International
Labels Required:	Corrosive	Corrosive
Placards Required:	Corrosive	Corrosive
Reportable Quantity (Lbs):	N/A	N/A
Hazard Identification Number:	NA2801	UN2801
Hazard Class:	8	8
Hazard Classification:	Coal Tar Dye Liquid	Dyes, Liquid N.O.S.
Freight Classification:	Indigo Paste	Pigment, Organic

U.S. EPA Hazardous Waste Information:

Hazardous Waste Code: D001
Hazardous Waste Class: Corrosive

For Further Information Conatct: Carol Laschinger 716 827-4549

The information herein is given in good faith but no warranty, expressed or implied, is made

Abreviations: NA = Not Applicable
NK = Not Known
NF = Not Found
ca = Approximately
(R) = Registered Trademark of Buffalo Color Corp.

M A T E R I A L S A F E T Y D A T A S H E E T PAGE: 1

DOW CHEMICAL U.S.A. MIDLAND MICHIGAN 48640 EMERGENCY PHONE: 517-636-4400

EFFECTIVE DATE: 07 NOV 79 PRODUCT CODE: 15216

PRODUCT NAME: CAUSTIC SODA SOLUTION 50% MSD: 0101

INGREDIENTS (TYPICAL VALUES-NOT SPECIFICATIONS)	%
SODIUM HYDROXIDE	50
WATER	BALANCE

SECTION 1 PHYSICAL DATA

BOILING POINT: 293F, 145C APPROX. : SOL. IN WATER: WATER SOLUTION
VAP PRESS: 1.5 MMHG, 0.2 KPA @ 20C: SP. GRAVITY: @ 20C (DENS.) 1.52 G/ML
VAP DENSITY (AIR=1): ---- : % VOLATILE BY VOL: LOW (WATER)

APPEARANCE AND ODOR: COLORLESS TO SLIGHTLY COLORED LIQUID, NO ODOR.

SECTION 2 FIRE AND EXPLOSION HAZARD DATA

FLASH POINT: NONE : FLAMMABLE LIMITS
METHOD USED: NOT APPLICABLE : LFL: NOT APPLIC. UFL: NOT APPLIC.

EXTINGUISHING MEDIA: NON-COMBUSTIBLE.

SPECIAL FIRE FIGHTING EQUIPMENT AND HAZARDS: IN WATER SOLUTION CAUSTIC CAN REACT WITH AMPHOTERIC METALS (SUCH AS ALUMINUM) GENERATING HYDROGEN WHICH IS FLAMMABLE AND/OR EXPLOSIVE WHEN IGNITED.

SECTION 3 REACTIVITY DATA

STABILITY: PRODUCT ABSORBS CARBON DIOXIDE FROM THE AIR.

INCOMPATIBILITY: WATER AND ACID. PRODUCT IS STRONG CAUSTIC ALKALI. MAY REACT VIOLENTLY OR EXPLOSIVELY WITH ACID, A NUMBER OF ORGANIC COMPOUNDS, AMPHOTERIC METALS (SUCH AS ALUMINUM), AND HEATED WATER.

HAZARDOUS DECOMPOSITION PRODUCTS: NONE.

HAZARDOUS POLYMERIZATION: WILL NOT OCCUR.

SECTION 4 SPILL, LEAK, AND DISPOSAL PROCEDURES

ACTION TO TAKE FOR SPILLS (USE APPROPRIATE SAFETY EQUIPMENT): ONLY TRAINED AND PROPERLY PROTECTED PERSONNEL SHOULD UNDERTAKE SPILL CLEAN UP. ACTING CAUTIOUSLY, DILUTE AND NEUTRALIZE WITH DILUTE ACID.

(CONTINUED ON PAGE 2)

W CHEMICAL U.S.A. MIDLAND MICHIGAN 48640 EMERGENCY PHONE: 517-636-4400

EFFECTIVE DATE: 07 NOV 79 PRODUCT CODE: 15216
PRODUCT (CONT'D): CAUSTIC SODA SOLUTION 50% MSD: 0101

SECTION 4 SPILL, LEAK, AND DISPOSAL PROCEDURES (CONTINUED)

ACTION TO TAKE FOR SPILLS (USE APPROPRIATE SAFETY EQUIPMENT): (CONTINUED)
PREFERABLY ACETIC ACID.

DISPOSAL METHOD: DISPOSAL OF CAUSTIC SODA MUST MEET ALL FEDERAL, STATE AND LOCAL REGULATIONS. CONTACT THE DOW CHEMICAL COMPANY FOR ADDITIONAL INFORMATION.

SECTION 5 HEALTH HAZARD DATA

INGESTION: MOST SERIOUS EFFECT IS CORROSION OF TISSUES. LOWEST LETHAL DOSE IN RABBIT IS 500 MG/KG CAUSTIC.

EYE CONTACT: SEVERE BURN AND POSSIBLE BLINDNESS.

SKIN CONTACT: BURNS, FREQUENTLY DEEP ULCERATION AND ULTIMATE SCARRING.

SKIN ABSORPTION: NOT LIKELY A PROBLEM.

INHALATION: ACGIH TLV AND OSHA GUIDE IS 2 MG/CU METER DUSTS AND MISTS, BASED ON SODIUM HYDROXIDE.

EFFECTS OF OVEREXPOSURE: DUSTS OR CONCENTRATED MIST MAY CAUSE DAMAGE TO UPPER RESPIRATORY TRACT & EVEN TO THE LUNGS PROPER, RANGES FROM MILD IRRITATION TO SEVERE PNEUMONITIS. MAIN EFFECT-TISSUE DAMAGE.

SECTION 6 FIRST AID

EYES: IMMEDIATE AND CONTINUOUS IRRIGATION WITH FLOWING WATER AT LEAST 30 MINUTES IS IMPERATIVE. PROMPT MEDICAL CONSULTATION ESSENTIAL.

SKIN: SKIN BURN LIKELY. IMMEDIATE AND CONTINUOUS AND THOROUGH WASHING IN FLOWING WATER FOR 30 MINUTES IS INDICATED. REMOVE CLOTHING IMMEDIATELY. CALL PHYSICIAN AND/OR TRANSPORT TO MEDICAL FACILITY. DESTROY CONTAMINATED SHOES. WASH CLOTHING BEFORE REUSE.

INHALATION: REMOVE TO FRESH AIR IF EFFECTS OCCUR. CALL PHYSICIAN AND/OR TRANSPORT TO MEDICAL FACILITY.

INGESTION: CORROSIVE. DO NOT INDUCE VOMITING. GIVE LARGE AMOUNTS OF WATER OR MILK IF IMMEDIATELY AVAILABLE AND TRANSPORT TO MEDICAL FACILITY.

NOTE TO PHYSICIAN:
EYES: MAY CAUSE SEVERE CORNEAL INJURY OR BURN. MAY CAUSE IMPAIRMENT OF VISION. STAIN FOR EVIDENCE OF CORNEAL INJURY. IF CORNEA IS BURNED, INSTILL ANTIBIOTIC STEROID PREPARATION FREQUENTLY. CONSULT

(CONTINUED ON PAGE 3)

DW CHEMICAL U.S.A. MIDLAND MICHIGAN 48640 EMERGENCY PHONE: 517-636-4400

EFFECTIVE DATE: 07 NOV 79 PRODUCT CODE: 15216
PRODUCT (CONT'D): CAUSTIC SODA SOLUTION 50% MSD: 0101

SECTION 6 FIRST AID (CONTINUED)

NOTE TO PHYSICIAN: (CONTINUED)
OPHTHALMOLOGIST.
SKIN: MAY CAUSE SEVERE BURNS. IF BURN IS PRESENT, TREAT AS ANY THERMAL BURN.
RESPIRATORY: MAY CAUSE SEVERE IRRITATION. ADMINISTER OXYGEN IF AVAILABLE. BRONCHODILATORS, EXPECTORANTS, AND ANTITUSSIVES MAY BE OF HELP.
ORAL: MAY CAUSE STRICTURE. IF LAVAGE IS PERFORMED, SUGGEST ENDOTRACHEAL AND/OR ESOPHAGOSCOPIC CONTROL.
GENERAL: CONSULT STANDARD LITERATURE. TREATMENT BASED ON THE SOUND JUDGMENT OF THE PHYSICIAN AND THE INDIVIDUAL REACTIONS OF THE PATIENT.

SECTION 7 SPECIAL HANDLING INFORMATION

VENTILATION: RECOMMEND CONTROL OF MISTS TO SUGGESTED GUIDE.

RESPIRATORY PROTECTION: NIOSH APPROVED RESPIRATORY PROTECTION REQUIRED IN ABSENCE OF PROPER ENVIRONMENTAL CONTROL. IF REQUIRED USE AN APPROVED DUST OR MIST RESPIRATOR.

PROTECTIVE CLOTHING: CLEAN, BODY-COVERING CLOTHING. IN ADDITION, IMPERVIOUS GLOVES, BOOTS, APRON, GAUNTLETS, FACE SHIELD AND A WIDE-HAT IN ADDITION TO RECOMMENDED EYE PROTECTION DEPENDING UPON THE EXTENT AND SEVERITY OF EXPOSURE LIKELY.

EYE PROTECTION: CHEMICAL WORKERS GOGGLES. FULL FACE SHIELD TO PROTECT FACE. MAINTAIN EYE WASH FOUNTAIN AND SAFETY SHOWER AT OR NEAR STATION.

SECTION 8 SPECIAL PRECAUTIONS AND ADDITIONAL INFORMATION

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORAGE: PREVENT EYE AND SKIN CONTACT. DO NOT BREATHE DUSTS OR MISTS. AVOID STORING NEXT TO STRONG ACIDS. DISSOLVING IN WATER AND OTHER SUBSTANCES GENERATES EXCESSIVE HEAT, SPATTERING, AND MISTS. SOLUTIONS OF GREATER THAN 45% ARE VISCOUS AND VERY SLIPPERY.

ADDITIONAL INFORMATION: REVISIONS 11/7/79 -- CONSISTENCY PROGRAM - ALL SECTIONS CHANGED SLIGHTLY.

LAST PAGE

CONSULT THE DOW CHEMICAL COMPANY FOR FURTHER INFORMATION.

Buffalo Color Corporation
100 Lee Street
Buffalo, New York 14210

Attention: Mr. David A. Kaczanowski

Dear Mr. Kaczanowski:

I have received and reviewed the Disaster Control Plan for Buffalo Color Corporation as it pertains to this organization.

Rev. John R. Gaglione
Name

Coordinator of Emergency Services
Title

City of Buffalo
Organization

January 14,1986
Date

Buffalo Color Corporation
100 Lee Street
Buffalo, New York 14210

Attention: Mr. David A. Kaczanowski

Dear Mr. Kaczanowski:

I have received and reviewed the Disaster Control Plan for Buffalo Color Corporation as it pertains to this organization.

Elmer R Walgate
Name

Battalion Chief
Title

Buffalo Fire Dept.
Organization

1-10-86
Date

Buffalo Color Corporation
100 Lee Street
Buffalo, New York 14210

Attention: Mr. David A. Kaczanowski

Dear Mr. Kaczanowski:

I have received and reviewed the Disaster Control Plan for Buffalo Color Corporation as it pertains to this organization.

James T. Griffin
Name

Mayor
Title

City of Buffalo
Organization

December 30, 1985
Date

Buffalo Color Corporation
100 Lee Street
Buffalo, New York 14210

Attention: Mr. David A. Kaczanowski

Dear Mr. Kaczanowski:

I have received and reviewed the Disaster Control Plan for Buffalo Color Corporation as it pertains to this organization.

[signature]
Name

Medical Coordinator. Emergency Dept.
Title

Buffalo Mercy Hosp.
Organization

12/10/85
Date

Buffalo Color Corporation
100 Lee Street
Buffalo, New York 14210

Attention: Mr. David A. Kaczanowski

Dear Mr. Kaczanowski:

I have received and reviewed the Disaster Control Plan for Buffalo Color Corporation as it pertains to this organization.

William Shenk
Name

Battalion Chief
Title

Buffalo Fire Dept.
Organization

12/15/85
Date

Buffalo Color Corporation
100 Lee Street
Buffalo, New York 14210

Attention: Mr. David A. Kaczanowski

Dear Mr. Kaczanowski:

I have received and reviewed the Disaster Control Plan for Buffalo Color Corporation as it pertains to this organization.

Matthew B. Herdzik
Name

Battalion Chief
Title

Buffalo Fire Department
Organization

10-3-85
Date

Buffalo Color Corporation
100 Lee Street
Buffalo, New York 14210

Attention: Mr. David A. Kaczanowski

Dear Mr. Kaczanowski:

I have received and reviewed the Disaster Control Plan for Buffalo Color Corporation as it pertains to this organization.

Kevin C. Harmon
Name

Captain
Title

Buffalo Police Dept Pct # 9
Organization

Nov. 27th 1985
Date

D

BUFFALO COLOR CORPORATION

BUFFALO DYE PLANT

SPILL PREVENTION CONTROL AND COUNTERMEASURE PLAN

Original	Jul 1974
Amended	Nov 1976
Amended	Jun 1977
Reviewed	Nov 1979
Amended	Dec 1981
Amended	Oct 1984
Amended	May 1986

The SPCC Plan Amendment, dated May, 1986 has been prepared in accordance with good engineering practice and is considered to meet the requirements of the Environmental Protection Agency Regulation Part 112, Oil Pollution Prevention as it pertains to the Buffalo Color Corporation.

Walter Manijak, PE
No. 59916
May 6, 1986

The SPCC plan amendment, dated 10/84, has been prepared in accordance with good engineering practice and is considered to meet the requirements of the Environmental Protection Agency Regulation Part 112, Oil Pollution Prevention, as it pertains to the Buffalo Color Corporation.

Walter Manijak

Walter Manijak, PE
No. 59916

December 11, 1984

The SPCC plan amendment, dated 12/81, has been prepared in accordance with good engineering practice and is considered to meet the requirements of the Environmental Protection Agency Regulation Part 112, Oil Pollution Prevention, as it pertains to the Buffalo Color Corporation.

Patrick J. Hurley
No. 55572

December 1, 1981

The SPCC plan amendment, dated 6/77, has been prepared in accordance with good engineering practice and is considered to meet the requirements of the Environmental Protection Agency Regulation Part 112, Oil Pollution Prevention, as it pertains to the Buffalo Color Corporation.

Thomas J. Owens, P.E.
No. 50325

July 1, 1977

The attached SPCC plan has been prepared in accordance with good engineering practice and is considered to meet the requirements of the Environmental Protection Agency Regulation Part 112, Oil Pollution Prevention as it pertains to the Buffalo Dye Plant, Allied Chemical Corporation.

Carl H. Bunker, Jr. P.E.

July 2, 1974

TABLE OF CONTENTS

1. Forward

This Spill Prevention Control and Countermeasure Plan (SPCC Plan) was initially prepared in July, 1974, in accordance with Federal Regulation 40 CFR Part 112 as published in the Federal Register, Vol. 38, No. 237 - Tuesday, December 11, 1983.

The Buffalo Dye Plant was required to prepare an SPCC Plan subject to 40 CFR Part 112.3 (a), being an operator of onshore facilities that could reasonably be expected to discharge oil in harmful quantities as defined in 40 CFT Part 110, into navigable water of the United States, specifically the Buffalo River.

The Buffalo Dye Plant was also obligated under 40 CFR Part 112.4, having had two spill events with a twelve-month period, to submit to the Regional Administrator copies of the amended SPCC Plan and a report of the spill events describing causes, corrective actions and preventive measures taken to prevent recurrence. After preparation of the initial SPCC Plan in July, 1974, many production and facility changes occurred at the Buffalo Dye Plant. Under provisions for such changes in 40 CFR Part 112.5, these amendments to the SPCC Plan were made and the report was subsequently presented in November 1976.

Other information requested under 40 CFR Part 112.4 to be submitted to the Regional Administrator was covered by this amended SPCC Plan.

On July 1, 1977 the Buffalo Dye Plant was sold to Buffalo Color Corporation and an amendment reflecting this change was submitted in June, 1977.

The entire SPCC Plan was reviewed in November 1979 and the information was found to be current.

Amendments suggested by NYDEC and updates of names and telephone numbers were made in December 1981.

The amendments of December 1984 included the addition of the Plant Abnormal Emissions and Discharges Control and Countermeasures Plan and the removal of several tanks from Bldg. 61 and environs reflecting ongoing demolition projects.

The amendments of May 1986 included the removal of the Building 316 underground storage tank and an updating of telephone numbers.

5/86

2. Spill Events

The Buffalo Dye Plant has experienced three oil spill events since the first preparation of this plan. Reports were prepared and issued and the events are summarized below. Detailed reports are presented in Section 13.

Description of Events

2.1 September 7, 1976

2.1.1 Incident

Oil was discharging to the Buffalo River from Outfall 010. This outfall was located in Plant Area A but it handled the clear water discharges from Plant Areas B and C.

2.1.2 Cause

The oil was identified as #6 Fuel Oil and the source of the oil was believed to have come from the steam boiler plant in Area C. However, the source of the oil was not found until a second spill occurred on October 15, 1976. The cause of this second spiill is subsequently described.

2.1.3 Action Taken

The oil spilled was contained by a boom that had been permanently installed at Outfall 010 as part of this original SPCC Plan. This boom proved very effective and served the intended purpose to prevent harmful quantities of oil from escaping the containment system. The oil was removed from the boom to the satisfaction of the U.S. Coast Guard.

2.1.4 Preventive Action

The areas served by Outfall 010 were thoroughly searched and the outfall was watched closely for further oil spillage in an effort to find the source of the oil.

2.2 October 15, 1976

2.2.1 Incident

Oil was observed discharging from Outfall 010 onto the Buffalo River. This outfall served Areas B and C but its discharge was located in Area A.

2.2.2 Cause

Oil was found discharging through the condensate line from the #6 Fuel Oil shell and tube steam heater H-1 in Building 234 at the boiler plant in Area C.

2.2.3 Action Taken

The oil heater H-1 was immediately taken out of service. The spilled oil was contained by the boom permanently installed at Outfall 010 and it was thoroughly cleaned up causing no harmful effect anywhere in the river.

2.2.4 Preventive Action

The condensate is being checked for oil each shift by the boiler plant operators. The condensate discharge from these heaters is under engineering study to develop a separation and containment system to eliminate any possibility of a recurring oil spill from this heater. In June 1977, Outfall 011 was disconnected from the plant sewers. It now serves as a Buffalo Sewer Authority street run-off sewer for Lee Street.

2.3 June 13, 1980

2.3.1 Incident

Oil was discharged to the ground inside and outside of a diked area around VT-3 in Area C.

2.3.2 Cause

Level indicator failed and glass diaphram broke allowing expanding #6 Fuel Oil to move through foam sprinkler system line to the ground.

2.3.3 Action Taken

Spill was cleaned up. Diaphram was replaced and level indicator was repaired.

2.3.4 Preventive Action

Level indicator will be inspected routinely.

5/86

3. Oil Spill Frequencies are Calculated as Follows:

			Cumulative Years	Cumulative Incidents	Rate Inc/Yr
3.1	Start of file	Jul 1974	0.00	0	1.04
3.2	1st Amendment	Nov 1976	1.92	2	1.04
3.3	2nd Amendment	Jun 1977	2.50	2	0.80
3.4	1st Review	Nov 1979	4.92	2	0.41
3.5	3rd Amendment	Dec 1981	7.00	3	0.43
3.6	4th Amendment	Oct 1984	9.83	3	0.31
3.7	5th Amendment	May 1986	11.41	3	0.26

5/86

4. CONTROL AND CONTAINMENT MEASURES

The Buffalo Dye Plant is located at the Buffalo River as shown on the U.S. Corp of Engineers Map and designated No. 60 (National Aniline Division, Allied Chemical and Dye Corporation).

There are two (2) active outfalls from the Plant to the river. Their relative locations are shown on the Plant Map SB-61450, with this further explanation:

Outfall 006 drains Area A.
Outfall 011 drains Areas B, C and E
Areas F and G drain to the Buffalo Sewer Authority sanitary sewer.

During 6/77, Outfall 010 was connected to Outfall 011 and eliminated as a separate discharge to the river. Also during 6/77, Outfalls 007 and 013 were eliminated as separate discharges to the river by connecting them both to Outfall 006.

Oil storage and handling facilities exist in Areas A, C and E. As a precautionary measure, oil containment booms are installed on the river at each outfall to contain possible spillages.

12/81

5. SPILL CONTINGENCY PLAN

An Abnormal Emissions and Discharges Control and Countermeasures Plan has been prepared. This plan lists internal and regulatory agency contacts to be made in the event of a spill or abnormal discharge.

The complete text of the AEDCCP is presented in Section 14.

10/84

6. Individual Control and Containment Measures

Operational changes have occurred in the plant since the preparation of the original SPCC Plan in July, 1974. As a result of these changes, the following oil storage and handling facilities are now in existence.

At the present time, there are three above-ground storage vessels, one underground storage vessel, three portable oil tanks in service, and five loading/unloading stations in the plant.

Each installation is located on the Plan Map SB-61450, with this further explanation:

Plant A

Storages:

VT-15 - #2 Fuel Oil - 13,500 Gal.

Unloading/Unloading Stations

VT-15 - Tank Truck - 6,000 Gal.

Plant C

Storage

VT-3 - #5 and/or #6 Fuel Oil - Bldg. 207 - 500,000 Gal.
VT-2 - #2 Fuel Oil - Bldg. 207 - 30,600 Gal.

Loading/Unloading Stations

VT-3 - Tank Truck - 6,000 Gal.
VT-2 - Tank Truck - 6,000 Gal.

Plant E

Storage

Portable (2) - Diesel Fuel - 500 gallon each.

5/86

Other Sources

There are also twenty electrical transformers, six capacitors, and four oil circuit breakers throughout the plant that contain cooling oil. These transformers are located at the following buildings:

Bldg.	Transformers	Capacitors	Oil C.B.
80	2	0	0
81	2	0	0
101	1	0	0
102	1	0	0
103	1	0	0
207	3	0	0
208	1	0	0
220	3	0	0
314	3	4	6
316	2	0	0
351	1	0	0
Total	20	4	6

Only two of these transformers have a greater than 600 gallon cooling oil capacity. These are located as follows:

Bldg.	Transformer I.D.	Oil Volume - Gal.
314	TF-1	1,065
314	TF-2	810

The probability of an oil discharge to the Buffalo River occurring from these transformers is considered minimal; consequently no specific spill control meassures are planned for these.

5/86

SPCC PLAN COMPLIANCE FOR STORAGE VESSEL - VT-15 - INSTALLATION DATE 1/74

PLANT A BUILDING T.P. #1

Material of Construction:	Steel
Capacity:	13,500 gal
Oil Type:	#2 Fuel Oil - Use Caustic Dehydrator Pots
Drawing:	SC-89148-3
Alarms, High Level:	None (not required)
Pump Cut-off Feature:	None (not required)
Liquid Level Guage:	Yes - Diaphragm Type
Testing:	Tank level comparison Instrument Department
Heating System:	Yes (not needed with #2 oil - not used)
Type:	30# Steam - internal coils - have been disconnected
Condensate Monitoring:	Not required - system not in use with #2 Fuel Oil.

Transfer operations:

Line Size:	3/4" - all above ground
Covering:	1" insulation
Pumps:	P-18 and P-19
Service:	Feed to dehydrator burners
Operating: Stand-by:	P-18 P-19
Drainage:	No drainage - pumps located inside a dike.

6/77

CONTAINMENT SYSTEM:

Dike = 21'2" x 21'2" x 4' = 13,400 gal.

Drainage:

Dike:	No drainage
Surrounding Area:	To Outfall 006
Pumping Out Dike:	
Oil Spills:	Manually - to separate container for incineration disposal or reuse.
Rain Water:	Manually - to process waste sewer.
Permeability:	Concrete floor - No permeability

Inspection:

Diked Area:	Daily by Operations - visual
Pumping Out Dike:	Environmental Control Department will be notified when oil is involved.

Integrity Testing:

Vessel and Support Structure:

Visual inspection by Operations for corrosion

Non-destructive metal thickness testing - Testing to be scheduled by Maintenance Department with recordkeeping by Maintenance Department Equipment Inspector.

Lines:

Under 50 psig pressure during system operation

Visual inspection by Operation for leaks

SPCC PLAN COMPLIANCE FOR UNLOADING STATION: #1 TANK TRUCK

Plant A To Storage Vessel VT-15

Tank Truck Capacity: 6,000 gal.

Oil Type: #2 Fuel Oil

Containment System:

Catch Basin: None

Existing: Unloading station is located west of VT-15 where there are no immediate storm drains. Absorbent material is stored in Building 38/48 for use in the event of a spill.

Warning Sign: Installed

Contact Indigo Supervision
Connect ground to truck
Indigo Supervision on site while unloading
Check for leaks, shut-off and repair as necessary

11/76

DISCUSSION:

VT-15 STORAGE AND UNLOADING STATION #1 - TANK PARK #1

An 11 x 19 ft. vertical storage tank is used to hold fuel oil for the Indigo dehydrator pots. The tank is equipped with heaters so that either #2 or #6 fuel oil may be used. At the present time, #2 fuel oil is being used continuously. The tank is mounted inside of a dike which has adequate capacity to hold the volume of the tank. There are two transfer pumps for feeding oil from this tank to the dehydrator pot burners. Pumps are located inside a dike area adjacent to VT-15. The tank is loaded from the tank truck unloading station located directly west of the tank.

To meet the SPCC guidelines for this storage tank and unloading station, the following modifications were made:

1. The tank truck unloading station was relocated to a position west of VT-15 where there are no immediate storm drains.

2. Absorbent material is stored in Building 48 to be used for absorbing any spilled oil.

3. The dirt floor of the dike was sealed to prevent seepage of oil into the ground and a pipe hole through the dike was sealed.

4. Warning sign was installed.

In addition to these measures taken to prevent spillage, there is a a boom installed at Outfall 006 that would serve to contain and minimize the spread of any oil spill should it reach the clear water sewer, Outfall 006.

Adequate supervision is also provided to insure that proper handling procedures are being followed.

6/77

SPCC PLAN COMPLIANCE FOR UNLOADING STATION: #1 PORTABLE TANK

Plant A From Storage Vessel VT-15

Portable Tank Capacity: 600 gal.

Oil Type: #2 Fuel Oil

Drawing:

Containment System:

Catch Basin:

Refer to the Tank Truck Unloading Station #1 for SPCC Compliance details. The portable tank will be filled at this same unloading station west of VT-15 where there are no immediate storm drains.

Warning Signs - Installed:

Unloading Station (1) for #2 Fuel Oil Portable tank filling

Fork Truck Operator Instructions:

Position empty tank properly for filling. Notify Indigo Department Supervision.

Indigo Department Operator Instructions:

Place automatic shutoff nozzle into tank. Open valves on filling line. Open automatic shutoff nozzle and fill tank. Stay in attendance while filling portable tank.

After Filling Tank

Close all valves on filling line. Remove nozzle from tank and secure properly. Notify Transportation Department for pickup. Report all leaks or spills promptly.

Oil absorbent bags stored in Building 48.

10/84

SPCC PLAN COMPLIANCE FOR STORAGE VESSEL: VT-3

INSTALLATION DATE: 1970

Plant C Building West of 207

Material of Construction: 1/4" Carbon Steel

Capacity: 500,000 Gal.

Oil Type: #5 and/or #6 Fuel Oil - Use Boiler Fuel

Drawing: 517338 - Allied

Alarms, High Level: Yes - Horn blows in Bldg. 207

Pump Cutoff Feature: No

Liquid Level Gauge: Yes - Buoyant Float Type

Testing: Yes - Monthly

Tank level comparison -
Instrument Department.

Heating System: Yes

Type: 30# Steam - internal tubular heater

Condensate Monitoring: No - Condensate traps to dike area.

Transfer Operations:

Line Size: 6" Suction - 3" Discharge - all above ground.

Covering: Heat insulation

Heat System: Yes - 2

Type: 150# Steam - Tubular Type

Condensate Monitoring: Yes - Condensate now discharges directly to a process waste sump in Bldg. 207.

Visual inspection - once per shift by operator for oil with recordkeeping on daily log sheet.

6/77

Pumps:

Service: Feed to steam boilers

Operating: Steam Turbine Driven
Standby : Electric Driven
Other : Unloading Tank Cars

Drainage: Pump room drains to containment sump.

Containment System:

Dike = 153' x 81' x 6' (irregular) = 525,000 Gal.

Drainage: Dike: No drainage

Surrounding Area: To Outfall 010

Pumping Out Dike:

Oil Spills: Manually - steam siphon pump - to separate container for disposal or reuse.

Rain Water: Manually - to process waste sewer.

Permeability: Exempt - #6 Fuel Oil

Inspection: Diked Area: Daily by Operations - visual.

Pumping Out Dike: Environmental Control Department will be notified when oil is involved.

10/84

INTEGRITY TESTING:

Vessel and Support Structure:

Visual inspection by Operations for general condition.

Non-destructive shell thickness testing every 5 years by Maintenance Department with recordkeeping by Maintenance Department Equipment Inspector.

Lines:

Under (140)psig pressure during system operation.

Visual inspection every 5 years included with vessel testing.

11/76

SPCC PLAN COMPLIANCE FOR UNLOADING STATION #2 TANK TRUCK & RR CAR

Plant C To Storage Vessel VT-3

Tank Truck Capacity:	6,000 Gal.
Oil Type:	#5 and/or #6 Fuel Oil
Drawing:	SC-89950-1
Containment System:	Catch Basin

A new concrete pad unloading station to fit two tank trucks as shown on Plant Drawing SC-89950-1.

Capacity:	16,000 Gal.
Drainage:	
Unloading Pad:	To containment sump.
Surrounding Area:	To clear water sewer - 010.
Pumping Out Unloading Pad Sump:	
Oil Spills:	Manually - to separate container for disposal or reuse.
Rain Water:	Steam siphon pump to VT-3 dike.
Inspection:	
Unloading Pad:	Daily by Operation - visual.
Sump:	Bubble tube alarm system.
Warning Signs:	
Present:	Unloading Station: (2) for #5 & #6 Fuel Oil

11/76

Truck Driver Instructions

Before Unloading:

Have Plant gate pass.
Contact Power Department Operator.
Attach grounding cable to truck.
Inspect connections for leaks.
Stay in attendance at all times while unloading.

After Unloaded:

Blow swing line empty and drain completely.
Inspect disconnected lines and truck for leaks.
Disconnect grounding cable from truck.
Secure pipe cap to receiving line.
Have gate pass signed by Power Department Operator and report any spills.
Return gate pass to Security Guards.
Report all leaks and spills promptly.

11/76

DISCUSSION:

VT-3 STORAGE AND UNLOADING STATION #2

VT-3 is a 500,000 gal. storage tank for #5 and/or #6 fuel oil located west of Bldg. 207. It is equipped with an internal hairpin pipe tank heater coil supplied with 30# steam. The dike area around the tank has the capacity to hold the entire contents of this tank. The clay floor of the dike is impervious and does hold rain water.

Oil is pumped from this tank by two (2) gear pumps; one (1) steam turbine driven and one (1) electric driven; to three boilers, SG-4, SG-5, and SG-6 in Bldg. 207. The oil is transferred through two tubular heat exchangers located in the pump house. These are heated with 150# steam and equipped with temperature regulating valves to maintain the temperature at approximately 240° F on the discharge side. The system is maintained under constant 140 psig pressure with a back pressure relief valve which discharges any excess flow back to the storage tank. The pumps are equipped so that if the steam turbine pump fails and the pressure drops, the electric pump will automatically start to maintain oil pressure and flow to the boilers.

A third pump is also located in the pump house to serve as an unloading pump for railroad tank cars. The pump house is located 30 feet west of Bldg. 207 and houses the three pumps, two tubular heat exchangers and pump and temperature controls.

Two (2) loading lines for filling the 500,000 gal. tank are located just east of the pump house and are separated approximately 80 feet which permits unloading two tank trucks simultaneously or one railroad tank car.

To meet SPCC guidelines for this installation, the following modifications were made:

1. The unloading area was provided with a concrete pad pitched to a sump to collect any spillage or leakage. It can accomodate two tank trucks simultaneously and has a 16,000 gal. capacity. The trenched approach from the unloading pad to the sump is fitted with a manually operated gate. The intent is to close the gate while the oil trucks are being intent is to close the gate while the oil trucks are being unloaded, preventing any oil spilled from entering the sump. The sump will primarily collect rain water runoff.

11/76

VT-3 STORAGE AND UNLOADING STATION #2

2. The pump house floor drain was piped up to the sump.

3. The overall layout of VT-3 and the dike, the pump house and unloading area is shown on Allied Drawing 517338. The unloading station is shown on Drawing SC-89950-1.

   Since the oil spill occurence on October 15, 1976 which was caused by a leak in the 150# steam oil heater, the condensate from these oil heaters has been repiped to discharge directly to a process waste sump in Building 207. This now prevents any recurrence of an oil spill from this heating system.

6/77

SPCC PLAN COMPLIANCE FOR:

STORAGE VESSEL: VT-2 INSTALLATION DATE: 1948

Plant C Building North of 203

Material of Construction: 1/4" Steel

Capacity: 30,600 Gal.

Oil Type: #2 Fuel Oil - Use Standby emergency for boilers.

Drawings: SC-83749, SC-83872

ALARMS, HIGH LEVEL: None (not required)

LIQUID LEVEL GUAGE: None (not required)

HEATING SYSTEM: No - Steam heater not used on #2 Fuel Oil - it is disconnected.

TRANSFER OPERATIONS:

Line Size: - 3" - all above ground.

Covering: Insulated

Pumps: Two (2); one electric driven, one steam turbine driven.

Service: Emergency feed to boilers - both in standby condition (off) and started only during emergency.

Drainage: Drip pan under pumps. Bldg. 203 drains to C.W. sewer - 010

CONTAINMENT SYSTEM:

Dike = 23' x 60' x 4' (irregular) = 40,000 Gal.

Drainage:

Dike: No drainage - base of dike is sealed with concrete.

Surrounding Area: To Outfall 010

11/76

Pumping Out Dike:

Oil Spill: Manually - portable pump - to separate container for disposal or reuse.

Rain Water: Manually - portable pump - to process waste sewer.

Permeability: None - Concrete floor

Inspection:

Diked Area: Daily by Operations - visual.

Pumping Out Dike: Environmental Control Department will be notified when oil is involved.

INTEGRITY TESTING:

Vessel and Support Structure:

Monthly visual inspection by Operations for general conditions.

Non-destructive shell thickness testing every 5 years by Maintenance Department with recordkeeping by Maintenance Department Equipment Inspector.

Lines:

Visual inspection every 5 years included with vessel shell thickness testing.

10/84

SPCC PLAN COMPLIANCE FOR:

UNLOADING STATION: #3 Tank Truck

Plant C To Storage Vessel VT-2

Tank Truck Capacity: 6,000 Gal.

Oil Type: #2 Fuel Oil

CONTAINMENT SYSTEM:

Catch Basin: None - Unloading station is located between Bldg. 203 and VT-2. There are no immediate sewer drains in this area. Sandbags are stored in Bldg. 203 for emergency use.

Drainage:

Surrounding Area: To clear water sewer - Oil - and to sanitary sewer.

WARNING SIGNS:

Present: None - Due to infrequent use of these facilities and the even less frequent delivery of oil, warning signs are considered unnecessary. Close supervision is considered adequate spill prevention control.

11/76

DISCUSSION:

VT-2 STORAGE AND UNLOADING STATION #3

VT-2 is a 30,000 gallon #2 fuel oil storage tank located N.W. of Bldg. 203. It was originally used to store #6 fuel oil for emergency use when the boilers were coal fired. It is equipped with an internal steam heater which is not being used on #2 oil and has been disconnected.

The #2 fuel oil is used as an emergency boiler fuel should the #6 fuel oil system fail. It has been used as an emergency fuel only two or three times in two years.

The unloading station is located between Bldg. 203 and the storage vessel where there are no immediate sewer drains. Less than one (1) oil delivery per year is normally received at this station.

It is because of the infrequent deliveries that close unloading supervision and the use of sandbags is deemed to be adequate spill prevention control and containment at this unloading station.

The dike area around the tank has sufficient capacity to hold the entire contents of the tank. The concrete floor is sealed to prevent seepage of oil into the ground.

10/84

SPCC PLAN COMPLIANCE FOR STORAGE VESSEL: 2 - PORTABLE TANKS

Plant E Building Tank Park South of Bldg. 320 - Diked

Material of Construction: Steel

Capacity: 500 gal. each (2)

Oil Type: Diesel Fuel Use Vehicle Fuel

Drawing: None

Alarms: None

Liquid Level Guage: None

Heating System: None

Transfer Operations: Lines: 1" hose

Pumps: Two (2) hand pumps

Service: Vehicle Fuel

Drainage: Filling Station Drains to Ground Outside Dike. Tanks and Pumps Drain Inside Dike

Containment System:

Dike = 80' x 60' x 3' = 100,000 gal.

Drainage: Dike: No drainage

Surrounding Area: To Clear Water Sewer - Oil

Integrity Testing:

Vessel: Visual inspection yearly for leaks and general condition by Maint. Dept. Equipment Inspector

6/77

SPCC PLAN COMPLIANCE FOR:

UNLOADING STATION: #4 TANK TRUCK

Plant E Two Portable Storage Vessels

Tank Truck Capacity: 1-2000 gal.

Oil Type: Diesel Fuel

CONTAINMENT SYSTEM:

Catch Basin: None

Existing:

Unloading Station is located adjacent to Tank Park dike where there are no immediate storm drains. Absorbent material is stored in Building 361 for use in the event of a spill.

WARNING SIGNS:

Present: None

Proposed:

Unloading Station #4 - Diesel Fuel

Portable Tank Capacity - 500 gal. each

Truck Driver Instructions

Before Unloading

Have gate pass.

Contact Service Department Supervisor

Attach grounding cable to truck.

Inspect connection for leaks.

Stay in attendance at all times while unloading.

6/77

After Unloading

Inspect disconnected lines and truck for leaks.

Disconnect grounding cable from truck.

Have gate pass signed by Service Department Supervisor and report any leaks.

Return gate pass to security guard.

Report all spills or leaks promptly.

Service Department Personnel:

Stay in attendance at all times while unloading.

Oil absorbent bags stored in Building 361.

6/77

DISCUSSION:

DIESEL FUEL PORTABLE TANKS AND UNLOADING STATION #4

The two (2) 500 gal. portable diesel fuel tanks are presently located inside the Tank Park dike south of Bldg. 320. They are owned by Petroleum Sales and Service Company who supply the diesel fuel.

An average of 800 gal. per month is consumed requiring one delivery per month. The plant vehicles are filled by hand operated pumps installed in each tank.

These diesel fuel quantities are minimal with respect to the SPCC guidelines and adequate control is maintained to prevent any polluting spillage.

6/77

SPCC PLAN VESSELS REMOVED FROM SERVICE

ID	Location	Capacity	Contents
	Building 61	13,500 Gal.	#2 Fuel Oil
	Building 316	7,000 Gal.	Unleaded Gasolines

5/86

D36.30

F. INSPECTION RECORDS

Records of inspections will be kept by the following departments:

Environmental Control Department - Bldg. 121

Dike and Sump Pump Out Control involving oil spillage containment.

See Page 32

Instrument Department - Bldg. 220

Liquid Level Gauge Testing

Maintenance Department - Equipment Inspection - Bldg. 222

Equipment Inspections - Form attached

10/84

EQUIPMENT INSPECTION REPORT

SONIC READINGS

Apparatus _____ Bldg. _____ Date _____

Top Head | Bottom Head | Typical Kettle or Jacket

Vert. Tank | Cone Tank | Hor. Tank

HOLE NO.	LOCATION	THICKNESS
1		
2		
3		
4		
5		
6		
7		
8		
9		
10		
11		

12/81

DIKE AND SUMP PUMP OUT CONTROL

Diked Vessel VT-3

Sump Collector Dike Area C

Cause of Oil Spill Failure of foam nozzle glass diaphram

Quantity 1800

Disposition Clean-up by Wizard Methods

Date June 13, 1980

Further Explanation

Authorization

Instructions: Notify the Environmental Control Department when oil is collected by the containment system. Cause determination and disposal authorization must be made.

12/81

FLOW METERS MONTHLY INSPECTION

Date _____ Name _____

Meter No.	Manometer Location	Recorder Location	Service	Orifice Location	Remarks
55	Boiler master pnl	Bailey	De-Airator	5th Level	
180	203 NW	203 TB	150#	Back of S.G. 4	
10	203 NW	205		Over Manometer	
184	203 NWd/p	208 TG	150	Back of S.G. 5	
181	203 NW	203 TG	150#	Back of S.G. 5	
179	207 Bsmt	203 TB	150#	Over Manometer	
53	203 SW	203 M	30#	Over Manometer	
175	203 SW	203 TB	150#	Over Manometer	
177	203 S	203 TG	150#	Roof of 203 S	
57	203 S	203 TG	30#	Roof of 203 S	
182	203 S	203 TB	150#	Roof of 205	
183	203 S	203 TB	150#	Roof of 203 S	
609	203 S	203 TB	30#	Roof of 203 S	
61	Hagan	203 M	30#	Side of SG 4	
186	Hagan	203 M	150#	Side of SG 4	
201	205 I S	205	Cold W	Over Manometer	
27	205 II S	205 II		Over d/p	
31	205 II S	203 M	30#	Over Manometer	
59	222 I NW	203 M	30#	Roof of 222	
36	204 II SW	203 M	30/5#	205 II S	
610	204 II E	203 M	30#	Over Manometer	
507	223 I NW	203 M	Brine	Over Manometer	
901	203 W	203 M	900#	S of main	
154	O-Street	208 M		Over d/p cells	
28	510 Fan Room	510		Over d/p	
26	102 I-B	102		Over Road	
4 L.W.	Prenatt St.	205		L.W. Pit 4	
37	312 II E	312 II El. Pan Rm		312 II Turbin	
168	312 II S	312 II El. Pan Rm		W. of d/p	
38	312 II S	312 II El. Pan Rm		W. of d/p	
56	312 I NE	312 II El. Pan Rm		Over d/p	
2 L.W.	Plant D	205		LW Pit 2	
166	52 I E d/p	52 I E		N of d/p	
46	52 Roof	52 Penthouse		Over d/p	
44	53 II N	53 II N		Over d/p	
43	83 E	83 E		Over d/p outside	
170	82 E	83 IN		Over d/p	
B 208	100# air	Dew Point			
006	Outfall	A Area		W of 46	
011	Outfall	E Area		E of 320	

Inspect #6 oil storage level indicator and alarms.
Have operating dip tank (29' 4" to top of flange.)
Check level indication on guage, report any discrepancy.
Check high alarm 27', check low alarm 7'.
Blow the supply air to remove any moisture in line.

Resuits Level = Date

Gauge Reading = _____ Alarms: _____

Outage Meas. = _____ High Activated at _____ feet

Total = _____ Lo Activated at _____ feet

Error = _____ Corrective Action Taken _____

Name _____ Date _____

INDIGO TEST AND INSPECTIONS

MONTHLY: MONTH _____ NAME _____

Job # 060-446

Tank Park 901 VT 15 #2 oil storage level indicator check.

1) Visually inspect installation.
2) Have operating dip tank to verify upper level indication.
3) If indicator is off, guage will have to be drained and calibrated.

RESULTS REMARKS

10/84

G. SECURITY

The Buffalo Dye Plant has a full-time security force from Pinkerton's, Inc. on duty 24 hours per day, 7 days per week. The property is bordered with security fencing except at the Buffalo River.

Lighting conditions are adequate for the performance of Plant operating functions at the present.

11/76

H. PERSONNEL TRAINING

All personnel at the Buffalo Dye Plant are adequately trained in the performance and responsibilities of their jobs. To further implement requirements of the Oil Pollution Prevention Regulation, 40 CFR 112, instruction will be given to those operating personnel involved in the handling and usage of oil concerning this SPCC Plan.

These instructions will be handled by Area Supervision. Where necessary, individual instruction will be given.

The Manager-Environmental Control is directly accountable for oil spill monthly.

13.1 Oil Discharge - Outfall 010 - September 7, 1976

DETAILS OF INCIDENT

While conducting the scheduled outfall monitoring on September 7, 1976, oil was observed discharging from outfall 010 at approximately 4:30 p.m. Supervision was alerted and an immediate canvass was made of plant areas B and C, which flow to this outfall, to determine the source of the oil discharge.

The Environmental Control Department was also promptly notified and assumed coordination of response activities.

The oil discharge appeared to stop about 5:30 p.m., and essentially all the oil had been contained by the boom that is permanently installed at outfall 010.

CLEAN-UP OPERATIONS

At 5:54 p.m., Superior Pipe Cleaning Inc. was called into the Plant to remove the oil contained inside the boom. They started operations at 6:30 p.m. using a vacuum truck and had completed the major portionof the oil clean-up by 10:30 p.m., September 7, 1976.

On September 8, 1976, they returned to the Plant to clear up some remaining oil from the boom and also to clean up a minor amount that apparently had seeped past the boom and accumulated in a cove along the shore line upstream from outfall 010. Winds during this period were such that they caused the surface current on the river to move upstream.

The oil accumulation at the shore was quite minimal. There seemed to be more scum than oil in the area. Possibly this was caused by the river dredging operation being conducted by the Corps of Engineers' dredge, "Lyman" at the time of the oil clean-up.

On September 10, 1976, Superior Pipe Cleaning returned to the Plant site and removed a remaining oil film from inside the boom at outfall 010.

AGENCY NOTIFICATION

The U.S. Coast Guard was notified of the oil discharge at 6:15 p.m. on September 7, 1976. Petty Officer Boatner arrived at the Plant site at 7:30 p.m. to inspect the discharge and the clean-up operations in progress.

11/76

AGENCY NOTIFICATION (Cont'd)

On September 8, 1976, Petty Officer Boatner returned at 10:00 a.m. to inspect outfall 010 and the shoreline clean-up effort. He discussed the operation with the Dye Plant Environmental Group at which time he seemed to be satisfied with the clean-up operation.

There was some confusion concerning proper notification priorities under the recent National response program. Consequently, notification of the NYDEC (Mr. R. Sweeney) was delayed until September 9, 1976.

CAUSE OF INCIDENT

Samples of the discharge were analyzed using infrared spectroscopy and found to be similar to No. 6 Fuel Oil which is used for steam generation in the Plant. All Power Department discharges flow to outfall 010. An intensive investigation was made in this area to locate the source of the oil discharge. However, no indication of the oil source could be found until a subsequent oil spill incident occurred on October 15, 1976. During this latter incident, the #6 fuel oil shell and tube steam heater H-1 in Building 234 was found to be leaking oil.

This same heater is believed to have been the source of this September 7, 1976 spill. The oil steam heater H-1 was taken out of service for repair during which its condensate discharge was diverted to the Plant's waste water treatment system thereby preventing any recurring oil discharge incident.

11/76

13.2 Oil Spill to Outfall 010 - October 15, 1976

DETAILS OF INCIDENT

During a dilution metering flow measurement of outfall 010, an oil discharge was observed from this outfall at approximately 10:00 a.m. on October 15, 1976. Subsequent investigation by the Enivironmental Control Department located the source of the oil coming from the steam generation facility in Plant C. Further work by the Power Department isolated the cause as being the condensate discharge from the #6 Fuel Oil shell and tube steam heater H-1.

The heater, H-1, was taken out of service at 12:30 p.m. and by this time some 10-15 gallons of oil had leaked from the unit and was being contained by the boom that is permanently installed at outfall 010.

CLEAN-UP OPERATION

Superior Pipe Cleaning Inc. was called into the Plant to pick up the oil contained inside the boom. They completed the job by 4:30 p.m. on October 15, 1976.

AGENCY NOTIFICATION

The National Response Center was called at 2:00 p.m. on October 15, 1976. They in turn notified Coast Guard Officer Howard who returned a call to the Plant at 2:30 p.m. He was briefed on the details of the incident by Mr. J. Gouck, Environmental Manager.

PREVENTIVE ACTION

The oil steam heater, H-1, was immediately taken out of service when discovered to be leaking oil and was repaired before going back into service.

As an interim preventive measure, condensate discharge from the oil heaters in service, H-1 and H-2, was routinely checked each shift by the operating personnel. The condensate from these heaters is under engineering studies to develop an alternate system to eliminate any possibility of a recurring oil discharge incident.

REPORT REQUIRED BY 40 CFR 112.3(A)

This incident was the second oil spill experienced by the Buffalo Dye Plant within twelve months (see report of 11/1/76 on 9/7/76 spill). The report required in such cases by 40 CFR 112.3(a) was submitted within 60 days of this second incident (by 12/14/76).

11/76

13.3 Contained Oil Spill VT-3 June 13,1980

At approximately 3:30 p.m., on Friday, June 13, during an oil delivery, the following events occurred. After a tanker had off-loaded approximately 3500 gallons, a high level alarm was sounded - this alarm point being 27'-2" of oil level. The level indicator and alarm points had been checked by the Instrument Shop on Thursday, June 12. The straight tank side is at 28'-0" and visual check indicated that the remaining 2500 gals on the tanker (representing less than 2" of fill in VT-3) could be accepted. The tanker was unloaded without incident.

Approximately five minutes after delivery had been completed, the glass diaphragm on the foam nozzle mounted on the tank for fire protection failed letting oil enter the foam piping system. This piping is fitted with an air aspirating fitting as part of the foam generating principle employed. Oil issuing from this fitting was contained within the dike. A drain valve on the foam piping for freeze protection was in its normally open position. This valve was closed when oil started to discharge north of the concrete block foamhouse north of the dike area.

Most of the spilled No. 6 Fuel Oil was contained in the dike and in low spots in the terrain next to the foam house - none was discharged to sewer. Clean up was started on Monday, June 16 under Contract with Wizard Methods Co. and was completed on June 27.

Total volume involved is difficult to estimate and complicated by ensuring rainfall. Possible 1800 gallons total spill, of which all bugt 50-75 gallons were confined within the dike.

12/81

14. Abnormal Emissions and Dicharges Control and Countermeasures

14.1 Actions to Be Taken

14.1.1 It is the policy of Buffalo Color Corporation to comply fully with all governmental regulations covering discharges to waterways, emissions to the atmosphere, dispostion of solid and liquid wastes, and a safe working environment for its employees. The Buffalo Plant requires all operations comply with such regulations.

14.1.2 The Buffalo Plant contains over five million dollars in capital equipment designed to bring emissions, effluents and working environment into compliance with these regulations. This equipment must be properly maintained and operated in order to achieve its purpose. In no case is any of this equipment to be bypassed. In no case is any process with installed pollution control equipment to be operated unless this equipment is functioning.

14.1.3 Every employee at the Buffalo Plant is responsible for preventing unusual discharges. A major part of this responsibility is continual alertness for the possibility of any condition that causes, or might cause, danger to his health, the health of his fellow workers and neighbors, or damage to the environment in which we all live. Employees in the plant who work with this equipment daily are expected to be familiar with its function, its operation, and with any symptoms that indicate that it is not operating properly. Such symptoms should be treated as spills or emissions and promptly reported to supervision. Supervisors, in turn, will be expected to take whatever measures are necessary to correct the situation or to shut down the process if it cannot be corrected quickly. Notification is mandatory in any case.

14.1.4 It is the purpose of these plans to provide all employees with a guide for the detection and reporting of violations or potential violations. In order for these plans to be effective, every employee must be alert to the possibility of such incidents and must be completely instructed in what action to take if they occur.

5/86

D36.31

14.1.5 Immediate notification and action are essential elements in any program to reduce effluent problems. Pursuant to the above, the Buffalo Plant policy is to report:

14.1.5.1 Immediately, all discharges that exceed the maximum daily limit set in the National Pollution Discharge Elimination System (NPDES) permit, or violation of any regulations imposed by the Buffalo Sewer Authority;

14.1.5.2 Discharges of toxic or hazardous materials which could interfere with public health, safety, or cause property damage. Toxic, hazardous materials are to be judged on the basis of applicable regulations or the Corporation's technical knowledge of the product and raw materials it handles;

14.1.5.3 The spill of any quantity of oil to a waterway as covered by Section 311 of the Federal Water Pollution Control Act in accordance with the procedure specified in the Spill Prevention Control and Countermeasure Plan existing at this plant;

14.1.5.4 Emissions in violation of permitted levels or which could adversely affect public health or safety.

14.1.6 Where an emission or discharge noted above occurs, the Plant will:

14.1.6.1 Take immediate action to stop the discharge and take steps to minimize the effect of the discharge on the environment. This action may involve the use of reagents under previously established procedures to neutralize an effluent, use of oil recovery equipment, or by diversion, if required;

14.1.6.2 Telephone a report to the Vice President-Manufacturing and to the Environmental Services identifying the incident and its status;

14.1.6.3 Promptly telephone a report of the incident to the appropriate governmental authorities after consultation with Environmental Services;

14.1.6.4 Submit a written report within five days to the Vice President-Manufacturing.

10/84

14.1.7 The best time to report a spill or emission before it happens. Be alert to possibilities and the incident need never occur.

14.2 General Definition

14.2.1 The term "spill" is defined as follows:

14.2.1.1 Any discharge to the river in excess of the quantities permitted by the Plant's NPDES permit whether through outfalls or runoff.

14.2.1.2 Any discharge to the BSA system in excess of the limits permittted by BSA regulations.

14.2.1.3 Any discharge of hazardous or toxic materials.

14.2.2 A spill will include, but is not limited to:

14.2.2.1 Any raw material, waste or product spill, or tank overflow either inside or outside of a building.

14.2.2.2 Any color problems at the BSA weir or at the Bird Island plaint.

14.2.2.3 Any process material, raw material, or waste to the clear water sewer system for any reason.

14.2.2.4 Any color or oil in any clean water outfall or runoff.

14.2.2.5 Any oil sheen on the Buffalo River.

14.2.2.6 "Pop-off" of any rupture disk or relief valve.

14.2.2.7 Any spills during the loading or unloading of any tank truck, tank car or transporter.

14.2.2.8 Any alarm failure on any waste system.

14.2.2.9 Any pump or equipment failure or equipment malfunction on any waste system.

10/84

14.2.2.10 Any discharge to the river or to the BSA containing any material in excess of that permitted by regulations.

14.2.2.11 Raw materials, scrap materials, product and off-grade materials, or containers with even small amounts of these materials are to be treated as potential spills and to be handled so as to avoid actual spills.

14.2.2.12 A spill or discharge from any truck or tank car transporting any Buffalo Plant product or waste.

14.3 Detection

14.3.1 It is essential that every employee be constantly alert to the posibility of spills so that they may be properly controlled in order to minimize any damage or health hazard.

14.3.2 The following procedures are established for reporting spills or potential spills:

14.3.2.1 Operating and Maintenance Personnel should immediately notify their supervisor or the appropriate night supervisor. Night supervisors can be paged by calling 230.

That supervisor will, in turn, notify a member of Environmenttal Services in the order listed in "Notifications".

It is the responsibility of the operating personnel to insure that tank levels are taken at least once per shift so that unexplained changes in level or leaks can be reported immediately. They are also required to check and monitor for possible boilovers or overfilling of equipment.

Maintenance personnel are responsible to insure that tanks and lines have been properly drained before working on the equipment.

14.3.2.2 Surveillance by Technical Department - Abnormal losses in product yield are reported to the Technical Manager for his evaluation and further process monitoring.

10/84

14.3.2.3 Surveillance by Guards - The guards are trained to observe any unusual discharge. Watchmen and guards will immediately notify a night supervisor who will, in turn, notify the Environmental Services Department.

14.3.2.4 Surveillance by Effluent Monitoring - The Waste Treatment Plant operator has a continual record of the discharge pH. In addition, he observes any color changes and by a simple test procedure, determines effect on the BSA discharge. Correction to flow or pH can be made to help correct conditions.

14.3.2.5 Surveillance by Others - All other personnel are expected to notify the first available operating supervisor or if one cannot be located quickly, to notify the Environmental Services Department directly.

Any contacts by private citizens are to be immediately referred to the Environmental Services Department who informs the Employee Relations Manager of such contacts.

14.4 Emergency Control and Countermeasures

14.4.1 Following notification, it is essential that the spill be stopped, then contained, controlled and cleaned up as quickly and efficiently as possible.

14.4.1.1 Stopping the Spill will be the responsibility of the department normally responsible for operation of the system involved. All plant resources are to be made available for those situations. This may be as easy as closing a valve or starting or stopping a pump, or as complex as shutting down a continuous process in a safe and orderly manner. This opertion should be primarily concerned with minimizing the effects of the spill and avoiding additional problems with due regard for the safety of personnel

14.4.1.2 Containment of the Spill will be the responsibility of the department normally responsible for operation of the system involved. This may involve the use of sandbags, booms, absorbent material, emergency earthen dikes, blocking os sewers, or an attempt to divert the spill into a single lagoon at the Waste Treatment Plant.

Where the spill has already entered the process sewer system, it is imperative that the Power Department be notified immediately so that diversion can be effected if possible.

14.4.1.3 Diversion of a spill to the process sewer system into a single lagoon at the Waste Treatment Plant.

14.4.1.4 Decontamination - The appropriate method for decontamination or treatment of each specific spill will be the responsibility of the Environmental Services Department in conjunction with Technical, Operating, Safety and Engineering. Effecting the actual decontamination of the spill will be the responsibility of the department normally responsible for the system involved.

14.4.1.5 Cleanup and Disposal of Wastes will be supervised by Environmental Services which will engage any outside contractors required. Any in-plant personnel used will be supplied by the Operating, Services and Maintenance Departments.

14.5 Notifications

14.5.1 Information Required - The Environmental Services will be responsible for collecting on the spot information regarding the spill and reporting such information promptly to the Vice President of Manufacturing together with an assessment of the environmental impact of the spill.

The minimum information required for a reasonable assessment should include:

14.5.1.1 Time of the spill or time first noted.
14.5.1.2 Location or outfall involved.
14.5.1.3 Material involved.
14.5.1.4 Properties of this material.
14.5.1.5 Quantity.
14.5.1.6 Extent.
14.5.1.7 Apparent cause.
14.5.1.8 Action taken or planned.
14.5.1.9 Personnel involved - hourly and salary.

10/84

14.5.2 Oil Spills - First notification should be given to the Coast Guard. The Coast Guard has primary responsibility in this area and will normally undertake notification of the other agencies involved. Nevertheless, contacts with and reports to NYDEC, Federal and local agencies involved with water pollution will follow.

14.5.3 Spills to the Buffalo River - First notification should be given to County and State agencies. Notification to the EPA in Rochester can follow. Reports to all agencies will be expected to follow.

14.5.4 Spills to BSA System

14.5.4.1 Fire or Explosion Hazard - Primarily because of the discharge of solvents, oil or other flammable material.

1. Notify Bird Island Plant
2. Notify Sewer Maintenance
3. Notify Mr. Menno in all cases

14.5.4.2 Spills to BSA System - Heaalth Hazard or Toxic Material - this includes acids and caustic as well as cyanides and other toxic materials.

1. Notify Sewer Maintenance
2. Notify Bird Island Plant
3. Notify Mr. Menno in all cases

The BSA will not notify any other agencies.

14.5.5 Notification list with telephone numbers is presented in section 14.8

10/84

14.6 Emission Incident Plan

14.6.1 General Definition

An "emission" will be defined as the discharge to the atmosphere of any visible dust, fumes, smoke, or color of any material which has a distinct odor, or of any material which could be hazardous or flammable. It is not expected that employees can easily distingguish between permissible emissions and violations. It is expected, however, that they will properly report what they know, see and smell.

10/84

14.6.2 An emission will include, but is not limited to:

14.6.2.1 Any noticeable smoke, dust, fumes or color from any plant stack or operation.

14.6.2.2 "Pop-off" of any rupture disk or relief valve.

14.6.2.3 Failure of any dust collector or scrubber to operate properly.

14.6.2.4 Alarm failure on any scrubber or dust collector system.

14.6.2.5 Any equipment failure or equipment malfunction on any scrubber or dust collector system.

14.6.2.6 Fugitive dust from any plant operation, construction or demolition.

14.6.2.7 Any operating conditions in any process which might result in any emission.

14.6.2.8 Any fuming or dusting during loading or unloading operations.

14.6.2.9 Scrubbing liquid or bag failure on any scrubber or dust collector system.

14.6.2.10 "Blowing" of any seal pot or water seal.

14.6.3 Detection

It is essential that every employee be constantly alert to the possibility of emissions so that they may be prevented if possible or, if they occur, so that they may be properly controlled in order to minimize any damage or health hazard.

10/84

14.6.4 Notification Procedures

14.6.4.1 Necessary Information and Facts - The minimum information required for a reasonable assessment should include:

1. Time of the emission or time first noted.
2. Location of stack.
3. Material involved.
4. Properties of this material.
5. Quantity.
6. Extent.
7. Apparent cause.
8. Action taken or planned.
9. Personnel involved - hourly and salary.

14.6.5 Emergency Control and Countermeasures

Following notification, it is essential that the emission be stopped and that its extent be determined so that any necessary clean up or decontamination can be carried out.

14.6.5.1 Stopping the Emission will be the responsibility of the Operating Department assisted by Maintenance, Technical, Safety and Environmental Services. The exact measures to be taken will vary with each emission incident but it is expected that all reasonably possible measures will be taken to insure that the emission is stopped as quickly and completely as possible with due regard for the safety of personnel and the generation of additional hazards or incidents.

14.6.5.2 Extent - The Environmental Services will be responsible for assessing the extent and consequences of any emission with assistance from other departments as required.

10/84

14.6.5.3 Clean Up and Disposal of Wastes will be under the supervision of Environmental Services which will engage any outside contractors required. Any in-plant personnel used will be supplied by the Operating, Services and Maintenance Departments. Costs of the cleanup and disposal of each emission will be charged to an individual holding account and their allocation determined by the Plant Controller.

14.6.5.4 Decontamination - The appropriate method for decontamination or treatment of each specific emission will be the responsibility of the Environmental Services in conjunction with Technical, Operating, Safety and Engineering. Effecting the actual decontamination will be accomplished as in "Clean Up and Disposal of Wastes".

14.6.5.5 Potential Health Hazards - The responsibility for developing information, advice and preventive procedures regarding potential health hazards will be the responsibility of Enviornmental Services.

14.6.6 Notification

14.6.6.1 General Guides

The agency with primary enforcement responsibility in the area of emission control is the Erie County Department of Environmental Quality, Division of Air Pollution Control. This agency is to be given first notification regarding any emission incident. The New York State Department of Environmental Conservation will be notified by Erie County if required. The Federal EPA is normally concerned only with ambient air quality and will not be notified unless other agencies deem it necessary. Reports and contacts will normally be only to the State and County.

10/84

14.7 Written Reports

14.7.1 To Agencies

It will be necessary to submit a written report of each incident to every agency which has been notified of the incident. Responsibility for the preparation and distribution of these reports will rest with the Environmental Services assisted by other departments as required.

14.7.2 Local

Incidents not requiring an agency report should be covered by an "Environmental Incident Note" for distribution within the Works. Such notes should contain the following details:

14.7.2.1 Date and time of the incident.
14.7.2.2 Location of outfall or stack involved.
14.7.2.3 Material involved and quantity
14.7.2.4 Extent of environmental impact
14.7.2.5 Cause
14.7.2.6 Remedial action
14.7.2.7 Cleanup details

10/84

14.8 Notification List as of May 1, 1986

14.8.1 Plant Personnel

14.8.1.1 Environmental Services Department:

	Office	Home
D. E. Sauer	4525	897-5385

14.8.1.2 Operating Personnel

T. J. Wlodarczak	4536	652-5335
F. F. Fleshman	4665	433-8845
E. P. Baczkowski	4615	895-0329
J. J. Marino	4566	684-1830
G. G. Bolles	4665	826-0969

14.8.1.3 Vice President - Manufacturing

L. J. Franckowiak	75-737	201-267-7482

14.8.2 Regulatory Agencies

		Regular Hours	Off Shifts
14.8.2.1	U.S. Coast Guard	800-424-8802	Any Hour
14.8.2.2	New York State DOT	518-457-7362	
14.8.2.3	EPA - Rochester	544-8581	
14.8.2.4	Erie County Air Pollution Control	846-8555	
14.8.2.5	New York DEC (Hotline)	800-457-7362	Any Hour
14.8.2.6	USEPA - New York	212-264-2073	

14.8.3 Buffalo Sewer Authority

14.8.3.1	Bird Island Plant	883-1820	
14.8.3.2	Sewer Maintenance	858-2549	883-1820
14.8.3.3	Engineering	854-6000	
14.8.3.4	Mr. Don Menno	883-1820	

		Regular Hours	Off Shifts
14.8.4	Tonawanda Water Treatment Plant	887-8800	
14.8.5	Other Firms:		
14.8.5.1	Republic Steel	821-5383	
14.8.5.2	Mobil Oil	827-5251	
14.8.5.3	Bethlehem Steel	821-3159	
14.8.5.4	Worthington Pump	822-0833	
14.8.5.5	Oldman Boiler	852-0932	
14.8.5.6	PVS Chemical	825-5762	
14.8.6	Other Agencies:		
14.8.6.1	Buffalo Fire Department	856-6600	856-5111
14.8.6.2	Buffalo Police	911	911
14.8.6.3	State Police	836-0240	896-2525
14.8.7	Cleanup Services		
14.8.7.1	Superior Pipe Cleaning	822-7500	876-8841
14.8.7.2	Pittsburgh Pipe Cleaning	648-0303	
14.8.7.3	Rupp Pump Rental	877-1992	
14.8.7.4	Elmwood Tank Cleaners	853-5960	
14.8.7.5	Buffalo Waste Oil Service	855-2212	
14.8.7.6	Wizard Method	892-8160	

5/86

D36.32

APPENDIX

Federal Regulations - 40 CFR Part 112
40 CFR Part 109
40 CFR Part 110

Drawings - SB-61450 - Plant Map
SC-89148-3
SC-89950
SC-83872
SC-83749
SC-85277-3
L-2169
L-2171
L-2172

5/86

D36.32

ent standard established under section 307 of the Act; any standard of performance established under section 306 of the Act; and any effluent limitation established under section 302, section 316, or section 318 of the Act.

(c) "Order" means any order issued by the Administrator under section 309 of the Act; any order issued by a State to secure compliance with a permit, or condition thereof, issued under a program approved pursuant to section 402 of the Act; or any order issued by a court in an action brought pursuant to section 309 or section 505 of the Act.

(d) "Party" means an employee filing a request under § 108.3, any employee similarly situated, the employer of any such employee, and the Regional Administrator or his designee.

(e) "Administrator" or "Regional Administrator" means the Administrator or a Regional Administrator of the Environmental Protection Agency.

§ 108.3 Request for investigation.

Any employee who is discharged or laid-off, threatened with discharge or lay-off, or otherwise discriminated against by any person because of the alleged results of any effluent limitation or order issued under the Act, or any representative of such employee, may submit a request for an investigation under this part to the Regional Administrator of the region in which such discrimination is alleged to have occurred.

§ 108.4 Investigation by Regional Administrator.

Upon receipt of any request meeting the requirements of § 108.3, the Regional Administrator shall conduct a full investigation of the matter, in order to determine whether the request may be related to an effluent limitation or order under the Act. Following the investigation, the Regional Administrator shall notify the employee requesting the investigation (or the employee's representative) and the employer of such employee, in writing, of his preliminary findings and conclusions. The employee, the representative of such employee, or the employer may within fifteen days following receipt of the preliminary findings and conclusions of the Regional Administrator request a hearing under this part. Upon receipt of such a request, the Regional Administrator, with the concurrence of the Chief Administrative Law Judge, shall publish notice of a hearing to be held not less than 30 days following the date of such publication where he determines that there are factual issues concerning the existence of the alleged discrimination or its relationship to an effluent limitation or order under the Act. The notice shall specify a date before which any party (or representative of such party) may submit a request to appear.

§ 108.5 Procedure.

Any hearing held pursuant to this part shall be of record and shall be conducted according to the requirements of 5 U.S.C. 554. The Administrative Law Judge shall conduct the hearing in an orderly and expeditious manner. By agreement of the parties, he may dismiss the hearing. The Administrative Law Judge, on his own motion, or at the request of any party, shall have the power to hold prehearing conferences, to issue subpoenas for the attendance and testimony of witnesses and the production of relevant papers, books, and documents, and he may administer oaths. The Regional Administrator, and any party submitting a request pursuant to § 108.3 or § 108.4, or counsel or other representative of such party or the Regional Administrator, may appear and offer evidence at the hearing.

§ 108.6 Recommendations.

At the conclusion of any hearing under this part, the Administrative Law Judge shall, based on the record, issue tentative findings of fact and recommendations concerning the alleged discrimination, and shall submit such tentative findings and recommendations to the Administrator. The Administrator shall adopt or modify the findings and recommendations of the Administrative Law Judge, and shall make copies of such findings and recommendations available to the complaining employee, the employer, and the public.

§ 108.7 Hearing before Administrator.

At his option, the Administrator may exercise any powers of an Administrative Law Judge with respect to hearings under this part.

PART 109—CRITERIA FOR STATE, LOCAL AND REGIONAL OIL REMOVAL CONTINGENCY PLANS

Sec.

AUTHORITY: Sec. 11(j)(1)(B), 84 Stat. 96, 33 U.S.C. 1161(j)(1)(B).

SOURCE: 36 FR 22485, Nov. 25, 1971, unless otherwise noted.

§ 109.1 Applicability.

The criteria in this part are provided to assist State, local and regional agencies in the development of oil removal contingency plans for the inland navigable waters of the United States and all areas other than the high seas, coastal and contiguous zone waters, coastal and Great Lakes ports and harbors and such other areas as may be agreed upon between the Environmental Protection Agency and the Department of Transportation in accordance with section 11(j)(1)(B) of the Federal Act, Executive Order No. 11548 dated July 20, 1970 (35 FR 11677) and section 306.2 of the National Oil and Hazardous Materials Pollution Contingency Plan (35 FR 8511).

§ 109.2 Definitions.

As used in these guidelines, the following terms shall have the meaning indicated below:

(a) "Oil" means oil of any kind or in any form, including, but not limited to, petroleum, fuel oil, sludge, oil refuse, and oil mixed with wastes other than dredged spoil.

(b) "Discharge" includes, but is not limited to, any spilling, leaking, pumping, pouring, emitting, emptying, or dumping.

(c) "Remove" or "removal" refers to the removal of the oil from the water and shorelines or the taking of such other actions as may be necessary to minimize or mitigate damage to the public health or welfare, including, but not limited to, fish, shellfish, wildlife, and public and private property, shorelines, and beaches.

(d) "Major disaster" means any hurricane, tornado, storm, flood, high water, wind-driven water, tidal wave, earthquake, drought, fire, or other catastrophe in any part of the United States which, in the determination of the President, is or threatens to become of sufficient severity and magnitude to warrant disaster assistance by the Federal Government to supplement the efforts and available resources of States and local governments and relief organizations in alleviating the damage, loss, hardship, or suffering caused thereby.

(e) "United States" means the States, the District of Columbia, the Commonwealth of Puerto Rico, the Canal Zone, Guam, American Samoa, the Virgin Islands, and the Trust Territory of the Pacific Islands.

(f) "Federal Act" means the Federal Water Pollution Control Act, as amended, 33 U.S.C. 1151, et seq.

§ 109.3 Purpose and scope.

The guidelines in this part establish minimum criteria for the development and implementation of State, local, and regional contingency plans by State and local governments in consultation with private interests to insure timely, efficient, coordinated and effective action to minimize damage resulting from oil discharges. Such plans will be directed toward the protection of the public health or welfare of the United States, including, but not limited to, fish, shellfish, wildlife, and public and private property, shorelines, and beaches. The development and implementation of such plans shall be consistent with the National Oil and Hazardous Materials Pollution Contingency Plan. State, local and regional oil removal contingency plans shall provide for the coordination of the total response to an oil discharge so that contingency organizations es-

tablished thereunder can function independently, in conjunction with each other, or in conjunction with the National and Regional Response Teams established by the National Oil and Hazardous Materials Pollution Contingency Plan.

§ 109.4 Relationship to Federal response actions.

The National Oil and Hazardous Materials Pollution Contingency Plan provides that the Federal on-scene commander shall investigate all reported spills. If such investigation shows that appropriate action is being taken by either the discharger or non-Federal entities, the Federal on-scene commander shall monitor and provide advice or assistance, as required. If appropriate containment or cleanup action is not being taken by the discharger or non-Federal entities, the Federal on-scene commander will take control of the response activity in accordance with section 11(c)(1) of the Federal Act.

§ 109.5 Development and implementation criteria for State, local and regional oil removal contingency plans.

Criteria for the development and implementation of State, local and regional oil removal contingency plans are:

(a) Definition of the authorities, responsibilities and duties of all persons, organizations or agencies which are to be involved or could be involved in planning or directing oil removal operations, with particular care to clearly define the authorities, responsibilities and duties of State and local governmental agencies to avoid unnecessary duplication of contingency planning activities and to minimize the potential for conflict and confusion that could be generated in an emergency situation as a result of such duplications.

(b) Establishment of notification procedures for the purpose of early detection and timely notification of an oil discharge including:

(1) The identification of critical water use areas to facilitate the reporting of and response to oil discharges.

(2) A current list of names, telephone numbers and addresses of the responsible persons and alternates on call to receive notification of an oil discharge as well as the names, telephone numbers and addresses of the organizations and agencies to be notified when an oil discharge is discovered.

(3) Provisions for access to a reliable communications system for timely notification of an oil discharge and incorporation in the communications system of the capability for interconnection with the communications systems established under related oil removal contingency plans, particularly State and National plans.

(4) An established, prearranged procedure for requesting assistance during a major disaster or when the situation exceeds the response capability of the State, local or regional authority.

(c) Provisions to assure that full resource capability is known and can be committed during an oil discharge situation including:

(1) The identification and inventory of applicable equipment, materials and supplies which are available locally and regionally.

(2) An estimate of the equipment, materials and supplies which would be required to remove the maximum oil discharge to be anticipated.

(3) Development of agreements and arrangements in advance of an oil discharge for the acquisition of equipment, materials and supplies to be used in responding to such a discharge.

(d) Provisions for well defined and specific actions to be taken after discovery and notification of an oil discharge including:

(1) Specification of an oil discharge response operating team consisting of trained, prepared and available operating personnel.

(2) Predesignation of a properly qualified oil discharge response coordinator who is charged with the responsibility and delegated commensurate authority for directing and coordinating response operations and who knows how to request assistance from Federal authorities operating under existing national and regional contingency plans.

(3) A preplanned location for an oil discharge response operations center and a reliable communications system for directing the coordinated overall response operations.

(4) Provisions for varying degrees of response effort depending on the severity of the oil discharge.

(5) Specification of the order of priority in which the various water uses are to be protected where more than one water use may be adversely affected as a result of an oil discharge and where response operations may not be adequate to protect all uses.

(e) Specific and well defined procedures to facilitate recovery of damages and enforcement measures as provided for by State and local statutes and ordinances.

§ 109.6 Coordination.

For the purposes of coordination, the contingency plans of State and local governments should be developed and implemented in consultation with private interests. A copy of any oil removal contingency plan developed by State and local governments should be forwarded to the Council on Environmental Quality upon request to facilitate the coordination of these contingency plans with the National Oil and Hazardous Materials Pollution Contingency Plan.

PART 110—DISCHARGE OF OIL

Sec.

AUTHORITY: Secs. 311(b) (3) and (4) and 501(a) of the Federal Water Pollution Control Act Amendments of 1972 (33 U.S.C. 1251 et seq.).

SOURCE: 41 FR 49810, Nov. 11, 1976, unless otherwise noted.

§ 110.1 Definitions.

As used in this part, the following terms shall have the meaning indicated below:

(a) "Oil" means oil of any kind or in any form, including, but not limited to, petroleum, fuel oil, sludge, oil refuse, and oil mixed with wastes other than dredged spoil;

(b) "Discharge" includes, but is not limited to, any spilling, leaking, pumping, pouring, emitting, emptying or dumping;

(c) "Vessel" means every description of watercraft or other artificial contrivance used, or capable of being used, as a means of transportation on water other than a public vessel;

(d) "Public vessel" means a vessel owned or bareboat chartered and operated by the United States, or by a State or political subdivision thereof, or by a foreign nation, except when such vessel is engaged in commerce;

(e) "United States" means the States, the District of Columbia, the Commonwealth of Puerto Rico, the Canal Zone, Guam, American Samoa, the Virgin Islands, and the Trust Territory of the Pacific Islands;

(f) "Person" includes an individual, firm, corporation, association, and a partnership;

(g) "Contiguous zone" means the entire zone established or to be established by the United States under article 24 of the Convention on the Territorial Sea and the Contiguous Zone;

(h) "Onshore facility" means any facility (including, but not limited to motor vehicles and rolling stock) of any kind located in, on, or under, any land within the United States other than submerged land;

(i) "Offshore facility" means any facility of any kind located in, on, or under, any of the navigable waters of the United States other than a vessel or public vessel;

(j) "Applicable water quality standards" means State water quality standards adopted by the State and approved by EPA pursuant to section 303 of the Federal Act or promulgated by EPA pursuant to that section;

(k) "Federal Act" means the Federal Water Pollution Control Act, as amended, 33 U.S.C. 1251, et seq;

(l) "Sheen" means an iridescent appearance on the surface of water;

(m) "Sludge" means an aggregate of oil or oil and other matter of any kind in any form other than dredged spoil having a combined specific gravity equivalent to or greater than water;

§ 110.2 Applicability.

The regulations of this part apply to the discharge of oil into or upon the waters of the United States, adjoining shorelines or into or upon the waters of the contiguous zone, prohibited by section 311(b)(3) of the Federal Act.

§ 110.3 Discharge into navigable waters harmful.

For purposes of section 311(b) of the Federal Act, discharges of such quantities of oil into or upon the navigable waters of the United States or adjoining shorelines determined to be harmful to the public health or welfare of the United States, at all times and locations and under all circumstances and conditions, except as provided in § 110.6 of this part, include discharges which:

(a) Violate applicable water quality standards, or

(b) Cause a film or sheen upon or discoloration of the surface of the water or adjoining shorelines or cause a sludge or emulsion to be deposited beneath the surface of the water or upon adjoining shorelines.

§ 110.4 Discharge into contiguous zone harmful.

For purposes of section 311(b) of the Federal Act, discharges of such quantities of oil into or upon the waters of the contiguous zone determined to be harmful to the public health or welfare of the United States, at all times and locations and under all circumstances and conditions, except as provided in § 110.6, include discharges which:

(a) Violate applicable water quality standards in navigable waters of the United States, or

(b) Cause a film or sheen upon or discoloration of the surface of the water or adjoining shorelines or cause a sludge or emulsion to be deposited beneath the surface of the water or upon adjoining shorelines.

§ 110.5 Discharge prohibited.

As provided in section 311(b)(3) of the Federal Act, no person shall discharge or cause or permit to be discharged into or upon the navigable waters of the United States, adjoining shorelines, or into or upon the waters of the contiguous zone any oil, in harmful quantities as determined in §§ 110.3 and 110.4 except as the same may be permitted in the contiguous zone under Article IV of the International Convention for the Prevention of Pollution of the Sea by Oil, 1954, as amended.

§ 110.6 Exception for vessel engines.

For purposes of section 311(b) of the Federal Act, discharges of oil from a properly functioning vessel engine are not deemed to be harmful; but such oil accumulated in a vessel's bilges shall not be so exempt.

§ 110.7 Dispersants.

Addition of dispersants or emulsifiers to oil to be discharged which would circumvent the provisions of this part is prohibited.

§ 110.8 Demonstration projects.

Notwithstanding any other provisions of this part, the Administrator of the Environmental Protection Agency may permit the discharge of oil into or upon the navigable waters of the United States, adjoining shorelines, or into or upon the waters of the contiguous zone, in connection with research, demonstration projects, or studies relating to the prevention, control, or abatement of oil pollution.

§ 110.9 Notice.

Any person in charge of any vessel or onshore or offshore facility shall, as soon as he has knowledge of any discharge of oil from such vessel or facility in violation of § 110.5, immediately notify the appropriate agency of such discharge in accordance with such procedures as the Secretary of Transportation may prescribe. The procedures for such notice are set forth in U.S. Coast Guard regulations, 33 CFR Part 153, Subpart B, 41 FR 12628 et seq. (March 25, 1976).

PART 112—OIL POLLUTION PREVENTION

Sec.

AUTHORITY: Secs. 311(j)(1)(C), 311(j)(2), 501(a), Federal Water Pollution Control Act (sec. 2, Pub. L. 92-500, 86 Stat. 816 et seq. (33 U.S.C. 1251 et seq.)); sec. 4(b), Pub. L. 92-500, 86 Stat. 897; 5 U.S.C. Reorg. Plan of 1970 No. 3 (1970), 35 FR 15623, 3 CFR 1966-1970 Comp.; E.O. 11735, 38 FR 21243, 3 CFR, unless otherwise noted.

SOURCE: 38 FR 34165, Dec. 11, 1973, unless otherwise noted.

§ 112.1 General applicability.

(a) This part establishes procedures, methods and equipment and other requirements for equipment to prevent the discharge of oil from non-transportation-related onshore and offshore facilities into or upon the navigable waters of the United States or adjoining shorelines.

(b) Except as provided in paragraph (d) of this section, this part applies to owners or operators of non-transportation-related onshore and offshore facilities engaged in drilling, producing, gathering, storing, processing, refining, transferring, distributing or consuming oil and oil products, and which, due to their location, could reasonably be expected to discharge oil in harmful quantities, as defined in Part 110 of this chapter, into or upon the navigable waters of the United States or adjoining shorelines.

(c) As provided in section 313 (86 Stat. 875) departments, agencies, and instrumentalities of the Federal government are subject to these regulations to the same extent as any person, except for the provisions of § 112.6.

(d) This part does not apply to:

(1) Facilities, equipment or operations which are not subject to the jurisdiction of the Environmental Protection Agency, as follows:

(i) Onshore and offshore facilities, which, due to their location, could not reasonably be expected to discharge oil into or upon the navigable waters of the United States or adjoining shorelines. This determination shall be based solely upon a consideration of the geographical, locational aspects of the facility (such as proximity to navigable waters or adjoining shorelines, land contour, drainage, etc.) and shall exclude consideration of manmade features such as dikes, equipment or other structures which may serve to restrain, hinder, contain, or otherwise prevent a discharge of oil from reaching navigable waters of the United States or adjoining shorelines; and

(ii) Equipment or operations of vessels or transportation-related onshore and offshore facilities which are subject to authority and control of the Department of Transportation, as defined in the Memorandum of Understanding between the Secretary of Transportation and the Administrator of the Environmental Protection Agency, dated November 24, 1971, 36 FR 24000.

(2) Those facilities which, although otherwise subject to the jurisdiction of the Environmental Protection Agency, meet both of the following requirements:

(i) The underground buried storage capacity of the facility is 42,000 gallons or less of oil, and

(ii) The storage capacity, which is not buried, of the facility is 1,320 gallons or less of oil, provided no single container has a capacity in excess of 660 gallons.

(e) This part provides for the preparation and implementation of Spill Prevention Control and Countermeasure Plans prepared in accordance with § 112.7, designed to complement existing laws, regulations, rules, standards, policies and procedures pertaining to safety standards, fire prevention and

pollution prevention rules, so as to form a comprehensive balanced Federal/State spill prevention program to minimize the potential for oil discharges. Compliance with this part does not in any way relieve the owner or operator of an onshore or an offshore facility from compliance with other Federal, State or local laws.

[38 FR 34165, Dec. 11, 1973, as amended at 41 FR 12657, Mar. 26, 1976]

§ 112.2 Definitions.

For the purposes of this part:

(a) "Oil" means oil of any kind or in any form, including, but not limited to petroleum, fuel oil, sludge, oil refuse and oil mixed with wastes other than dredged spoil.

(b) "Discharge" includes but is not limited to, any spilling, leaking, pumping, pouring, emitting, emptying or dumping. For purposes of this part, the term "discharge" shall not include any discharge of oil which is authorized by a permit issued pursuant to Section 13 of the River and Harbor Act of 1899 (30 Stat. 1121, 33 U.S.C. 407), or sections 402 or 405 of the FWPCA Amendments of 1972 (86 Stat. 816 et seq., 33 U.S.C. 1251 et seq.).

(c) "Onshore facility" means any facility of any kind located in, on, or under any land within the United States, other than submerged lands, which is not a transportation-related facility.

(d) "Offshore facility" means any facility of any kind located in, on, or under any of the navigable waters of the United States, which is not a transportation-related facility.

(e) "Owner or operator" means any person owning or operating an onshore facility or an offshore facility, and in the case of any abandoned offshore facility, the person who owned or operated such facility immediately prior to such abandonment.

(f) "Person" includes an individual, firm, corporation, association, and a partnership.

(g) "Regional Administrator", means the Regional Administrator of the Environmental Protection Agency, or his designee, in and for the Region in which the facility is located.

(h) "Transportation-related" and "non-transportation-related" as applied to an onshore or offshore facility, are defined in the Memorandum of Understanding between the Secretary of Transportation and the Administrator of the Environmental Protection Agency, dated November 24, 1971, 36 FR 24080.

(i) "Spill event" means a discharge of oil into or upon the navigable waters of the United States or adjoining shorelines in harmful quantities, as defined at 40 CFR Part 110.

(j) "United States" means the States, the District of Columbia, the Commonwealth of Puerto Rico, the Canal Zone, Guam, American Samoa, the Virgin Islands, and the Trust Territory of the Pacific Islands.

(k) The term "navigable waters" of the United States means "navigable waters" as defined in section 502(7) of the FWPCA, and includes:

(1) All navigable waters of the United States, as defined in judicial decisions prior to passage of the 1972 Amendments to the FWPCA (Pub. L. 92-500), and tributaries of such waters;

(2) Interstate waters;

(3) Intrastate lakes, rivers, and streams which are utilized by interstate travelers for recreational or other purposes; and

(4) Intrastate lakes, rivers, and streams from which fish or shellfish are taken and sold in interstate commerce.

(l) "Vessel" means every description of watercraft or other artificial contrivance used, or capable of being used as a means of transportation on water, other than a public vessel.

§ 112.3 Requirements for preparation and implementation of Spill Prevention Control and Countermeasure Plans.

(a) Owners or operators of onshore and offshore facilities in operation on or before the effective date of this part that have discharged or, due to their location, could reasonably be expected to discharge oil in harmful quantities, as defined in 40 CFR Part 110, into or upon the navigable waters of the United States or adjoining shorelines, shall prepare a Spill Prevention Control and Countermeasure Plan (hereinafter "SPCC Plan"), in writing and in accordance with § 112.7. Except as provided for in paragraph (f) of this section, such SPCC Plan shall be prepared within six months after the effective date of this part and shall be fully implemented as soon as possible, but not later than one year after the effective date of this part.

(b) Owners or operators of onshore and offshore facilities that become operational after the effective date of this part, and that have discharged or could reasonably be expected to discharge oil in harmful quantities, as defined in 40 CFR Part 110, into or upon the navigable waters of the United States or adjoining shorelines, shall prepare an SPCC Plan in accordance with § 112.7. Except as provided for in paragraph (f) of this section, such SPCC Plan shall be prepared within six months after the date such facility begins operations and shall be fully implemented as soon as possible, but not later than one year after such facility begins operations.

(c) Owners or operators of onshore and offshore mobile or portable facilities, such as onshore drilling or workover rigs, barge mounted offshore drilling or workover rigs, and portable fueling facilities shall prepare and implement an SPCC Plan as required by paragraphs (a), (b) and (d) of this section. The owners or operators of such facility need not prepare a new SPCC Plan each time the facility is moved to a new site. The SPCC Plan may be a general plan, prepared in accordance with § 112.7, using good engineering practice. When the mobile or portable facility is moved, it must be located and installed using the spill prevention practices outlined in the SPCC Plan for the facility. No mobile or portable facility subject to this regulation shall operate unless the SPCC Plan has been implemented. The SPCC Plan shall only apply while the facility is in a fixed (non-transportation) operating mode.

(d) No SPCC Plan shall be effective to satisfy the requirements of this part unless it has been reviewed by a Registered Professional Engineer and certified to by such Professional Engineer. By means of this certification the engineer, having examined the facility and being familiar with the provisions of this part, shall attest that the SPCC Plan has been prepared in accordance with good engineering practices. Such certification shall in no way relieve the owner or operator of an onshore or offshore facility of his duty to prepare and fully implement such Plan in accordance with § 112.7, as required by paragraphs (a), (b) and (c) of this section.

(e) Owners or operators of a facility for which an SPCC Plan is required pursuant to paragraph (a), (b) or (c) of this section shall maintain a complete copy of the Plan at such facility if the facility is normally attended at least 8 hours per day, or at the nearest field office if the facility is not so attended, and shall make such Plan available to the Regional Administrator for on-site review during normal working hours.

(f) Extensions of time.

(1) The Regional Administrator may authorize an extension of time for the preparation and full implementation of an SPCC Plan beyond the time permitted for the preparation and implementation of an SPCC Plan pursuant to paragraph (a), (b) or (c) of this section where he finds that the owner or operator of a facility subject to paragraphs (a), (b) or (c) of this section cannot fully comply with the requirements of this part as a result of either nonavailability of qualified personnel, or delays in construction or equipment delivery beyond the control and without the fault of such owner or operator or their respective agents or employees.

(2) Any owner or operator seeking an extension of time pursuant to paragraph (f)(1) of this section may submit a letter of request to the Regional Administrator. Such letter shall include:

(i) A complete copy of the SPCC Plan, if completed;

(ii) A full explanation of the cause for any such delay and the specific aspects of the SPCC Plan affected by the delay;

(iii) A full discussion of actions being taken or contemplated to minimize or mitigate such delay;

(iv) A proposed time schedule for the implementation of any corrective actions being taken or contemplated, including interim dates for completion

of tests or studies, installation and operation of any necessary equipment or other preventive measures.

In addition, such owner or operator may present additional oral or written statements in support of his letter of request.

(3) The submission of a letter of request for extension of time pursuant to paragraph (f)(2) of this section shall in no way relieve the owner or operator from his obligation to comply with the requirements of § 112.3 (a), (b) or (c). Where an extension of time is authorized by the Regional Administrator for particular equipment or other specific aspects of the SPCC Plan, such extension shall in no way affect the owner's or operator's obligation to comply with the requirements of § 112.3 (a), (b) or (c) with respect to other equipment or other specific aspects of the SPCC Plan for which an extension of time has not been expressly authorized.

[38 FR 34165, Dec. 11, 1973, as amended at 41 FR 12657, Mar. 26, 1976]

§ 112.4 Amendment of SPCC Plans by Regional Administrator.

(a) Notwithstanding compliance with § 112.3, whenever a facility subject to § 112.3 (a), (b) or (c) has: Discharged more than 1,000 U.S. gallons of oil into or upon the navigable waters of the United States or adjoining shorelines in a single spill event, or discharged oil in harmful quantities, as defined in 40 CFR Part 110, into or upon the navigable waters of the United States or adjoining shorelines in two spill events, reportable under section 311(b)(5) of the FWPCA, occurring within any twelve month period, the owner or operator of such facility shall submit to the Regional Administrator, within 60 days from the time such facility becomes subject to this section, the following:

(1) Name of the facility;

(2) Name(s) of the owner or operator of the facility;

(3) Location of the facility;

(4) Date and year of initial facility operation;

(5) Maximum storage or handling capacity of the facility and normal daily throughput;

(6) Description of the facility, including maps, flow diagrams, and topographical maps;

(7) A complete copy of the SPCC Plan with any amendments;

(8) The cause(s) of such spill, including a failure analysis of system or subsystem in which the failure occurred;

(9) The corrective actions and/or countermeasures taken, including an adequate description of equipment repairs and/or replacements;

(10) Additional preventive measures taken or contemplated to minimize the possibility of recurrence;

(11) Such other information as the Regional Administrator may reasonably require pertinent to the Plan or spill event.

(b) Section 112.4 shall not apply until the expiration of the time permitted for the preparation and implementation of an SPCC Plan pursuant to § 112.3 (a), (b), (c) and (f).

(c) A complete copy of all information provided to the Regional Administrator pursuant to paragraph (a) of this section shall be sent at the same time to the State agency in charge of water pollution control activities in and for the State in which the facility is located. Upon receipt of such information such State agency may conduct a review and make recommendations to the Regional Administrator as to further procedures, methods, equipment and other requirements for equipment necessary to prevent and to contain discharges of oil from such facility.

(d) After review of the SPCC Plan for a facility subject to paragraph (a) of this section, together with all other information submitted by the owner or operator of such facility, and by the State agency under paragraph (c) of this section, the Regional Administrator may require the owner or operator of such facility to amend the SPCC Plan if he finds that the Plan does not meet the requirements of this part or that the amendment of the Plan is necessary to prevent and to contain discharges of oil from such facility.

(e) When the Regional Administrator proposes to require an amendment to the SPCC Plan, he shall notify the facility operator by certified mail addressed to, or by personal delivery to, the facility owner or operator, that he proposes to require an amendment to the Plan, and shall specify the terms of such amendment. If the facility owner or operator is a corporation, a copy of such notice shall also be mailed to the registered agent, if any, of such corporation in the State where such facility is located. Within 30 days from receipt of such notice, the facility owner or operator may submit written information, views, and arguments on the amendment. After considering all relevant material presented, the Regional Administrator shall notify the facility owner or operator of any amendment required or shall rescind the notice. The amendment required by the Regional Administrator shall become part of the Plan 30 days after such notice, unless the Regional Administrator, for good cause, shall specify another effective date. The owner or operator of the facility shall implement the amendment of the Plan as soon as possible, but not later than six months after the amendment becomes part of the Plan, unless the Regional Administrator specifies another date.

(f) An owner or operator may appeal a decision made by the Regional Administrator requiring an amendment to an SPCC Plan. The appeal shall be made to the Administrator of the United States Environmental Protection Agency and must be made in writing within 30 days of receipt of the notice from the Regional Administrator requiring the amendment. A complete copy of the appeal must be sent to the Regional Administrator at the time the appeal is made. The appeal shall contain a clear and concise statement of the issues and points of fact in the case. It may also contain additional information from the owner or operator, or from any other person. The Administrator or his designee may request additional information from the owner or operator, or from any other person. The Administrator or his designee shall render a decision within 60 days of receiving the appeal and shall notify the owner or operator of his decision.

[38 FR 34165, Dec. 11, 1973, as amended at 41 FR 12658, Mar. 26, 1976]

§ 112.5 Amendment of Spill Prevention Control and Countermeasure Plans by owners or operators.

(a) Owners or operators of facilities subject to § 112.3 (a), (b) or (c) shall amend the SPCC Plan for such facility in accordance with § 112.7 whenever there is a change in facility design, construction, operation or maintenance which materially affects the facility's potential for the discharge of oil into or upon the navigable waters of the United States or adjoining shore lines. Such amendments shall be fully implemented as soon as possible, but not later than six months after such change occurs.

(b) Notwithstanding compliance with paragraph (a) of this section, owners and operators of facilities subject to § 112.3 (a), (b) or (c) shall complete a review and evaluation of the SPCC Plan at least once every three years from the date such facility becomes subject to this part. As a result of this review and evaluation, the owner or operator shall amend the SPCC Plan within six months of the review to include more effective prevention and control technology if: (1) Such technology will significantly reduce the likelihood of a spill event from the facility, and (2) if such technology has been field-proven at the time of the review.

(c) No amendment to an SPCC Plan shall be effective to satisfy the requirements of this section unless it has been certified by a Professional Engineer in accordance with § 112.3(d).

§ 112.6 Civil penalties for violation of oil pollution prevention regulations.

Owners or operators of facilities subject to § 112.3 (a), (b) or (c) who violate the requirements of this Part 112 by failing or refusing to comply with any of the provisions of § 112.3, § 112.4 or § 112.5 shall be liable for a civil penalty of not more than $5,000 for each day such violation continues. Civil penalties shall be imposed in accordance with procedures set out in Part 114 of this Subchapter D.

(Secs. 311(j), 501(a), Pub. L. 92-500, 86 Stat. 868, 885 (33 U.S.C. 1321(j), 1361(a)))

[39 FR 31602, Aug. 29, 1974]

§ 112.7 Guidelines for the preparation and implementation of a Spill Prevention Control and Countermeasure Plan.

The SPCC Plan shall be a carefully thought-out plan, prepared in accordance with good engineering practices, and which has the full approval of management at a level with authority to commit the necessary resources. If the plan calls for additional facilities or procedures, methods, or equipment not yet fully operational, these items should be discussed in separate paragraphs, and the details of installation and operational start-up should be explained separately. The complete SPCC Plan shall follow the sequence outlined below, and include a discussion of the facility's conformance with the appropriate guidelines listed:

(a) A facility which has experienced one or more spill events within twelve months prior to the effective date of this part should include a written description of each such spill, corrective action taken and plans for preventing recurrence.

(b) Where experience indicates a reasonable potential for equipment failure (such as tank overflow, rupture, or leakage), the plan should include a prediction of the direction, rate of flow, and total quantity of oil which could be discharged from the facility as a result of each major type of failure.

(c) Appropriate containment and/or diversionary structures or equipment to prevent discharged oil from reaching a navigable water course should be provided. One of the following preventive systems or its equivalent should be used as a minimum:

(1) Onshore facilities:

(i) Dikes, berms or retaining walls sufficiently impervious to contain spilled oil;

(ii) Curbing;

(iii) Culverting, gutters or other drainage systems;

(iv) Weirs, booms or other barriers;

(v) Spill diversion ponds;

(vi) Retention ponds;

(vii) Sorbent materials.

(2) Offshore facilities:

(i) Curbing, drip pans;

(ii) Sumps and collection systems.

(d) When it is determined that the installation of structures or equipment listed in § 112.7(c) to prevent discharged oil from reaching the navigable waters is not practicable from any onshore or offshore facility, the owner or operator should clearly demonstrate such impracticability and provide the following:

(1) A strong oil spill contingency plan following the provision of 40 CFR Part 109.

(2) A written commitment of manpower, equipment and materials required to expeditiously control and remove any harmful quantity of oil discharged.

(e) In addition to the minimal prevention standards listed under § 112.7(c), sections of the Plan should include a complete discussion of conformance with the following applicable guidelines, other effective spill prevention and containment procedures (or, if more stringent, with State rules, regulations and guidelines):

(1) *Facility drainage (onshore); (excluding production facilities).* (i) Drainage from diked storage areas should be restrained by valves or other positive means to prevent a spill or other excessive leakage of oil into the drainage system or inplant effluent treatment system, except where plan systems are designed to handle such leakage. Diked areas may be emptied by pumps or ejectors; however, these should be manually activated and the condition of the accumulation should be examined before starting to be sure no oil will be discharged into the water.

(ii) Flapper-type drain valves should not be used to drain diked areas. Valves used for the drainage of diked areas should, as far as practical, be of manual, open-and-closed design. When plant drainage drains directly into water courses and not into wastewater treatment plants, retained storm water should be inspected as provided in paragraphs (e)(2)(iii) (B), (C) and (D) before drainage.

(iii) Plant drainage systems from undiked areas should, if possible, flow into ponds, lagoons or catchment basins, designed to retain oil or return it to the facility. Catchment basins should not be located in areas subject to periodic flooding.

(iv) If plant drainage is not engineered as above, the final discharge of all in-plant ditches should be equipped with a diversion system that could, in the event of an uncontrolled spill, return the oil to the plant.

(v) Where drainage waters are treated in more than one treatment unit, natural hydraulic flow should be used. If pump transfer is needed, two "lift" pumps should be provided, and at least one of the pumps should be permanently installed when such treatment is continuous. In any event, whatever techniques are used facility drainage systems should be adequately engineered to prevent oil from reaching navigable waters in the event of equipment failure or human error at the facility.

(2) *Bulk storage tanks (onshore); (excluding production facilities).* (i) No tank should be used for the storage of oil unless its material and construction are compatible with the material stored and conditions of storage such as pressure and temperature, etc.

(ii) All bulk storage tank installations should be constructed so that a secondary means of containment is provided for the entire contents of the largest single tank plus sufficient freeboard to allow for precipitation. Diked areas should be sufficiently impervious to contain spilled oil. Dikes, containment curbs, and pits are commonly employed for this purpose, but they may not always be appropriate. An alternative system could consist of a complete drainage trench enclosure arranged so that a spill could terminate and be safely confined in an inplant catchment basin or holding pond.

(iii) Drainage of rainwater from the diked area into a storm drain or an effluent discharge that empties into an open water course, lake, or pond, and bypassing the in-plant treatment system may be acceptable if:

(A) The bypass valve is normally sealed closed.

(B) Inspection of the run-off rain water ensures compliance with applicable water quality standards and will not cause a harmful discharge as defined in 40 CFR Part 110.

(C) The bypass valve is opened, and resealed following drainage under responsible supervision.

(D) Adequate records are kept of such events.

(iv) Buried metallic storage tanks represent a potential for undetected spills. A new buried installation should be protected from corrosion by coatings, cathodic protection or other effective methods compatible with local soil conditions. Such buried tanks should at least be subjected to regular pressure testing.

(v) Partially buried metallic tanks for the storage of oil should be avoided, unless the buried section of the shell is adequately coated, since partial burial in damp earth can cause rapid corrosion of metallic surfaces, especially at the earth/air interface.

(vi) Aboveground tanks should be subject to periodic integrity testing, taking into account tank design (floating roof, etc.) and using such techniques as hydrostatic testing, visual inspection or a system of non-destructive shell thickness testing. Comparison records should be kept where appropriate, and tank supports and foundations should be included in these inspections. In addition, the outside of the tank should frequently be observed by operating personnel for signs of deterioration, leaks which might cause a spill, or accumulation of oil inside diked areas.

(vii) To control leakage through defective internal heating coils, the following factors should be considered and applied, as appropriate.

(A) The steam return or exhaust lines from internal heating coils which discharge into an open water course should be monitored for contamination, or passed through a settling tank, skimmer, or other separation or retention system.

(B) The feasibility of installing an external heating system should also be considered.

(viii) New and old tank installations should, as far as practical, be fail-safe engineered or updated into a fail-safe engineered installation to avoid spills. Consideration should be given to providing one or more of the following devices:

(A) High liquid level alarms with an audible or visual signal at a constantly manned operation or surveillance station; in smaller plants an audible air vent may suffice.

(B) Considering size and complexity of the facility, high liquid level pump cutoff devices set to stop flow at a predetermined tank content level.

(C) Direct audible or code signal communication between the tank gauger and the pumping station.

(D) A fast response system for determining the liquid level of each bulk storage tank such as digital computers, telepulse, or direct vision gauges or their equivalent.

(E) Liquid level sensing devices should be regularly tested to insure proper operation.

(ix) Plant effluents which are discharged into navigable waters should have disposal facilities observed frequently enough to detect possible system upsets that could cause an oil spill event.

(x) Visible oil leaks which result in a loss of oil from tank seams, gaskets, rivets and bolts sufficiently large to cause the accumulation of oil in diked areas should be promptly corrected.

(xi) Mobile or portable oil storage tanks (onshore) should be positioned or located so as to prevent spilled oil from reaching navigable waters. A secondary means of containment, such as dikes or catchment basins, should be furnished for the largest single compartment or tank. These facilities should be located where they will not be subject to periodic flooding or washout.

(3) *Facility transfer operations, pumping, and in-plant process (onshore); (excluding production facilities).* (i) Buried piping installations should have a protective wrapping and coating and should be cathodically protected if soil conditions warrant. If a section of buried line is exposed for any reason, it should be carefully examined for deterioration. If corrosion damage is found, additional examination and corrective action should be taken as indicated by the magnitude of the damage. An alternative would be the more frequent use of exposed pipe corridors or galleries.

(ii) When a pipeline is not in service, or in standby service for an extended time the terminal connection at the transfer point should be capped or blank-flanged, and marked as to origin.

(iii) Pipe supports should be properly designed to minimize abrasion and corrosion and allow for expansion and contraction.

(iv) All aboveground valves and pipelines should be subjected to regular examinations by operating personnel at which time the general condition of items, such as flange joints, expansion joints, valve glands and bodies, catch pans, pipeline supports, locking of valves, and metal surfaces should be assessed. In addition, periodic pressure testing may be warranted for piping in areas where facility drainage is such that a failure might lead to a spill event.

(v) Vehicular traffic granted entry into the facility should be warned verbally or by appropriate signs to be sure that the vehicle, because of its size, will not endanger above ground piping.

(4) *Facility tank car and tank truck loading/unloading rack (onshore).* (i) Tank car and tank truck loading/unloading procedures should meet the minimum requirements and regulation established by the Department of Transportation.

(ii) Where rack area drainage does not flow into a catchment basin or treatment facility designed to handle spills, a quick drainage system should be used for tank truck loading and unloading areas. The containment system should be designed to hold at least maximum capacity of any single compartment of a tank car or tank truck loaded or unloaded in the plant.

(iii) An interlocked warning light or physical barrier system, or warning signs, should be provided in loading/unloading areas to prevent vehicular departure before complete disconnect of flexible or fixed transfer lines.

(iv) Prior to filling and departure of any tank car or tank truck, the lowermost drain and all outlets of such vehicles should be closely examined for leakage, and if necessary, tightened, adjusted, or replaced to prevent liquid leakage while in transit.

(5) *Oil production facilities (onshore)*—(i) *Definition.* An onshore production facility may include all wells, flowlines, separation equipment, storage facilities, gathering lines, and auxiliary non-transportation-related equipment and facilities in a single geographical oil or gas field operated by a single operator.

(ii) *Oil production facility (onshore) drainage.* (A) At tank batteries and central treating stations where an accidental discharge of oil would have a reasonable possibility of reaching navigable waters, the dikes or equivalent required under § 112.7(c)(1) should have drains closed and sealed at all times except when rainwater is being drained. Prior to drainage, the diked area should be inspected as provided in paragraphs (e)(2)(iii) (B), (C), and (D). Accumulated oil on the rainwater should be picked up and returned to storage or disposed of in accordance with approved methods.

(B) Field drainage ditches, road ditches, and oil traps, sumps or skimmers, if such exist, should be inspected at regularly scheduled intervals for accumulation of oil that may have escaped from small leaks. Any such accumulations should be removed.

(iii) *Oil production facility (onshore) bulk storage tanks.* (A) No tank should be used for the storage of oil unless its material and construction are compatible with the material stored and the conditions of storage.

(B) All tank battery and central treating plant installations should be provided with a secondary means of containment for the entire contents of the largest single tank if feasible, or alternate systems such as those outlined in § 112.7(c)(1). Drainage from undiked areas should be safely confined in a catchment basin or holding pond.

(C) All tanks containing oil should be visually examined by a competent person for condition and need for maintenance on a scheduled periodic basis. Such examination should include the foundation and supports of tanks that are above the surface of the ground.

(D) New and old tank battery installations should, as far as practical, be fail-safe engineered or updated into a fail-safe engineered installation to prevent spills. Consideration should be given to one or more of the following:

(*1*) Adequate tank capacity to assure that a tank will not overfill should a pumper/gauger be delayed in making his regular rounds.

(*2*) Overflow equalizing lines between tanks so that a full tank can overflow to an adjacent tank.

(*3*) Adequate vacuum protection to prevent tank collapse during a pipeline run.

(*4*) High level sensors to generate and transmit an alarm signal to the computer where facilities are a part of a computer production control system.

(iv) *Facility transfer operations, oil production facility (onshore).* (A) All above ground valves and pipelines should be examined periodically on a scheduled basis for general condition of items such as flange joints, valve glands and bodies, drip pans, pipeline supports, pumping well polish rod stuffing boxes, bleeder and gauge valves.

(B) Salt water (oil field brine) disposal facilities should be exained often, particularly following a sudden change in atmospheric temperature to detect possible system upsets that could cause an oil discharge.

(C) Production facilities should have a program of flowline maintenance to prevent spills from this source. The program should include periodic examinations, corrosion protection, flowline replacement, and adequate records, as appropriate, for the individual facility.

(6) *Oil drilling and workover facilities (onshore).* (i) Mobile drilling or workover equipment should be positioned or located so as to prevent spilled oil from reaching navigable waters.

(ii) Depending on the location, catchment basins or diversion structures may be necessary to intercept and contain spills of fuel, crude oil, or oily drilling fluids.

(iii) Before drilling below any casing string or during workover operations, a blowout prevention (BOP) assembly and well control system should be installed that is capable of controlling any well head pressure that is expected to be encountered while that BOP

assembly is on the well. Casing and BOP installations should be in accordance with State regulatory agency requirements.

(7) *Oil drilling, production, or workover facilities (offshore).* (i) Definition: "An oil drilling, production or workover facility (offshore)" may include all drilling or workover equipment, wells, flowlines, gathering lines, platforms, and auxiliary nontransportation-related equipment and facilities in a single geographical oil or gas field operated by a single operator.

(ii) Oil drainage collection equipment should be used to prevent and control small oil spillage around pumps, glands, valves, flanges, expansion joints, hoses, drain lines, separators, treaters, tanks, and allied equipment. Drains on the facility should be controlled and directed toward a central collection sump or equivalent collection system sufficient to prevent discharges of oil into the navigable waters of the United States. Where drains and sumps are not practicable oil contained in collection equipment should be removed as often as necessary to prevent overflow.

(iii) For facilities employing a sump system, sump and drains should be adequately sized and a spare pump or equivalent method should be available to remove liquid from the sump and assure that oil does not escape. A regular scheduled preventive maintenance inspection and testing program should be employed to assure reliable operation of the liquid removal system and pump start-up device. Redundant automatic sump pumps and control devices may be required on some installations.

(iv) In areas where separators and treaters are equipped with dump valves whose predominant mode of failure is in the closed position and pollution risk is high, the facility should be specially equipped to prevent the escape of oil. This could be accomplished by extending the flare line to a diked area if the separator is near shore, equipping it with a high liquid level sensor that will automatically shut-in wells producing to the separator, parallel redundant dump valves, or other feasible alternatives to prevent oil discharges.

(v) Atmospheric storage or surge tanks should be equipped with high liquid level sensing devices or other acceptable alternatives to prevent oil discharges.

(vi) Pressure tanks should be equipped with high and low pressure sensing devices to activate an alarm and/or control the flow or other acceptable alternatives to prevent oil discharges.

(vii) Tanks should be equipped with suitable corrosion protection.

(viii) A written procedure for inspecting and testing pollution prevention equipment and systems should be prepared and maintained at the facility. Such procedures should be included as part of the SPCC Plan.

(ix) Testing and inspection of the pollution prevention equipment and systems at the facility should be conducted by the owner or operator on a scheduled periodic basis commensurate with the complexity, conditions and circumstances of the facility or other appropriate regulations.

(x) Surface and subsurface well shut-in valves and devices in use at the facility should be sufficiently described to determine method of activation or control, e.g., pressure differential, change in fluid or flow conditions, combination of pressure and flow, manual or remote control mechanisms. Detailed records for each well, while not necessarily part of the plan should be kept by the owner or operator.

(xi) Before drilling below any casing string, and during workover operations a blowout preventer (BOP) assembly and well control system should be installed that is capable of controlling any well-head pressure that is expected to be encountered while that BOP assembly is on the well. Casing and BOP installations should be in accordance with State regulatory agency requirements.

(xii) Extraordinary well control measures should be provided should emergency conditions, including fire, loss of control and other abnormal conditions, occur. The degree of control system redundancy should vary with hazard exposure and probable consequences of failure. It is recommended that surface shut-in systems

have redundant or "fail close" valving. Subsurface safety valves may not be needed in producing wells that will not flow but should be installed as required by applicable State regulations.

(xiii) In order that there will be no misunderstanding of joint and separate duties and obligations to perform work in a safe and pollution free manner, written instructions should be prepared by the owner or operator for contractors and subcontractors to follow whenever contract activities include servicing a well or systems appurtenant to a well or pressure vessel. Such instructions and procedures should be maintained at the offshore production facility. Under certain circumstances and conditions such contractor activities may require the presence at the facility of an authorized representative of the owner or operator who would intervene when necessary to prevent a spill event.

(xiv) All manifolds (headers) should be equipped with check valves on individual flowlines.

(xv) If the shut-in well pressure is greater than the working pressure of the flowline and manifold valves up to and including the header valves associated with that individual flowline, the flowline should be equipped with a high pressure sensing device and shut-in valve at the wellhead unless provided with a pressure relief system to prevent over pressuring.

(xvi) All pipelines appurtenant to the facility should be protected from corrosion. Methods used, such as protective coatings or cathodic protection, should be discussed.

(xvii) Sub-marine pipelines appurtenant to the facility should be adequately protected against environmental stresses and other activities such as fishing operations.

(xviii) Sub-marine pipelines appurtenant to the facility should be in good operating condition at all times and inspected on a scheduled periodic basis for failures. Such inspections should be documented and maintained at the facility.

(8) *Inspections and records.* Inspections required by this part should be in accordance with written procedures developed for the facility by the owner or operator. These written procedures and a record of the inspections, signed by the appropriate supervisor or inspector, should be made part of the SPCC Plan and maintained for a period of three years.

(9) *Security (excluding oil production facilities).* (i) All plants handling, processing, and storing oil should be fully fenced, and entrance gates should be locked and/or guarded when the plant is not in production or is unattended.

(ii) The master flow and drain valves and any other valves that will permit direct outward flow of the tank's content to the surface should be securely locked in the closed position when in non-operating or non-standby status.

(iii) The starter control on all oil pumps should be locked in the "off" position or located at a site accessible only to authorized personnel when the pumps are in a non-operating or non-standby status.

(iv) The loading/unloading connections of oil pipelines should be securely capped or blank-flanged when not in service or standby service for an extended time. This security practice should also apply to pipelines that are emptied of liquid content either by draining or by inert gas pressure.

(v) Facility lighting should be commensurate with the type and location of the facility. Consideration should be given to: (A) Discovery of spills occurring during hours of darkness, both by operating personnel, if present, and by non-operating personnel (the general public, local police, etc.) and (B) prevention of spills occurring through acts of vandalism.

(10) *Personnel, training and spill prevention procedures.* (i) Owners or operators are responsible for properly instructing their personnel in the operation and maintenance of equipment to prevent the discharges of oil and applicable pollution control laws, rules and regulations.

(ii) Each applicable facility should have a designated person who is accountable for oil spill prevention and who reports to line management.

(iii) Owners or operators should schedule and conduct spill prevention briefings for their operating personnel at intervals frequent enough to assure adequate understanding of the SPCC

Plan for that facility. Such briefings should highlight and describe known spill events or failures, malfunctioning components, and recently developed precautionary measures.

APPENDIX—MEMORANDUM OF UNDERSTANDING BETWEEN THE SECRETARY OF TRANSPORTATION AND THE ADMINISTRATOR OF THE ENVIRONMENTAL PROTECTION AGENCY

SECTION II—DEFINITIONS

The Environmental Protection Agency and the Department of Transportation agree that for the purposes of Executive Order 11548, the term:

(1) "Non-transportation-related onshore and offshore facilities" means:

(A) Fixed onshore and offshore oil well drilling facilities including all equipment and appurtenances related thereto used in drilling operations for exploratory or development wells, but excluding any terminal facility, unit or process integrally associated with the handling or transferring of oil in bulk to or from a vessel.

(B) Mobile onshore and offshore oil well drilling platforms, barges, trucks, or other mobile facilities including all equipment and appurtenances related thereto when such mobile facilities are fixed in position for the purpose of drilling operations for exploratory or development wells, but excluding any terminal facility, unit or process integrally associated with the handling or transferring of oil in bulk to or from a vessel.

(C) Fixed onshore and offshore oil production structures, platforms, derricks, and rigs including all equipment and appurtenances related thereto, as well as completed wells and the wellhead separators, oil separators, and storage facilities used in the production of oil, but excluding any terminal facility, unit or process integrally associated with the handling or transferring of oil in bulk to or from a vessel.

(D) Mobile onshore and offshore oil production facilities including all equipment and appurtenances related thereto as well as completed wells and wellhead equipment, piping from wellheads to oil separators, oil separators, and storage facilities used in the production of oil when such mobile facilities are fixed in position for the purpose of oil production operations, but excluding any terminal facility, unit or process integrally associated with the handling or transferring of oil in bulk to or from a vessel.

(E) Oil refining facilities including all equipment and appurtenances related thereto as well as in-plant processing units, storage units, piping, drainage systems and waste treatment units used in the refining of oil, but excluding any terminal facility, unit or process integrally associated with the handling or transferring of oil in bulk to or from a vessel.

(F) Oil storage facilities including all equipment and appurtenances related thereto as well as fixed bulk plant storage, terminal oil storage facilities, consumer storage, pumps and drainage systems used in the storage of oil, but excluding inline or breakout storage tanks needed for the continuous operation of a pipeline system and any terminal facility, unit or process integrally associated with the handling or transferring of oil in bulk to or from a vessel.

(G) Industrial, commercial, agricultural or public facilities which use and store oil, but excluding any terminal facility, unit or process integrally associated with the handling or transferring of oil in bulk to or from a vessel.

(H) Waste treatment facilities including in-plant pipelines, effluent discharge lines, and storage tanks, but excluding waste treatment facilities located on vessels and terminal storage tanks and appurtenances for the reception of oily ballast water or tank washings from vessels and associated systems used for off-loading vessels.

(I) Loading racks, transfer hoses, loading arms and other equipment which are appurtenant to a nontransportation-related facility or terminal facility and which are used to transfer oil in bulk to or from highway vehicles or railroad cars.

(J) Highway vehicles and railroad cars which are used for the transport of oil exclusively within the confines of a nontransportation-related facility and which are not intended to transport oil in interstate or intrastate commerce.

(K) Pipeline systems which are used for the transport of oil exclusively within the confines of a nontransportation-related facility or terminal facility and which are not intended to transport oil in interstate or intrastate commerce, but excluding pipeline systems used to transfer oil in bulk to or from a vessel.

(2) "Transportation-related onshore and offshore facilities" means:

(A) Onshore and offshore terminal facilities including transfer hoses, loading arms and other equipment and appurtenances used for the purpose of handling or transferring oil in bulk to or from a vessel as well as storage tanks and appurtenances for the reception of oily ballast water or tank washings from vessels, but excluding terminal waste treatment facilities and terminal oil storage facilities.

(B) Transfer hoses, loading arms and other equipment appurtenant to a nontransportation-related facility which is used to transfer oil in bulk to or from a vessel.

(C) Interstate and intrastate onshore and offshore pipeline systems including pumps and appurtenances related thereto as well as in-line or breakout storage tanks needed for the continuous operation of a pipeline system, and pipelines from onshore and offshore oil production facilities, but excluding onshore and offshore piping from wellheads to oil separators and pipelines which are used for the transport of oil exclusively within the confines of a nontransportation-related facility or terminal facility and which are not intended to transport oil in interstate or intrastate commerce or to transfer oil in bulk to or from a vessel.

(D) Highway vehicles and railroad cars which are used for the transport of oil in interstate or intrastate commerce and the equipment and appurtenances related thereto, and equipment used for the fueling of locomotive units, as well as the rights-of-way on which they operate. Excluded are highway vehicles and railroad cars and motive power used exclusively within the confines of a nontransportation-related facility or terminal facility and which are not intended for use in interstate or intrastate commerce.

PART 113—LIABILITY LIMITS FOR SMALL ONSHORE STORAGE FACILITIES

Subpart A—Oil Storage Facilities

Sec.

AUTHORITY: Sec. 311(f)(2), 86 Stat. 867, 33 U.S.C. 1251 (1972).

SOURCE: 38 FR 25440, Sept. 13, 1973, unless otherwise noted.

Subpart A—Oil Storage Facilities

§ 113.1 Purpose.

This subpart establishes size classifications and associated liability limits for small onshore oil storage facilities with fixed capacity of 1,000 barrels or less.

§ 113.2 Applicability.

This subpart applies to all onshore oil storage facilities with fixed capacity of 1,000 barrels or less. When a discharge to the waters of the United States occurs from such facilities and when removal of said discharge is performed by the United States Government pursuant to the provisions of subsection 311(c)(1) of the act, the liability of the owner or operator and the facility will be limited to the amounts specified in § 113.4.

§ 113.3 Definitions.

As used in this subpart, the following terms shall have the meanings indicated below:

(a) "Aboveground" storage facility means a tank or other container, the bottom of which is on a plane not more than 6 inches below the surrounding surface.

(b) "Act" means the Federal Water Pollution Control Act, as amended, 33 U.S.C. 1151, et seq.

(c) "Barrel" means 42 United States gallons at 60 degrees Fahrenheit.

(d) "Belowground" storage facility means a tank or other container located other than as defined as "Aboveground".

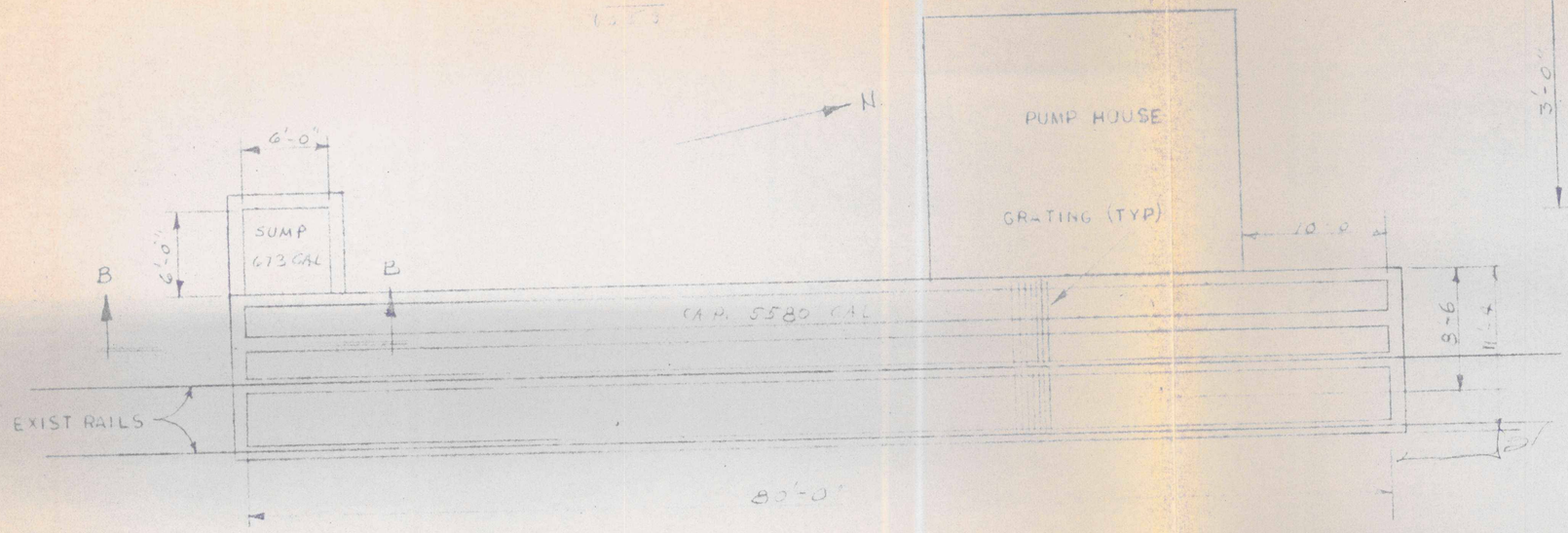
(e) "Discharge" includes, but is not limited to any spilling, leaking, pumping, pouring, emitting, emptying or dumping.

(f) "Onshore Oil Storage Facility" means any facility (excluding motor vehicles and rolling stock) of any kind located in, on, or under, any land within the United States, other than submerged land.

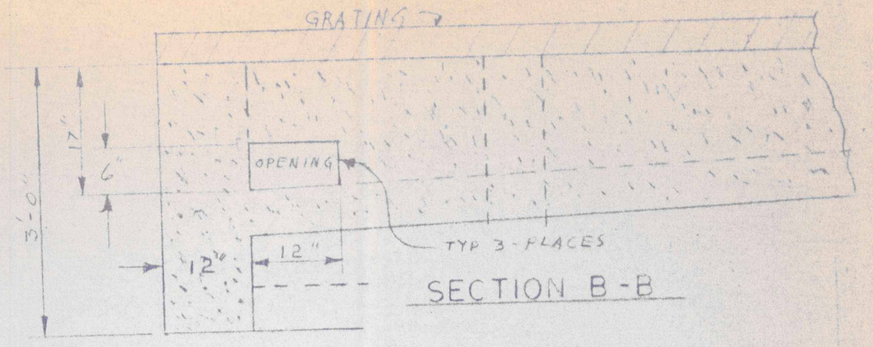
(g) "On-Scene Coordinator" is the single Federal representative designated pursuant to the National Oil and Hazardous Substances Pollution Contingency Plan and identified in approved Regional Oil and Hazardous Substances Pollution Contingency Plans.

(h) "Oil" means oil of any kind or in any form, including but no limited to, petroleum, fuel oil, sludge, oil refuse, and oil mixed with wastes other than dredged spoil.

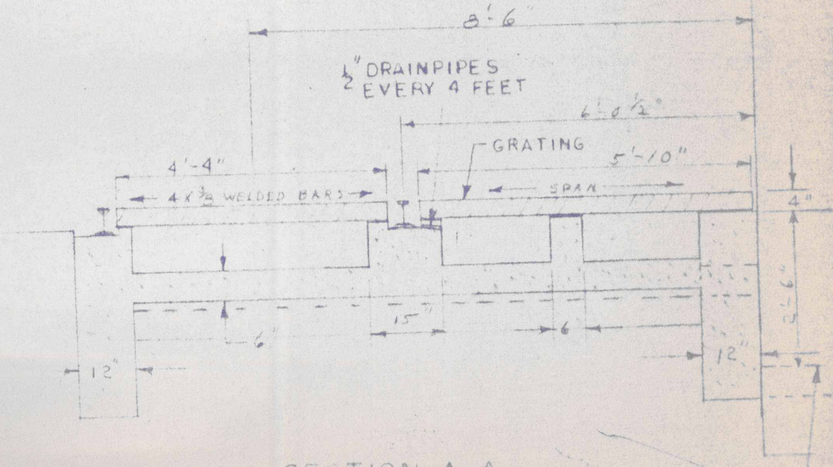
(i) "Remove" or "removal" means the removal of the oil from the water and shorelines or the taking of such other actions as the Federal On-Scene Coordinator may determine to be necessary to minimize or mitigate damage to the public health or welfare, including but not limited to, fish, shellfish,



PLAN

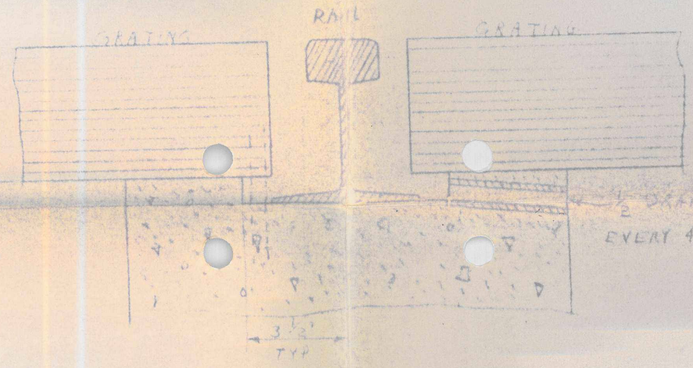


SECTION B-B



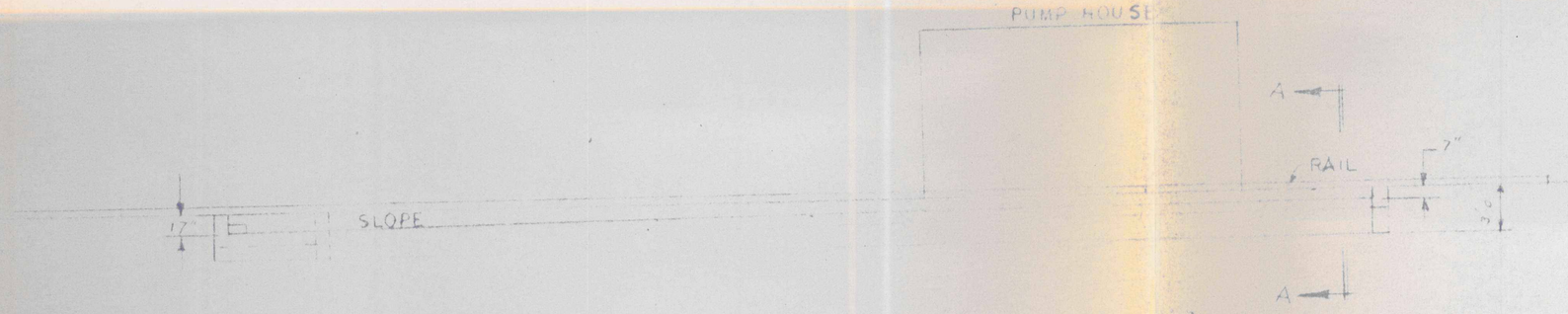
SECTION A-A

SUMP - 2'-10" DEEP

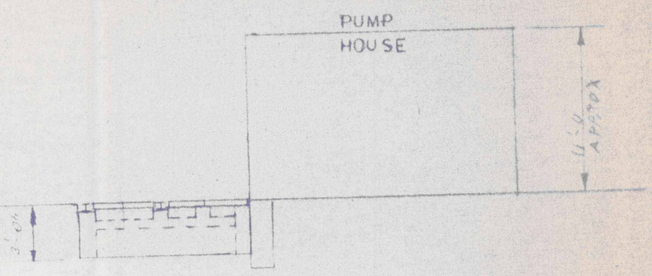


RAIL T. 5" WIDTH OF BASE 5"
WIDTH OF HEAD 2½
4-¾" ELEVEN INCHES

[illegible] "HEAVY WEIGHT" [illegible]

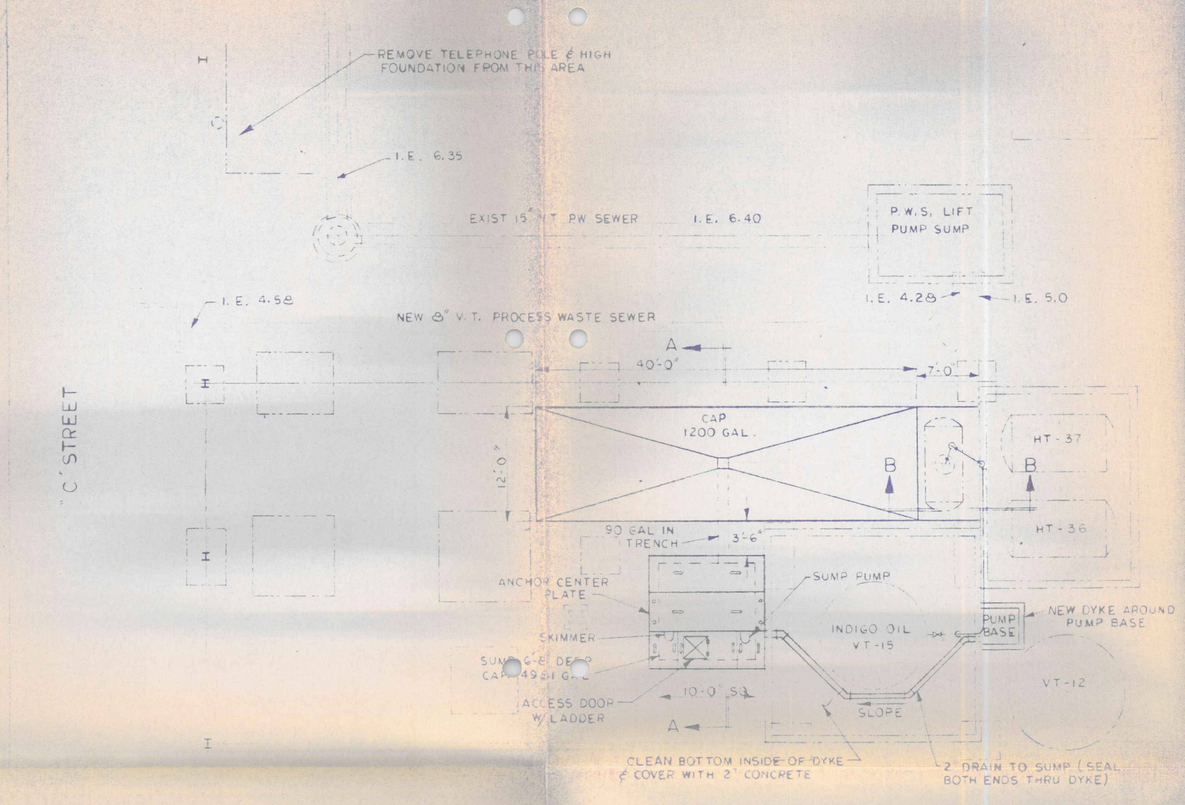


ELEVATION



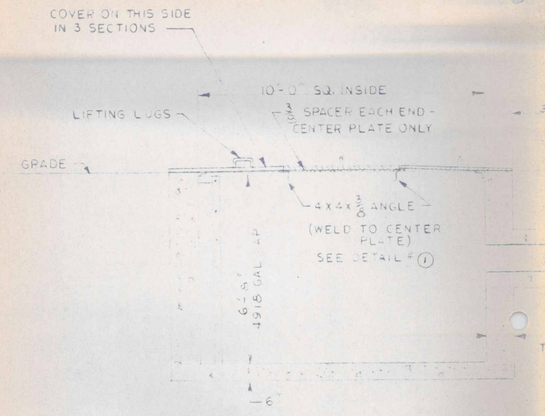
END (LOOKING SOUTH)

L-2172



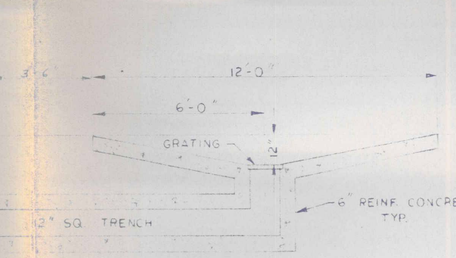
PLAN (TANK PARK #1)

SCALE: $\frac{1}{8}$" = 1'-0"

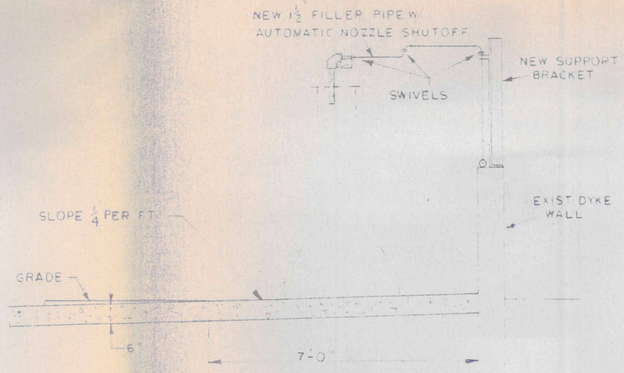


SECTION A-A

SCALE: $\frac{3}{8}$" = 1'-0"



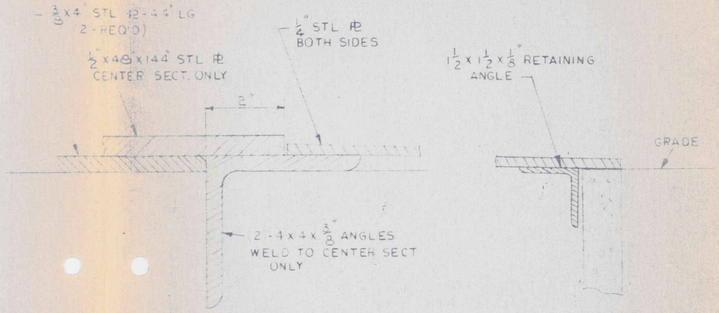
1200 GAL
50
4981
TOTAL 6271 # CAP



PORTABLE TANK STATION

SECTION B-B

SCALE: $\frac{1}{2}$" = 1'-0"



DETAIL #1

SCALE: $\frac{1}{2}$" = 1'

5-6-74

MAY 5 1986

NO.	REVISION	BY	APP.	DATE

NO.	REVISION	BY	APP.	DATE

NO.	REVISION	BY	APP.	DATE

REFERENCE	DWG. NO.

REFERENCE	DWG. NO.

APPROVED DATE

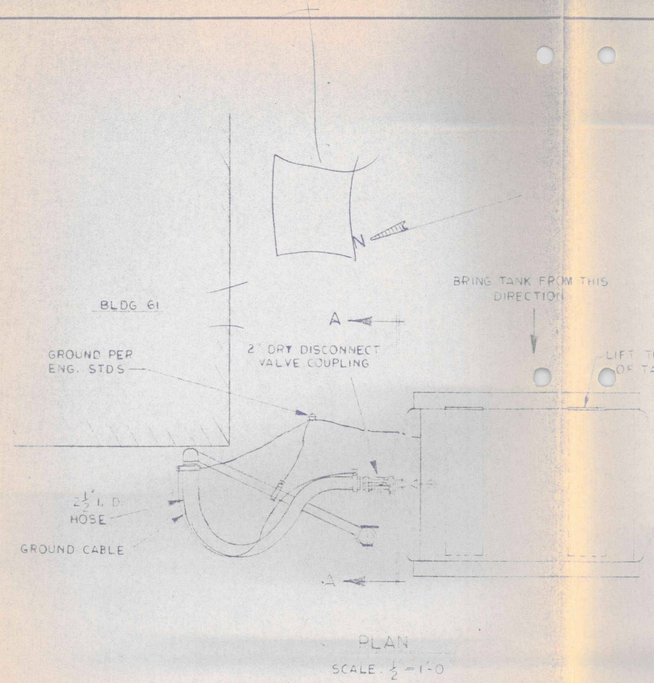
JOB NO. 26209
ITEM
BLDG PLANT-A
APP. NO.
SCALE NOTED

SPECIALTY CHEMICALS DIVISION
BUFFALO DYE PLANT
PLANT ENGINEERING DEPARTMENT
OIL SPILL CONTROL - INDIGO OIL
DRN. EDG DATE 5-6-74 CH. DATE

Allied Chemical

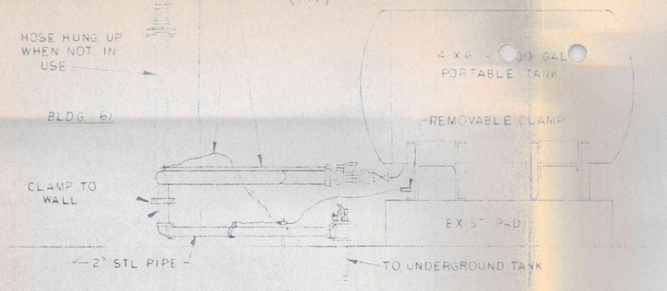
L-2171

REV.



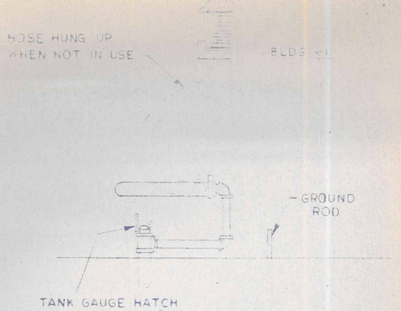
PLAN

SCALE: ½"=1'-0"

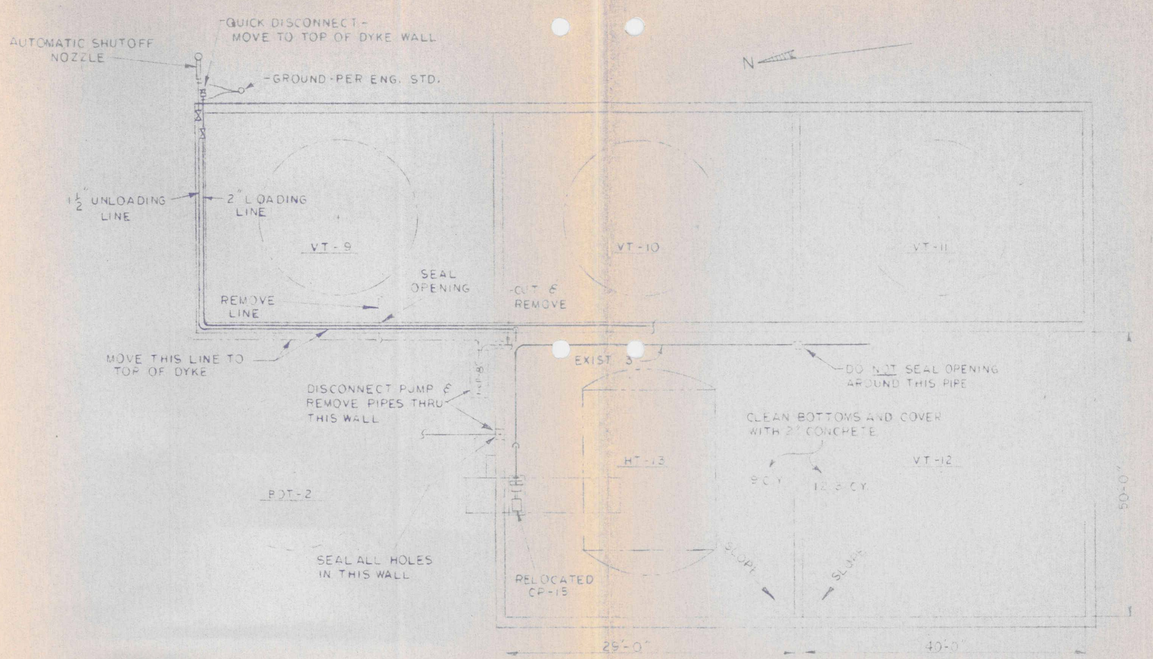


ELEVATION

SCALE: ½"=1'-0"

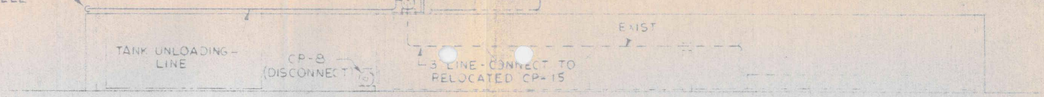


SECTION A-A

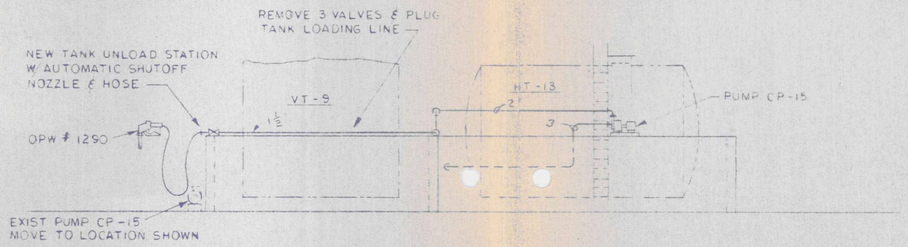


PLAN (TANK PARK #10)

NO SCALE



ELEVATION (LOOKING EAST)



ELEVATION (LOOKING SOUTH)

NO.	REVISION	BY	APP.	DATE

NO.	REVISION	BY	APP.	DATE

NO.	REVISION	BY	APP.	DATE

7. REFERENCE	8. DWG. NO.
FOUNDATION & LOCATION PLAN TANK PARK #10	SC-85247

9. REFERENCE	10. DWG. NO.

11. APPROVED	DATE

12.

JOB NO. 26209
ITEM
BLDG VARIOUS
APP NO
T-
SCALE NOTED

SPECIALTY CHEMICALS DIVISION

BUFFALO DYE PLANT

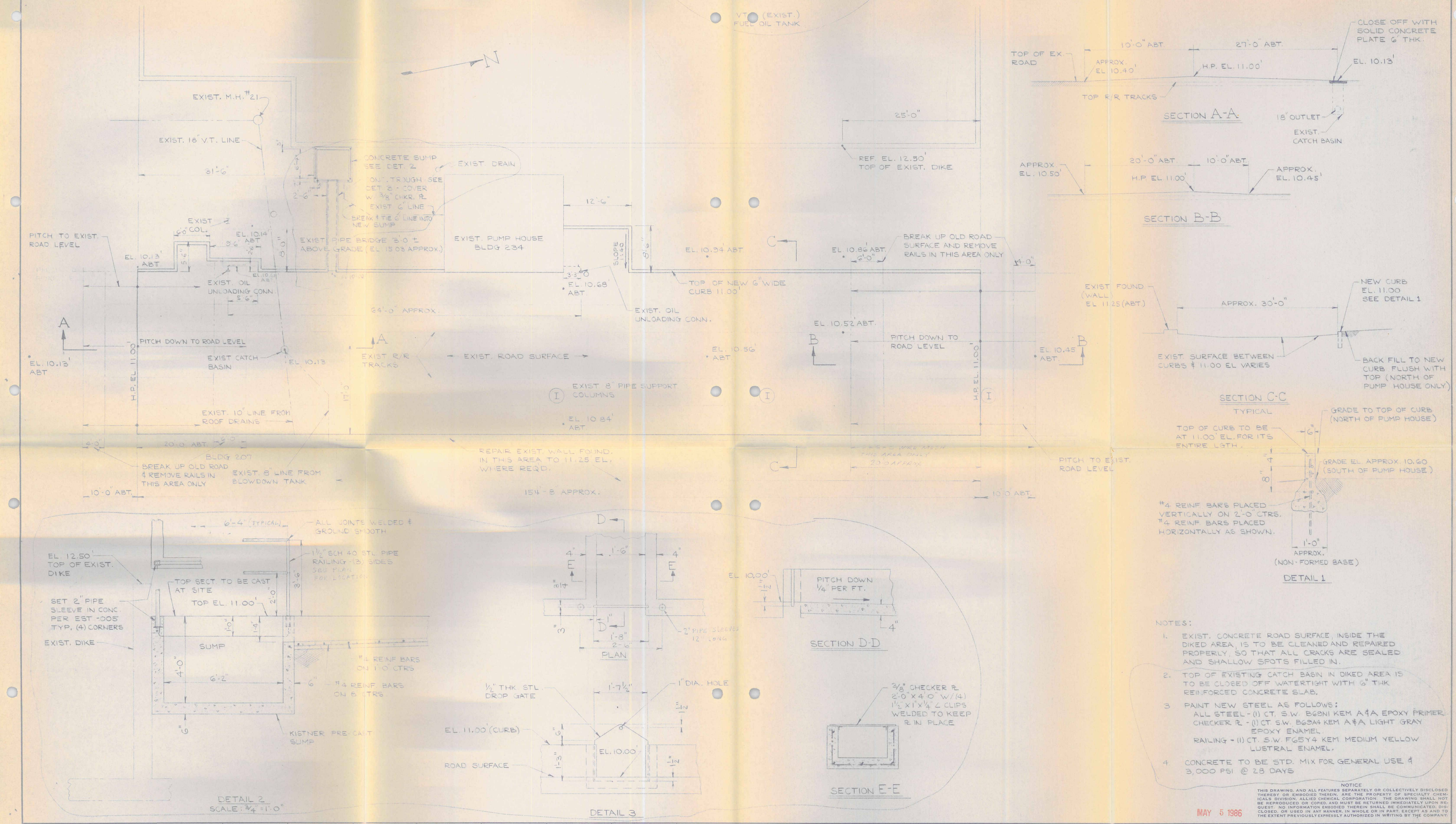
PLANT ENGINEERING DEPARTMENT

Allied Chemical

OIL SPILL CONTROL

L-2169

DRN. EDG DATE 5-3-79 CH. DATE REV.



NOTES:

1. EXIST. CONCRETE ROAD SURFACE, INSIDE THE DIKED AREA, IS TO BE CLEANED AND REPAIRED PROPERLY, SO THAT ALL CRACKS ARE SEALED AND SHALLOW SPOTS FILLED IN.
2. TOP OF EXISTING CATCH BASIN IN DIKED AREA IS TO BE CLOSED OFF WATERTIGHT WITH 6" THK REINFORCED CONCRETE SLAB.
3. PAINT NEW STEEL AS FOLLOWS:
   ALL STEEL - (1) CT. S.W. B69N1 KEM A&A EPOXY PRIMER
   CHECKER PL - (1) CT S.W. B69A4 KEM A&A LIGHT GRAY EPOXY ENAMEL
   RAILING - (1) CT. S.W. F69Y4 KEM MEDIUM YELLOW LUSTRAL ENAMEL.
4. CONCRETE TO BE STD. MIX FOR GENERAL USE @ 3,000 PSI @ 28 DAYS

MAY 5 1986

NO.	REVISION	BY	APP.	DATE
1	GENERAL REVISIONS	W.R.	AL	3/18/75

NO.	REFERENCE	DWG. NO.
	ARRGT. OF FUEL OIL COMPOUND	517 B 38

APPROVED	DATE
	9/7/75
	11/14/75

JOB NO. 26643
ITEM
LDG. PLANT C
APP. NO.
SCALE 1/8" = 1'-0"

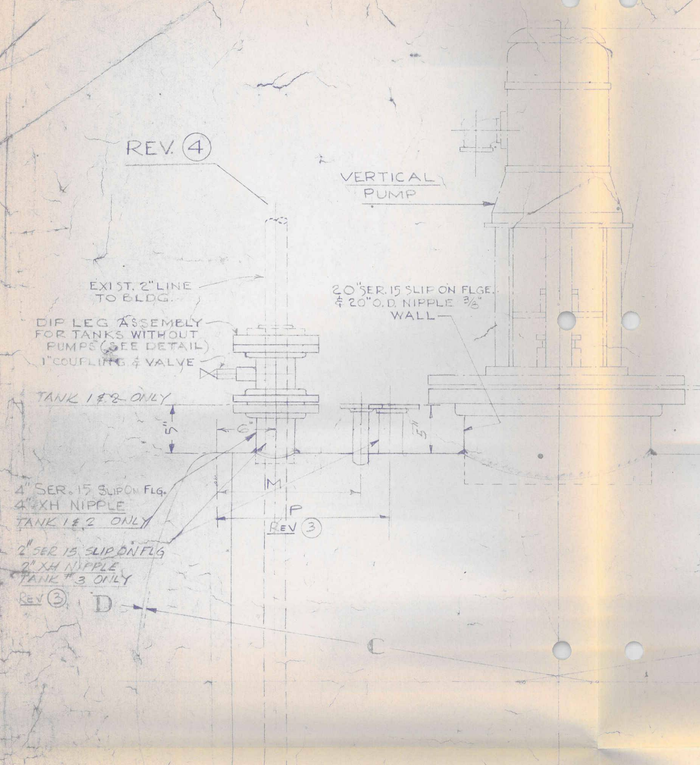
SPECIALTY CHEMICALS DIVISION
BUFFALO DYE PLANT
PLANT ENGINEERING DEPARTMENT
OIL SPILL PREVENTION
ARCH. DETAILS

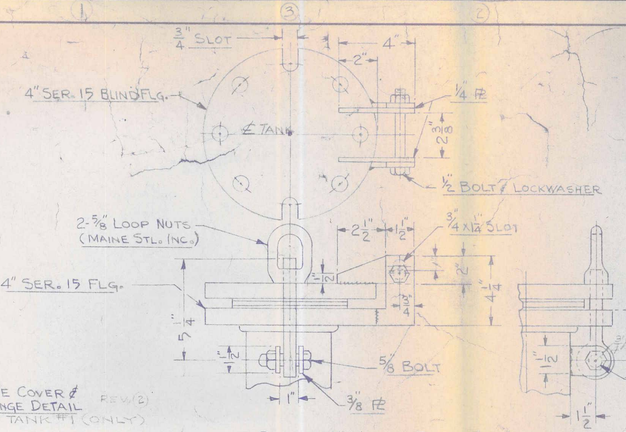
Allied Chemical

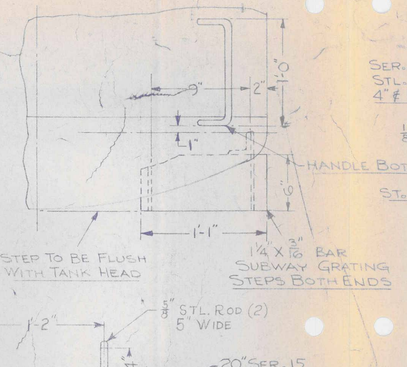
DRN. W.P.R. DATE 8-5-75 CH. DATE

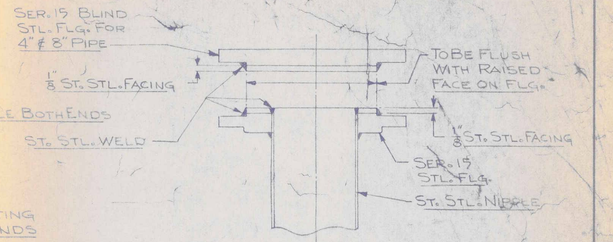
SC-89950-1
REV. 1

REV. (4)

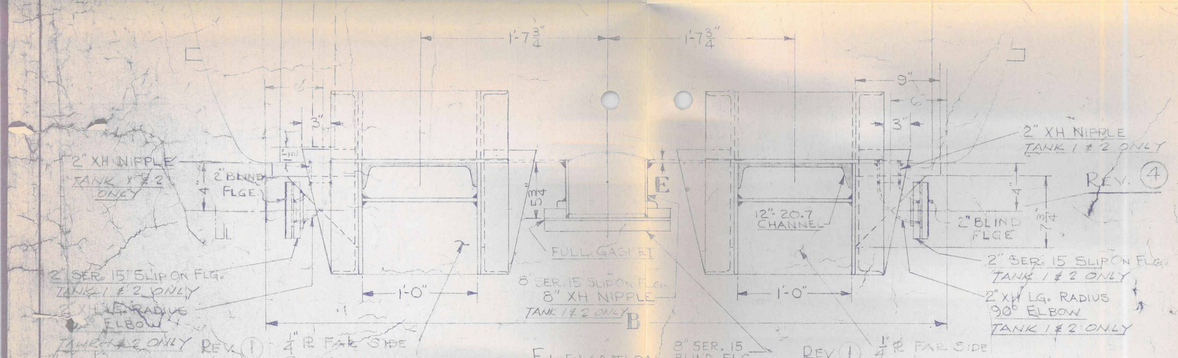






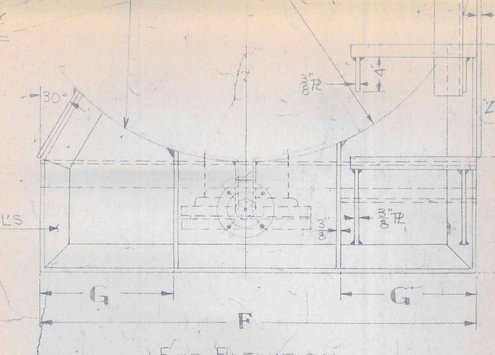


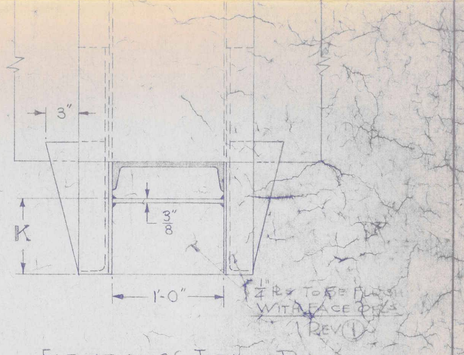
TYPICAL NOZZLE DETAIL FOR ST. STL. TANKS



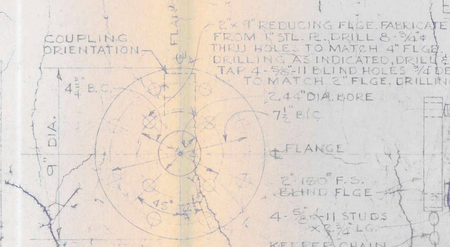
TANK No.	A	B	C	D	E	F	G	H	J	K	L	M	N	O	S	T	TANK TEST WORK PRESS.	HAMMER TEST	FINAL TEST	CAPACITY GALS.	JOB #
1	4'-0"	6'-0"	4'-0"	3/8"	3/8"	3'-9 1/2"	1'-2"	3'-0"	1'-0"	8"	3'-3"						60 PSI	90 PSI	120 PSI	600	
2	4'-0"	6'-0"	4'-0"	3/8"	5/8"	3'-9 1/2"	1'-2"	3'-0"	1'-0"	8"	3'-3"						60 PSI	90 PSI	120 PSI	600	M-32283
3	4'-0"	6'-0"	4'-0"	3/8"	3/8"	3'-9 1/2"	1'-2"	3'-0"	1'-0"	8"							60 PSI	90 PSI	120 PSI	600	60720

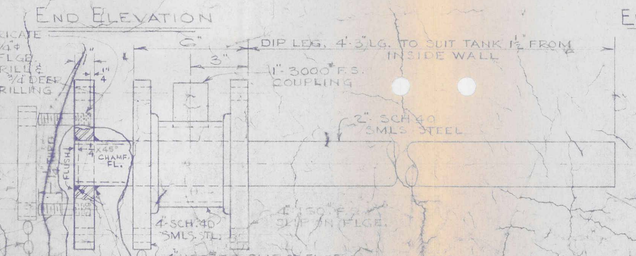
SADDLES TO BE CONTINUOUSLY WELDED TO TANK





ELEVATION OF TILTING PADS





END ELEVATION

DIP LEG, 4'-3" LG. TO SUIT TANK 1" FROM INSIDE WALL

MAY 5 1986

REV. (4)

NOTES: 1. ALL WELDED CONSTRUCTION EXCEPT AS NOTED
MATERIAL: FOR STL. TANKS MATERIAL TO BE A.S.M.E. SPEC. SA285 GR C
ALL WELDING EQUAL TO A.S.M.E. CODE
THIS EQUIPMENT SUBJECT TO INSPECTION BY NATIONAL INSPECTOR

PAINT
1 CT. SEWELL 1 KEMIK PRIMER
1 CT. BARRETT'S ETERNIUM
MIN. PLANT HEAT CLEARANCE

REFERENCE	DWG. NO.	NO.	REVISION	DR.	APP.	DATE	NO.	REVISION	BY	APP.	DATE
		4	ADDED 2" SER. 15 BLIND FLG. & 2" XH NIPPLE TANK 1 & 2 ONLY REV (4)			5/5/86	5	WELD 6" FLG. TO 2" x 3" REC. FLANGE			
		3	ADDED 2" SER. 15 SLIP ON FLG. & 2" XH NIPPLE TANK #3 ONLY REV (3)								
		2	ADDED 2" SER. 15 SLIP ON FLG. & 2" XH NIPPLE TANK 1 & 2 ONLY REV (2)								
		1	G.O. 60720								

APPROVED	DATE
C.H. DOBBS	10/24
J. JACK	
C. COCOMILES	
J. MANAGER	

JOB NO.	
ITEM	
BLDG.	
APP. NO.	
T.	
SCALE	1/2" = 1'-0"

SMERZBERG 10-18-51 | B.M.H. 10-22-51 | G.R. PATTERSON 10-23-51 | W.C. 10-24-51 | B.R.M. 10-24-51 | R.P.K. 10-25-51 | C.H.D. 10-26-51 | W.H. 10-29-51

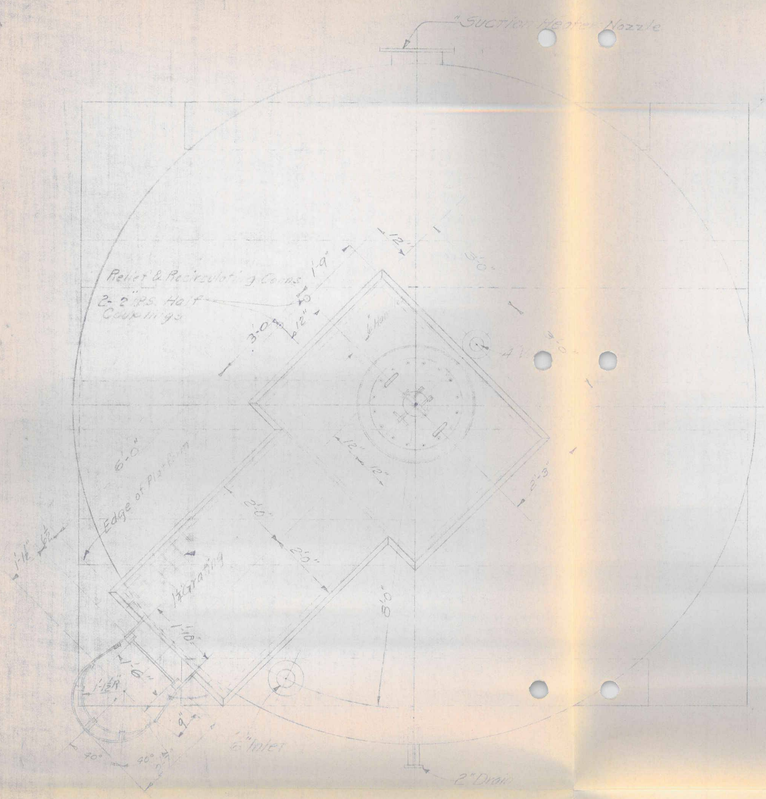
NATIONAL ANILINE DIVISION
ALLIED CHEMICAL & DYE CORPORATION
ENGINEERING DIVISION, BUFFALO, N. Y.

PORTABLE TANK FOR SET-TRUCK

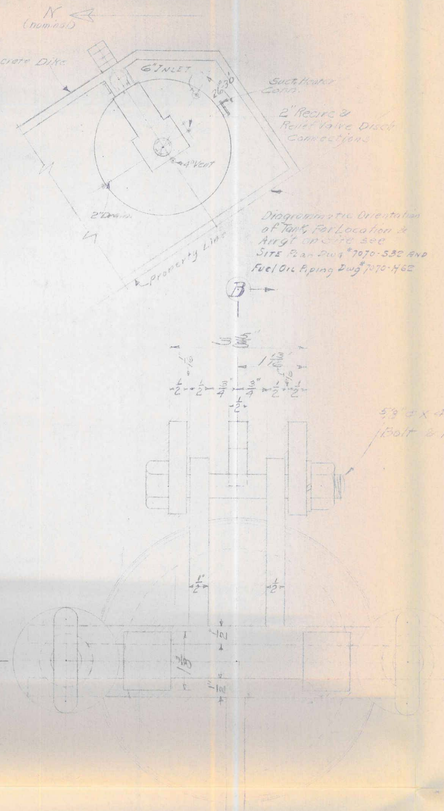
C.D. B.C. DATE 10-31-51 | ES. G.W.A. DATE 9-17-51
DRN. J.T.W. DATE 10-30-51 | CH. DATE | REV. 1 2 3 4 5

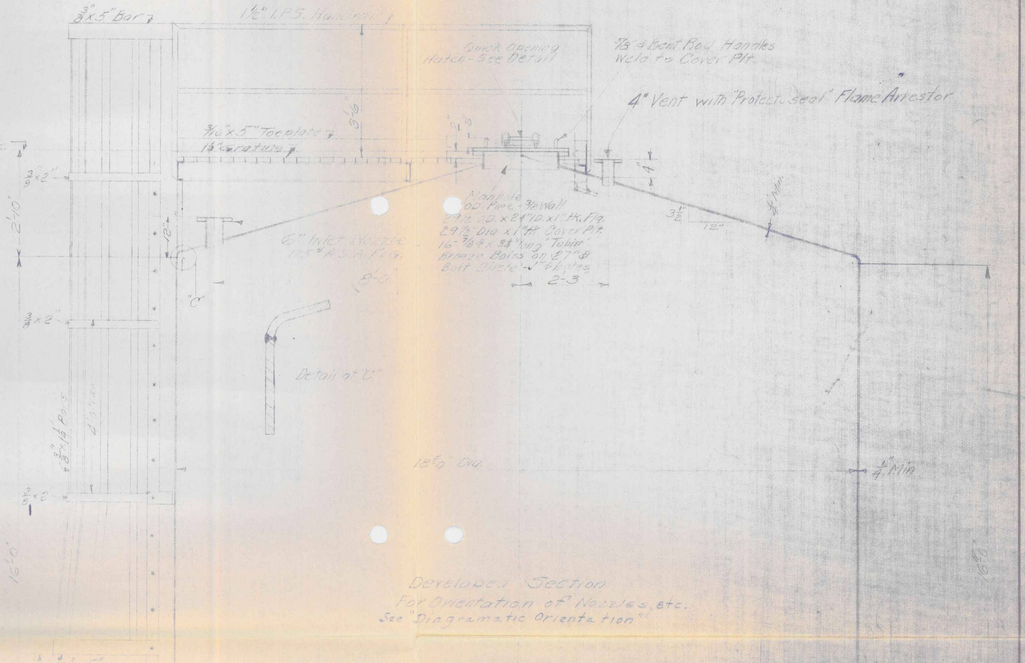
SC-85277-5

7070-H-1

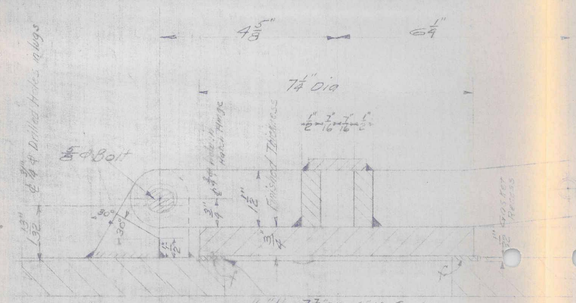


Plan.

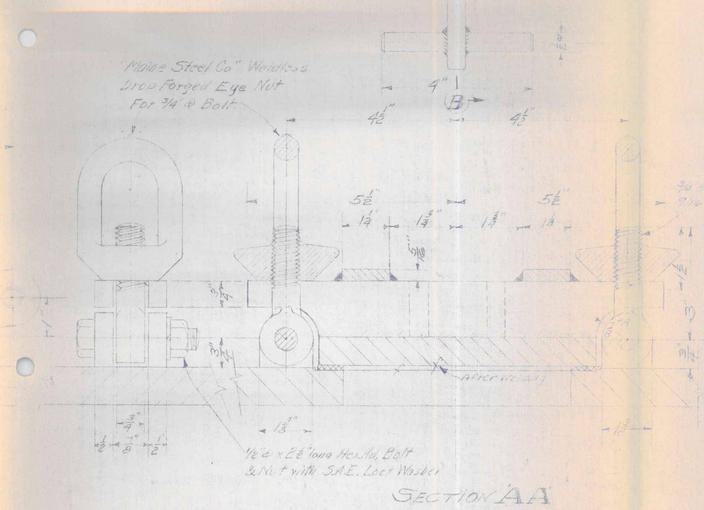




Developed Section
For Orientation of Nozzles, etc.
See "Diagramatic Orientation"



Section "BB"



Section "AA"

Detail of Quick Opening Hatch

No	PRE-APPROVAL ISSUES	CHKD	INSPD	CORRCT	APP	DATE
0	Dwg. Issued	Est.	[illegible]	[illegible]	[illegible]	7/6/47
1	Master Issue	Estes	Gilley	A.S.	[illegible]	7/16/47
2	Corrected for Info (Non Issue)	Estes	[illegible]	A.S.	[illegible]	7/30/47
3	Record Print Issue	Estes	[illegible]	[illegible]	[illegible]	7/31/47

1	2	3	4	5	6	7	8	9	10	11
S.M. Lazarus 6/26/47	W.W. Minnie 6/26/47		G.A.R. Tenney 7/1/47	C.G.K. 6/30/47	B. Nash 6/23/47		R.A.K. 6/24/47	D.L. Rothermel 7/1/47	C.H.E. 7/1/47	W.R.H. 7/1/47

REFERENCE	DWG. NO.	NO.	REVISION	BY	APP	DATE	NO	REVISION	BY	APP	DATE

APPROVED	DATE
Art Bussel	7/1/47
G.A. Eshee	7/1/47
[illegible]	7/1/47
C.G. Cooksey	7/1/47
[illegible]	7/31/47

JOB NO. C5000
ITEM
BLDG.
APP. NO.
T-
SCALE

NATIONAL ANILINE DIVISION
ALLIED CHEMICAL & DYE CORPORATION
ENGINEERING DIVISION, BUFFALO, N. Y.
FUEL OIL STORAGE TANK
MECHANICAL

C.D. G.S. Young DATE 6/24/47 EST. G.W.A. DATE 7/2/47
DRN. A.P.S. DATE 6/27/47 CH. Estes DATE 7/2/47

SC-83749
REV.

MAY 5 1986

STATE OF NEW YORK · CERTIFICATE OF REGISTRATION · NO. 20807 · PROFESSIONAL ENGINEER

UNITED ENGINEERS & CONSTRUCTORS INC
PHILADELPHIA

7070-H-1

7070-H-45

SECT H-H

ALL DIMENSIONS & DETAILS NOT DESCRIBED FOR FDN 'B' SAME AS FDN 'A'

SECTION 1-1

DETAIL OF FDN. A, C & D

SECTION J-J

SECTION D-D
West Wall

SECTION E-E
TYPICAL

SECTION F-F

SECTION 3-4

PLAN

DETAIL OF FDN. E & G

SALT BASIN
SEE DWG 30A38971 FOR DETAILS

BLG. 204

Bldg. 207
Boiler Room

Truck Hopper

Coal Conveyor

Track

Track Hopper

Notes:
Provide 1" chamfer strips on all exposed concrete corners.

STATE OF NEW YORK
ELMER B. SEVERS
No. 20907
PROFESSIONAL ENGINEER

MAY 5 1986

REFERENCE	DWG. NO.
New Silo Supports	SC-81317
Truck Hopper	SC-81947
Trenches - Final Out Points	SC-81980
Tank Details	SC-81981

NO.	REVISION	BY	APP.	DATE
1	Issued as Master Print	H.P.	H.W.	12/29/87
2	Issued as "Record Print"	M.E.	H.W.	12/29/87
3	Issued as "Record Print"	M.E.	H.W.	12/29/87
4	ISSUED AS "FIELD ISSUE"	M.E.	H.W.	12/29/87
5	As Bid - Revision	M.E.	H.W.	12/29/87

NO.	REVISION	BY	APP.	DATE

APPROVED	DATE

JOB NO. C5000
ITEM 33.36
BLDG.
APP. NO.
T-
SCALE

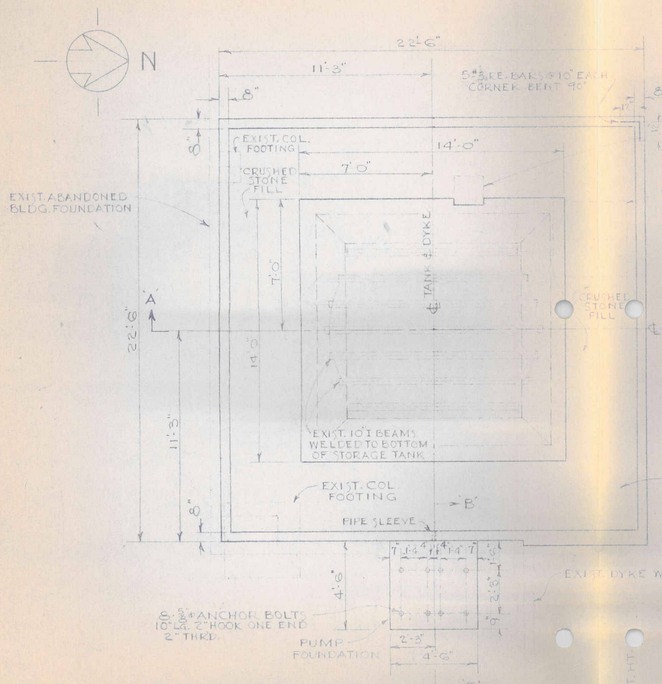
NATIONAL ANILINE DIVISION
ALLIED CHEMICAL & DYE CORPORATION
ENGINEERING DIVISION, BUFFALO, N. Y.
GENERAL PLAN OF FOUNDATIONS
STRUCTURAL

C.D. DATE EST. DATE
DRN. DATE CH. DATE

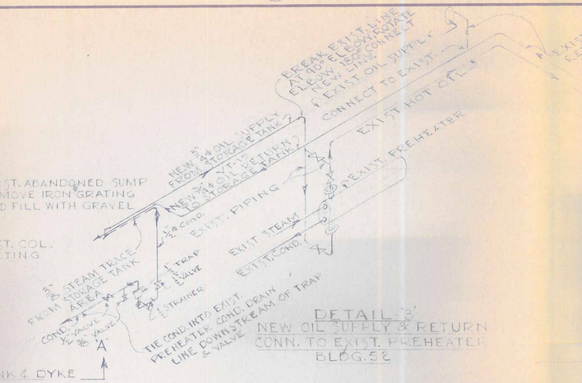
SC-83981
REV.

UNITED ENGINEERS & CONSTRUCTORS INC.
PHILADELPHIA

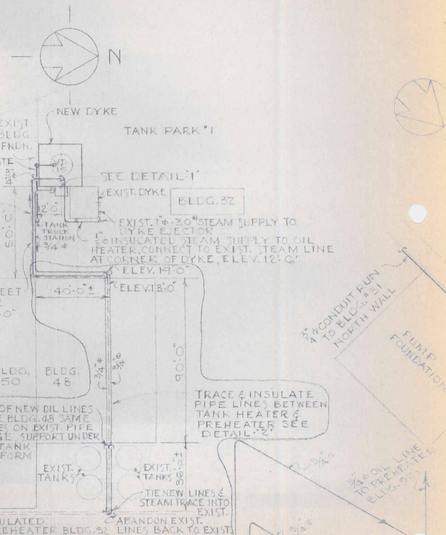
7070-H-45



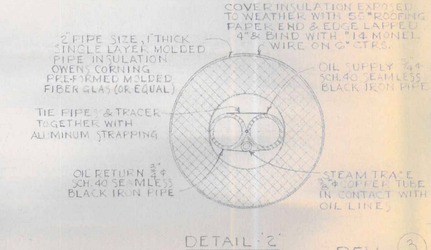
PLAN
OIL TANK FOUNDATION & DYKE
SCALE 1/4"=1'-0"



DETAIL '3'
NEW OIL SUPPLY & RETURN
CONN. TO EXIST. PREHEATER
BLDG. 52

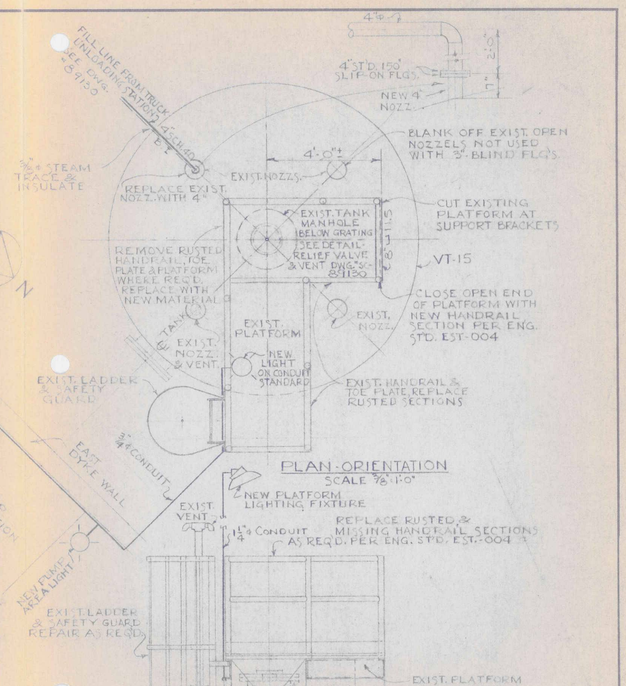


PLAN - OIL PIPING AND
STORAGE TANK RE LOCATION
SCALE 1"=40'-0"

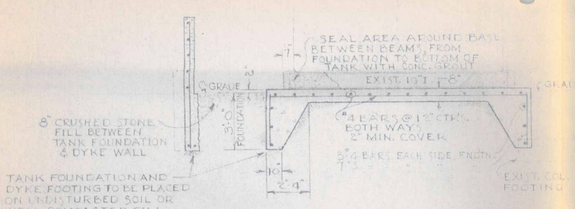


DETAIL '2'

REV. 3

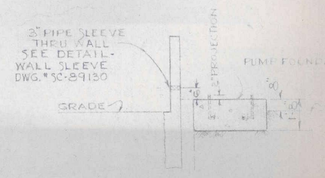


PLAN - ORIENTATION
SCALE 3/8"=1'-0"

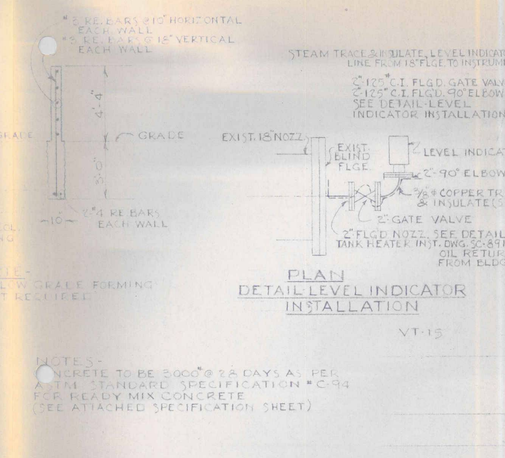


SECTION 'A-A'

NOTE:
FOR CONCRETE FORMING NOT REQUIRED

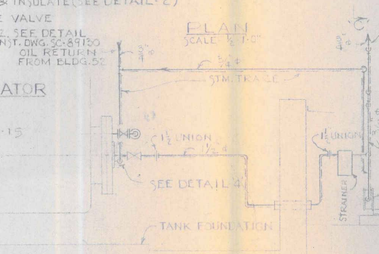


SECTION 'B-B'



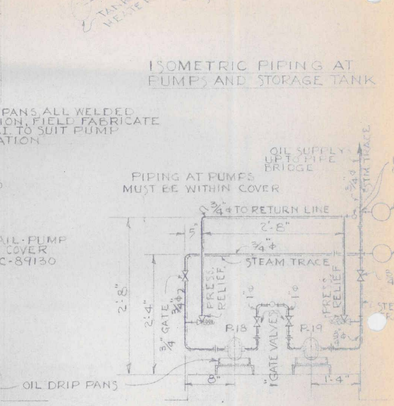
PLAN
DETAIL LEVEL INDICATOR
INSTALLATION

NOTES:
1. CONCRETE TO BE 3000# @ 28 DAYS AS PER ASTM STANDARD SPECIFICATION "C-94 FOR READY MIX CONCRETE (SEE ATTACHED SPECIFICATION SHEET)



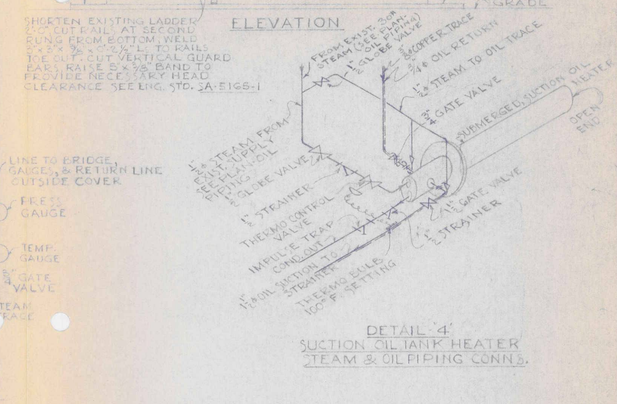
PLAN
SCALE 1"=1'-0"

SIDE ELEVATION
DETAIL '1' PIPING AT PUMPS & TANK



ISOMETRIC PIPING AT
PUMPS AND STORAGE TANK

SECTION 'C-C'



ELEVATION

DETAIL '4'
SUCTION OIL TANK HEATER
STEAM & OIL PIPING CONN'S.

MAY 5 1986

NO.	REVISION	BY	APP.	DATE
1	OIL PIPING DETAIL, ADD EX. PLATFORM, ADDED PIPE SLEEVE, ELEVATION CHANGES	KT	[illegible]	8/16/73
2	LIQUID LEVEL INDICATOR CONNECTION ADDED, PLATFORM & PUMP LIGHTING ADDED, STEAM TRACE (CORRECTIONS, OIL DRIP PANS)	Thomas 9/17/73	[illegible]	9/19/73
3	OIL LINE ROUTING THRU BLDG'S. 50 & 51 CHANGED TO OUTSIDE	KT 12/6/73	[illegible]	[illegible]

REFERENCE	DWG. NO.
OIL STORAGE TANK: TANK HTR. & PIPING	SC-89130

APPROVED	DATE
J.A. McGlothlin	9-19-73
M. Campanella for W.R. Austin	9/19/73

JOB NO. 29304
ITEM
BLDG. T.P.INST.
APP. NO.
T-
SCALE NOTED

SPECIALTY CHEMICALS DIVISION
BUFFALO DYE PLANT
PLANT ENGINEERING DEPARTMENT
OIL STORAGE TANK FOUNDATIONS & PIPING DETAILS
DRN. THOMA DATE CH. DATE

Allied Chemical

SC-89148-3
REV. 1 2 3

ST. STEPHENS PLACE
SMITH STREET
PARKING LOT
S.C.D. PLANT L
D.L.&W. R.R.
OWAHN PLACE
PRENATT STREET
SELKIRK
PLANT "D"
PLANT "A"
PLANT "B"
PLANT "C"
PLANT "F"
BUFFALO CREEK RAIL ROAD
REPUBLIC STEEL CO.
BUFFALO RIVER
SLUDGE PONDS
#2
#1
B.C.R.R.
TP20
TP1
FUEL OIL STORAGE
101
102
103
150
121
100
123
LEE STREET
SOUTH PARK AVENUE
BUFFALO CHEMICAL PLANT
N.M.P.
207
205
223
221
222
ALLIED CHEMICAL
ROOF NEAL & CO.
PEABODY STREET
PARKING B.C.C.
WALTER STREET
MAURICE STREET
ORLANDO STREET
BABCOCK STREET
WATER TREATMENT PLANT
#3
#2
353
351
352
350
320
326P
SCALE
0 100' 200' 300' 400 500
N

NOTICE
THIS DRAWING, AND ALL FEATURES SEPARATELY OR COLLECTIVELY DISCLOSED THEREBY OR EMBODIED THEREIN, ARE THE PROPERTY OF SPECIALTY CHEMICALS DIVISION, ALLIED CHEMICAL CORPORATION. THE DRAWING SHALL NOT BE REPRODUCED OR COPIED, AND MUST BE RETURNED IMMEDIATELY UPON REQUEST. NO INFORMATION EMBODIED THEREIN SHALL BE COMMUNICATED, DISCLOSED, OR USED IN ANY MANNER, IN WHOLE OR IN PART, EXCEPT AS AND TO THE EXTENT PREVIOUSLY EXPRESSLY AUTHORIZED IN WRITING BY THE COMPANY.

1 S.M. LAZARUS 2 W. MINNIS 3 4 G.A. PATERSON 5 C.G.K. 6 7 B.R.M. 8 A.A.K. 9 D.L.
10 E.P. LEANDER 11 W.M.H.

REFERENCE	DWG. NO.	NO.	REVISION	BY	APP.	DATE	NO.	REVISION
GENERAL PLAN TRACK LEASE/S	SC82384	1	REVISED TO DATE					
		2	REDRAWN & REVISED TO DATE			10-59		
		3	REVISED TO DATE			-61		

BY	APP.	DATE	APPROVED	DATE

JOB NO.
ITEM
BLDG.
APP. NO.
T.
SCALE

SPECIALTY CHEMICALS DIVISION
BUFFALO DYE PLANT
PLANT ENGINEERING DEPARTMENT MAY 5 1986

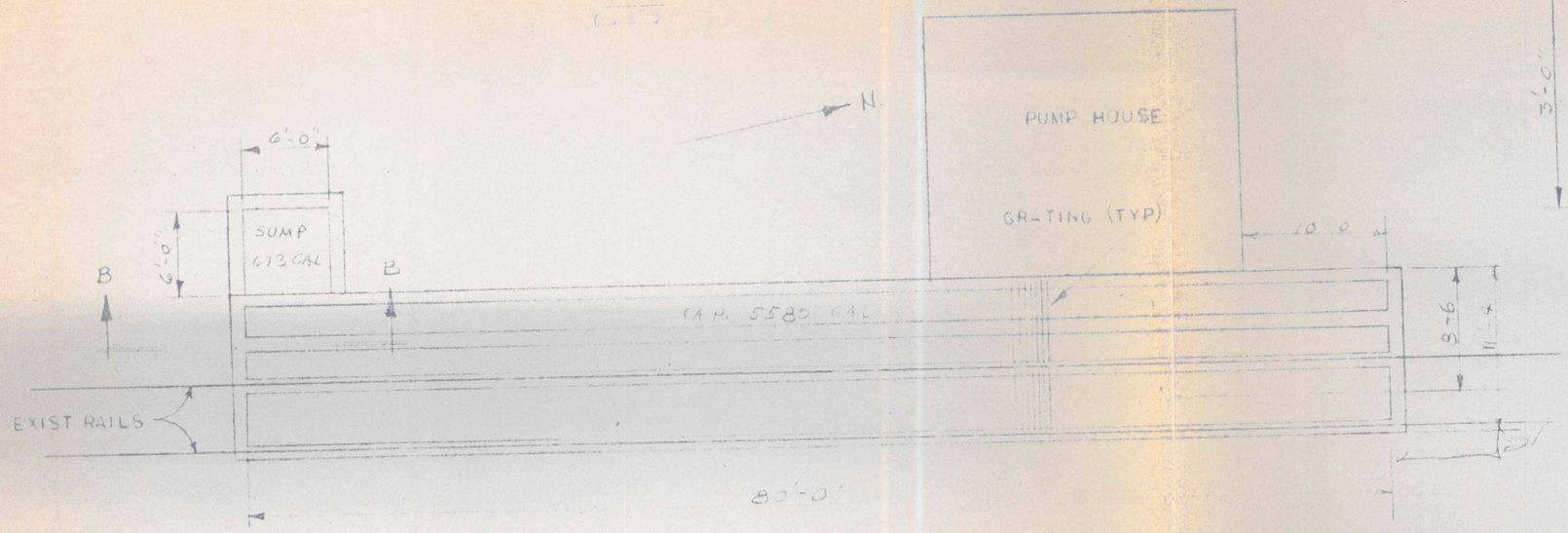
Allied Chemical

PLANT MAP

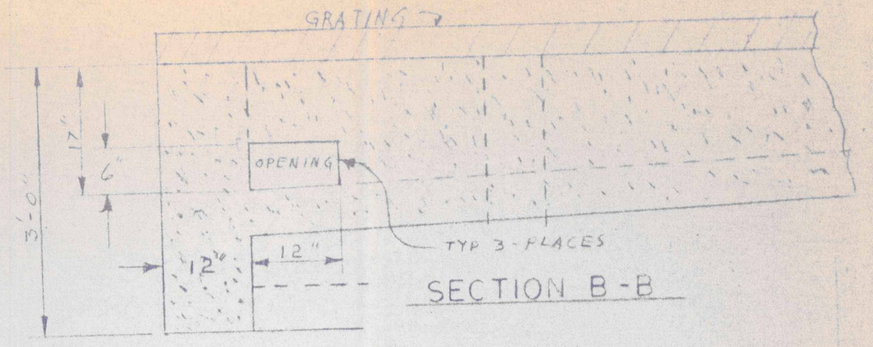
SB-61450

DRN. DATE CH. DATE REV.

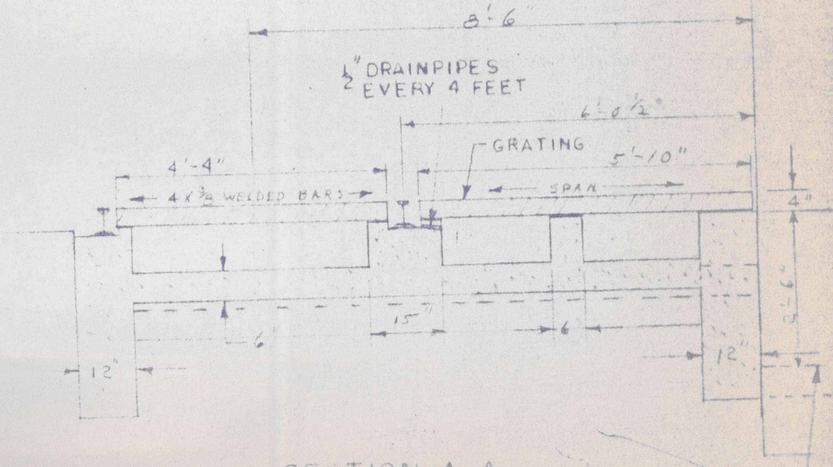
PLANT



PLAN

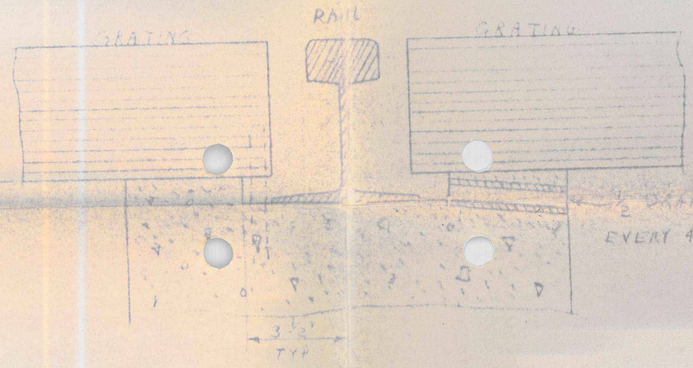


SECTION B-B



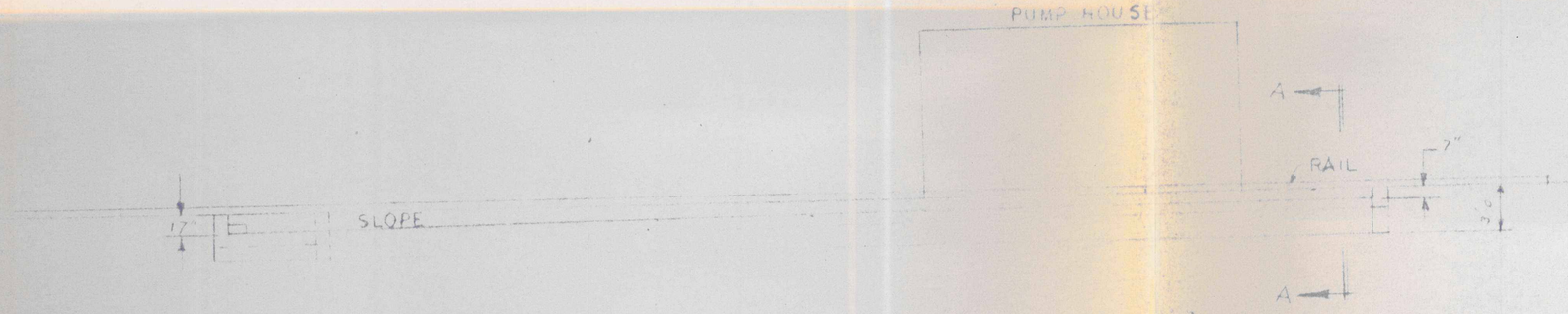
SECTION A-A

SUMP - 2'-10" DEEP

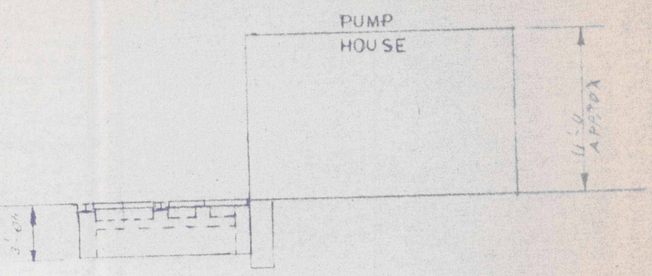


RAIL T. 5" WIDTH OF BASE 5"
WIDTH OF HEAD 2½
4-¾" ELEVEN INCHES

[illegible] "HEAVY WEIGHT" [illegible]



ELEVATION



END (LOOKING SOUTH)

L-2172

7070-H-45

SECT H-H

ALL DIMENSIONS & DETAILS NOT DESCRIBED FOR FDN 'B' SAME AS FDN 'A'

SECTION 1-1

DETAIL OF FDN. A, C & D

SECTION J-J

SECTION D-D
West Wall

SECTION E-E
TYPICAL

SECTION F-F

SECTION 3-4

PLAN

DETAIL OF FDN. E & G

SALT BASIN
SEE DWG 30A38971 FOR DETAILS

BLG. 204

Bldg. 207
Boiler Room

Truck Hopper

Coal Conveyor

Track

Track Hopper

Notes:
Provide 1" chamfer strips on all exposed concrete corners.

STATE OF NEW YORK
ELMER B. SEVERS
No. 20907
PROFESSIONAL ENGINEER

MAY 5 1986

REFERENCE	DWG. NO.
New Silo Supports	SC-81317
Truck Hopper	SC-81947
Trenches - Final Out Points	SC-81980
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2	Issued as "Record Print"	M.E.	H.W.	12/29/87
3	Issued as "Record Print"	M.E.	H.W.	12/29/87
4	ISSUED AS "FIELD ISSUE"	M.E.	H.W.	12/29/87
5	As Bid - Revision	M.E.	H.W.	12/29/87

NO.	REVISION	BY	APP.	DATE

APPROVED	DATE

JOB NO. C5000
ITEM 33.36
BLDG.
APP. NO.
T-
SCALE

NATIONAL ANILINE DIVISION
ALLIED CHEMICAL & DYE CORPORATION
ENGINEERING DIVISION, BUFFALO, N. Y.
GENERAL PLAN OF FOUNDATIONS
STRUCTURAL

C.D. DATE EST. DATE
DRN. DATE CH. DATE

SC-83981
REV.

UNITED ENGINEERS & CONSTRUCTORS INC.
PHILADELPHIA

7070-H-45

F

APPENDIX F

F.1 Closure and Post Closure Plan Lagoons #1 and #2

F.2 Closure Plan Lagoon #3

F.3 Contingency Closure - Post Closure Plan

F.4 Cost of Closure/Post Closure

F.5 Cost of Contingency Closure/Post Closure

F.6 Analysis of Lagoon Solids

F.7 Financial Assurance

CLOSURE AND POST CLOSURE PLAN

SURFACE IMPOUNDMENTS #1 AND #2

BUFFALO COLOR CORPORATION

1. General Provisions

1.1 The procedure for the closure of the surface impoundments includes analytical testing of sludge to be removed, core sampling of clay liner to determine any traces of contamination, leveling of above grade dikes, backfill remaining area with clean soil to grade and seed.

The following steps outline the exact procedure as proposed.

1.2 Testing of Sludge

1.2.1 Samples of sludge from the surface impoundment will be sent to a certified laboratory to determine EP toxicity as listed in 40 CFR ~~161~~ 261.20 - 261.24. This determination will dictate the method disposal if it is found to be toxic, the material will go to an approved secure bulk landfill, if it is found to be non-toxic it will go to an approved sanitary landfill (methods for handling will be tailored to the type of landfill selected by the N.Y.D.E.C.).

1.2.2 A similar project approved by the N.Y.D.E.C. which was performed earlier in 1984 and resulted in the sludge from an impoundment being sent to a sanitary landfill after dewatering and being mixed with sawdust.

1.3 Notification

1.3.1 Official notification of intent to close an impoundment will be forwarded to the DEC by Buffalo Color Corporation's Environmental and Safety Office. This office will be responsible for the filing of all required documents and the obtainment of all permits required prior to any closure start. This submission will also include all available technical data and procedures to be followed.

1.4 Engineering Requirements After Approval

1.4.1 BCC Project Engineering will prepare a qualified bidders list in conjunction with representative of Environmental staff.

1.4.2 BCC Project Engineering will prepare and issue a request for quotation for the work required on this project with the coordination of BCC Purchasing Department. Manager Environmental Affairs will review the request for completeness prior to issuance.

1.4.3 Bids will be reviewed by both Purchasing and Project Engineering to insure complete understanding by contractor.

1.4.4 A contractor will be selected based on bid and previous experience. The final vendor selection will be the responsibility of BCC Project Engineering.

1.4.5 The selected contractor will supply a list of all/any subcontractors to be used on this project prior to start-up with BCC retaining the right of rejecting any proposed subcontractor.

2. Sludge Removal

2.1 Contractor shall remove all sludge from an impoundment using dragline, backhoe, bulldozer and manual equipment.

2.1.1 All sludge will be dredged into a pile or piles within the lagoon and dewatered prior to loading. Separated waste water shall be pumped to an existing lagoon for treatment by Buffalo Color Corporation or directly to the waste treatment plant reactors. Sawdust will be utilized on site to maintain maximum water content of approximately 55% on a cumulative basis.

how

in free flowing form

2.1.2 Contractor shall provide a certified geologist to take samples and perform tests on each load of material to insure the percent water content; he will maintain a log of these results in a bound logbook.

2.1.3 Contractor shall provide a pump and operator to keep the lagoon as dry as possible during working hours.

2.2 Any air and effluent lines shall remain intact and open. Sludge will be manually removed as necessary if any plugging occurs.

2.3 Each load shall be inspected to insure that solids content will be equal or greater than 45% (see 1.2). Sawdust shall be mixed as necessary to maintain the solids content. See 2.1.1

2.4 The sludge shall be loaded into lugger boxes where sawdust will be applied on top of the load to absorb any surface moisture.

2.5 All loads will be inspected and logged by Buffalo Color Corporation personnel, noted as to the load number, condition, driver, departure time, and vehicle license number.

2.6 Loads shall not exceed NYS maximum legal weight.

2.7 All loads shall be tarp covered and vehicles shall be in a proper state so as not to track sludge upon any public highway.

2.7.1 A water hose connection shall be provided by Buffalo Color Corporation to ensure truck cleanliness prior to leaving Buffalo Color Corporation property. The contractor shall be responsible for public highway protection.

how handle water from washing

2.8 Truck routing shall conform to NY DEC requirements.

2.9 Trucks shall be gross and tare weighed with copies issued to Buffalo Color Corporation on a daily basis.

2.10 Trucks will enter and leave through the Maurice Street gate and shall abide by all plant traffic rules and any directives of the Buffalo Color Corporation Security Force. This gate will be manned by a guard during working hours.

2.11 Trucks will be permitted to enter the plant between 8:00 A.M. and 4:00 P.M. All trucks must leave the plant by 4:30 P.M.

2.12 Days of work shall be Monday through Friday. Buffalo Color Corporation holidays will be observed unless the contractor obtains approval through the Buffalo Color Corporation Project Engineer at least three days prior to the holiday.

2.13 Buffalo Color Corporation will supply a staging area for the contractor's use during this project.

2.14 Buffalo Color Corporation will provide all line disconnects of incoming effluent, exit and air piping prior to initiation of work.

2.15 All luggers and trucks must be approved for water tight service and include appropriate tarping.

2.16 All vehicles will be provided by the contractor. Vehicles used for hauling will have licenses with appropriate DEC permits. Detailed routing will be provided by the contractor and approved by the NYDEC and Buffalo Color Corporation.

2.17 Bufffalo Color Corporation will provide personal wash-up facilities (Bldg. 351) but the contractor must provide all other sanitation facilities. Buffalo Color Corporation will provide water for non-drinking purposes only.

2.18 Buffalo Color Corporation will provide one portable safety shower/eyewash station.

3. Safety

3.1 Wet sludge can be highly alkaline with a pH range of 7-12. It includes various chemicals: primarily, mixed organics with metal salts and water. All personnel who will be coming in contact with the sludge shall wear:

3.1.1 Disposable chemical suit (light weight).
3.1.2 Rubber boots (high top)
3.1.3 Rubber gloves
3.1.4 Safety glasses with side shields
3.1.5 Hard hats

4. Clay Removal

4.1 The contractor shall provide a certified geologist who will sample the clay surface after the sludge is removed to determine the extent, if any, of contamination of the clay. Sampling shall consist of a minimum of five different core samples at least six inches in depth. Sample will be composited. The geologist shall prepare documents directing the contractor in the amounts and area of removal of the contaminated clay. These documents shall be reviewed with and approved by the Buffalo Color Corporation project Engineer prior to the start of clay removal. He shall continue testing and the contractor shall continue removing clay until the geologist is satisfied that all the contaminated clay has been removed (any increase in the volume of clay removal beyond the original estimate must be reviewed with Buffalo Color Corporation Project Engineer). He shall then prepare a report for submittal to the NYDEC stating that the lagoon is, in fact, decontaminated.

depth

4.2 Determination for contaminated clay shall be done by checking for:

4.2.1 Excessive discoloration (Blue/Purple color)

4.2.2 pH (a reading of less than 5 or equal to background material).

4.2.3 Final determination shall be by testing the composite sample for EP Toxicity (metals and pesticides) and EP Extract for the following:

4.2.3.1 Aniline
4.2.3.2 N-Methylaniline
4.2.3.3 N,N-Dimethylaniline
4.2.3.4 N-Ethylaniline
4.2.3.5 N,N-Diethylaniline
4.2.3.6 Cyanide
4.2.3.7 Sulfide

what level safe for sanitary disposal? Same as lagoon #3? what level for others

4.2.3 This testing and resulting data will be reviewed with the NYDEC to insure correct methodology is used and interpretation of results are agreed upon. All tests will be performed in a certified laboratory and approved by NYDEC. Test methods followed will be SW846 and in-house methods as appended.

4.3 The contractor shall follow the same procedures for the clay removal as he did for the sludge removal (1.0 to 23.0).

4.4 The contractor shall notify Buffalo Color Corporation when this portion of the project is completed. The contractor shall not proceed until directed to by the Buffalo Color Corporation Project Engineer.

5. Lagoon Closure

5.1 Once notification from Buffalo Color Corporation is received the contractor shall proceed to close surface impoundment.

5.1.1 The contractor shall cut through the walls of the impoundment in at least four places, which will be selected by the geologist; thus creating trenches at least two feet wide, extending from the bottom of the lagoon to the top of the rise. The trenches will be back filled with bankrun gravel to allow for drainage. where to

5.1.2 The contractor shall then push the mounded sides of the lagoon into the central depression.

5.1.3 The contractor shall then supply enough clean fill to completely raise the elevation of the lagoon center so that it conforms with the surrounding topography. In no case will the contractor leave the lagoon area such that standing water forms after a rain or during the spring thaw.

5.1.3.1 The lowest level of fill shall be bankrun gravel to ensure drainage.

5.1.3.2 The top two inches of fill shall be topsoil capable of supporting vegetation.

5.1.4 The contractor shall then grade and rake the surface and plant it with grass. The contractor shall give a guarantee of one year on the germination and life of the grass.

6. Impoundment Post Closure Maintenance

6.1 Buffalo Color will notify the NYDEC when work is complete so that any post closure inspections can be made.

6.2 The existing groundwater monitoring wells will be used and will be sampled semi-annualy for at ieast two years for those parameters required by ~~40 CFR 265.92~~ 373-3

6.3 At all times Buffalo Color will keep the area well kept by grass cutting and free of debris so that erosion can be visually checked and also to insure nothing is being pushed to the surface.

6.4 Dependent on date of application of finish cover on impoundment, a ~~top~~topographical survey after a fall and spring season shall be done. Any significant depressions caused by settling will be filled in; the survey process shall be repeated once every four years.

PE certification

F.2

CLOSURE PLAN FOR LAGOON #3

BUFFALO COLOR CORPORATION

1. Facility Description

1.1 General Information

Buffalo Color Corporation is located within the City of Buffalo, County of Erie, State of New York. The plant site occupies 61 acres adjacent to the Buffalo River at river mile 4.5 - 5.5.

1.1.1 The street address is: Buffalo Color Corporation
100 Lee Street
Buffalo, New York 14210

1.1.2 The mailing address is: Buffalo Color Corporation
P.O. Box 7027
Buffalo, New York 14240

1.2 Historical Background

The plant was originally built in 1879 by Schoelkopf Aniline and Dye Company, which became National Aniline Chemical Company in 1916 and was one of the five companies which united to become Allied Chemical Corporation in 1920. Buffalo Color was formed July 1, 1977 to purchase the plant from Allied Chemical and has operated it since that date. There has been continuous manufacture of dyestuffs and/or organic chemicals at the facility for 105 years.

Originally all dye plant process waste waters were discharged to the Buffalo River. Much of this material would be classed as hazardous waste under today's regulations.

Over the years efforts were made to ameliorate this situation. A Pollution Control Department was formed in 1939. Efforts were largely aimed at developing changes in the production processes which resulted in a reduction in the weight and impact of effluents to the river.

During the 1940's, 1950's and 1960's Allied Chemical took part in a development process which culminated in the formation of the Buffalo River Improvement Corporation (B.R.I.C.) in 1967. A water pumping station larger that that used by the City of Buffalo was constructed to pump Lake Erie cooling water to the dye plant and four other plants on the Buffalo River. This augmented the flow of the river and reduced the concentration of pollutants 20% annually and by as much as 95% during the low-flow summer months.

In response to a directive from New York State in 1966, Allied Chemical constructed a pretreatment plant which went on line in June 1971 with clay-lined lagoons #1 and #2. Clay-lined lagoon #3 was added in 1977. The pretreatment project entailed the construction of a new sewer system in the plant which separated the flows between process waste (containing the effluents from the production processes) and clear (largely non-contact cooling) water. The process waste sewer diverted the organic and inorganic waste streams out of the Buffalo River and to the pretreatment facility where the extreme acidity of the waste water was neutralized with lime and solids were precipitated and removed to landfills. Pretreated waste water was sent to the Buffalo Sewer Authority. Specifics of the pretreatment operation are discussed in Section 1.3

Production peaked in the early 1950's. Since that time the number of compounds made at the facility has been reduced from more than 1700 to the present 8. Non-contact cooling water from the B.R.I.C. system passes through the dye plant and augments the flow of the river through two outfalls. The process waste water has become net alkaline rather than net acidic. The loadings to the Buffalo Sewer Authority have been substantially reduced for both inorganic and organic materials. Non-ferrous heavy metals have been virtually eliminated while the biodegradable organics are largely destroyed at the Buffalo Sewer Authority's secondary treatment facility. There has been no manufacturing use of chlorinated organics since 1981.

1.3 Management of Hazardous Waste

Hazardous wastes are generated by chemical processing in production activities. If they are hazardous solid wastes they are placed in drums, labeled, handled, and disposed of according to Federal and State regulations. Approximately 1000 drums/year of solid wastes are brought to the Solid Waste Control Area from whence they are transported to the proper disposal facilities. The Solid Waste Control Area is operated in compliance with 40 CFR 265 Subpart I. The area is fenced, locked and posted. Wastes are labeled, dated and segregated by type. Ignitable and reactive wastes are not stored within 50 feet of the property line or near incompatible materials. The drums are inspected weekly and the operators are trained in the hazards and procedures to be followed when handling the wastes.

Hazardous solid wastes commonly handled include off-grade Indigo paste, Phosphoric Acid, Still Bottoms, Tetrapropylene - Maleic Anhydride, Anhydride Tars, Spent Nickel Catalyst and Waste Solvents. At any point in time there are about 200 drums of hazardous waste in storage, waiting to be shipped out under the 90 day restriction.

Process waste in the form of process waste water (200,000 - 700,000 gpd) is transported via the process waste sewer to the pretreatment plant. The two original parallel surface impoundments (Lagoons #1 and #2) now receive the waste water and smooth variations in flow and concentration to prevent "slug" discharges. Lagoon #3 has been taken out of service. The process waste water is a RCRA hazardous waste due to corrosivity, sometimes having a pH in excess of 12.5. In addition, it contains parts per million quantities of hazardous components Aniline, and Cyanide, which are raw materials of the facility. The suspended solids which settle out in the lagoons are neither corrosive in themselves, nor enriched in the anilines or cyanides.

The process waste water is pumped to three reactors in series where it is neutralized with sulfuric acid to render it no longer corrosive under RCRA regulations and acceptable to the Buffalo Sewer Authority (BSA) under their Sewer Use Ordinance. Buffalo Color is permitted by the BSA under 40 CFR 403 to send this neutralized waste water forward with poundage restrictions on the Aniline and the Cyanide.

The person responsible for hazardous waste management activities at Buffalo Color is: David E. Sauer, Manager of Environmental Affairs, 716-827-4525

1.4 Current Status of Lagoon #3

Lagoon #3 has not received process waste water since mid 1984 and now contains 250-400 tons of settled suspended solids mixed with sloughed clay from the sides of the lagoon. The calculation of this volume is presented in Appendix 6. This sludge contains oxidative polymers of anilines and alkylanilines as its main constituent. Rain water which has accumulated in Lagoon #3 from time to time has been pumped to Lagoon #1 via a portable pump. Recent samples taken of this water and of the Lagoon #3 sludge itself have shown pH values of the order of 9-10. Lagoon #3, therefore, does not now contain the corrosive waste water which it held while in operation.

Monitoring wells installed around all three of the treatment plant lagoons in the deep aquifer have not shown evidence of leakage from any of them.

2. General Description for Lagoon No. 3 Closure Procedure

2.1 Testing of Sludge and Waste Water

2.1.1 Representative samples of sludge from lagoon #3 were sent to a certified laboratory to determine hazardous characteristics. The sludge was found to be:

- 2.1.1.1 Not Corrosive
- 2.1.1.2 Not Reactive
- 2.1.1.3 Not Ignitable
- 2.1.1.4 Not EP Toxic
- 2.1.1.5 Not Toxic when fed to test animals.

2.1.2 These sludge determinations may dictate the method of landfill. Procedures for handling will be tailored to the type of landfill selected and approved by the N.Y.D.E.C. (See Section 3.0 Determination of Physical and Chemical Properties of Sludge).

2.1.3 When Lagoon #3 was in operation it contained process waste water. Twenty-four hour composite samples of typical process waste water were also analyzed to determine hazardous characteristics. The waste water was found to be:

- 2.1.3.1 Sometimes corrosive
- 2.1.3.2 Not reactive
- 2.1.3.3 Not ignitable
- 2.1.3.4 Not EP toxic

2.2 Issue Request for Quote (RFQ)

2.2.1 Buffalo Color Corporation Project Engineering will prepare a qualified bidders list in conjunction with BCC Environmental and Safety Departments and BCC Purchasing Department.

2.2.2 Buffalo Color Corporation Project Engineering will prepare and issue a request for quotation for the work required on this project with the coordination of BCC Purchasing Department. BCC Environmental and Safety Departments will review the request for completeness prior to issuance.

2.2.3 Bids will be reviewed by both Purchasing and Project Engineering.

2.3 Select Contractor

2.3.1 A contractor will be selected based on being low bidder and previous experience. The final vendor selection will be the responsibility of Buffalo Color Project Engineering.

2.3.2 The vendor will supply a list of any or all subcontractors to be used on this project prior to start-up with BCC retaining the right of rejecting any proposed subcontractor.

2.4 Run-on and Run-off Controls

2.4.1 All rain which falls on the surface impoundment area will run into Lagoon #3 during sludge removal, clay removal, and closure. There will be no run-off from the site.

2.4.2 As has been its practice with accumulated rainwater, Buffalo Color will continue to dewater the lagoon prior to sludge removal by pumping the liquid contents of the lagoon to Lagoon #1 and from there, after treatment, (neutralization if required) to the Buffalo Sewer Authority.

2.4.3 This procedure will be used throughout the rest of the project to handle any accumulations of liquid in the lagoon.

2.5 Collect Sludge

2.5.1 The sludge from the bottom and sides of the lagoon will be placed into appropriate containers for shipment to the selected landfill by a New York State DOT approved hauler.

2.5.2 It is anticipated that the actual procedure will be; the sludge will be mixed with sawdust or flyash (to standardize the moisture content) and placed in luggers using power equipment such as draglines or backhoes. The final amount of sludge will be collected with front end loaders to insure that all the sludge has been removed.

2.5.3 During this operation there will be continuous removal of any accumulation of liquid from the lagoon using the previously mentioned method (2.4.1).

2.5.4 Details of sludge removal are given in section 5 below.

2.6 Clay Removal

2.6.1 Any clay that is shown by testing to be contaminated with sludge will be collected and removed to a landfill using the method outline in 2.5.2. These tests will be performed by a certified laboratory with the approval of the New York DEC. (See section 3.0 below)

2.6.2 The Soil Sampling and Testing Plan is presented in Appendix 6.

2.6.3 Details of clay removal are given in section 6 below.

2.7 Backfill

2.7.1 When tests show that all contaminants have been removed from Lagoon #3 the vendor shall proceed to fill in the lagoon. This condition shall be proved by a New York State Certified Geologist who shall collect an appropriate number of samples, have them tested, and who shall prepare the proper documentation for submittal to the DEC stating that, in fact, the lagoon is free of contamination.

2.7.2 The contractor shall cut through the walls of the lagoon in at least four places, which will be selected by the geologist; thus creating trenches at least two feet wide, extending from the bottom of the lagoon to the top of the rise. The trenches will be back filled with bankrun gravel to allow for drainage.

2.7.3 The contractor shall then push the mounded sides of the lagoon into the central depression.

2.7.4 The contractor shall then supply enough clean fill to completely raise the elevation of the lagoon center so that it conforms with the surrounding topography. In no case will the contractor leave the lagoon area so that standing water forms after a rain or during the spring thaw.

2.7.4.1 The lowest level of fill shall be bankrun gravel to ensure drainage.

2.7.4.2 The top two inches of fill shall be topsoil capable of supporting vegetation.

2.7.5 The contractor shall then grade and rake the surface and plant it with grass. The contractor shall give a guarantee of one year on the germination and life of the grass.

2.8 Closure

2.8.1 The vendor shall grade the top layer of fill so that it conforms with the prevailing local topology. In no case shall the area be left in such a condition that water will be left standing after it rains or during the spring thaw.

2.8.2 Finally, the vendor shall seed the area with grass.

2.8.3 BCC will submit all forms and documents required to complete the closure procedure including a certification in accordance with 6NYCRR 373-3.7 (f) by an independent registered professional engineer.

2.8.4 The existing test wells will remain in service and be sampled semi annually for three years following closure of Lagoons #1 and #2.

3. Determination of Physical and Chemical Properties of the Lagoon No. 3 Sludge.

3.1 Samples of Lagoon #3 sludge were taken on several occasions. One sample was taken from the north end of the lagoon and the other sample was taken from the south end of the lagoon. The samples were extracted by hand, digging approximately 4-6 inches into the sludge. The sample's physical characteristics were like wet mud with a crust on top due to wind drying on the surface.

3.2 Samples were shipped to Termini Associates for subsequent hazard testing. The results of that testing are found in Appendix 1.

3.3 The testing procedures, sample preparation, and methods of analysis were performed in accordance with the procedures established in "Test Methods for the Evaluation of Solid Waste, Physical/Chemical Methods" (EPA SW-846, July 1982) using the methods listed in appendix 1.

3.4 In another test, some of the sludge was fed to laboratory animals. This data which shows the non-toxic nature of the sludge, is also included in Appendix 1.

4. Monitoring Wells

4.1 Monitoring wells have been installed in the area around the lagoon in both the shallow and deep aquifer. The contractor shall warn his work crews of their existence and caution them that the wells are not to be damaged. Any damage done to these wells will be rectified at the contractor's expense.

4.2 The sampling schedule for these wells will continue both during and after closure activity. The sampling schedule currently is as follows:

4.2.1 Deep Aquifer Wells R02, R03, R05, R06, R07, R12 - Semi Annually
4.2.2 Shallow Aquifer Wells R08, R09, R10, R11 - Quarterly through November 1986 Semi Annually thereafter.

5. Sludge Removal

5.1 Contractor shall remove all sludge from Lagoon #3 using dragline, backhoe, bulldozer and manual equipment. An equipment list is provided in Appendix 6.

5.1.1 Contractor shall select the landfill to be used and will purchase and obtain any and all permits required for this project. Final selection of landfill must meet with both Buffalo Color Corporation and New York State Department of Environmental Conservation approval.

5.1.2 All sludge will be dredged into a pile or piles within the lagoon and dewatered prior to loading. Waste water shall be pumped to an existing holding tank (thickener) for treatment by Buffalo Color Corporation. Flyash or sawdust will be utilized on site to maintain maximum water content of approximately 55% on a cumulative basis. Field verification of solids content will be made using EPA Method 160.3 Residue, Total.

5.1.3 Contractor shall provide a certified geologist to take samples and perform tests on each load of material to insure this percent water content; he will maintain a log of these results in a bound logbook. The moisture test that will be used is the DEC paint filter test.

5.1.4 Contractor shall provide a pump and operator to keep the lagoon as dry as possible during working hours. During the off hours, Buffalo Color will use a portable pump to keep the lagoon as dry as possible.

5.2 Any air and effluent lines shall remain intact and open. Sludge will be manually removed as necessary if any plugging occurs.

5.3 Each load shall be inspected to insure that solids content will be equal or greater than 45% (see 5.1.2). Flyash or sawdust shall be mixed as necessary to maintain this solids content.

5.4 The sludge shall be loaded into lugger boxes where flyash or sawdust will be applied to absorb any surface moisture on top of the load.

5.5 All loads will be inspected and logged by Buffalo Color Corporation personnel, noted as to the load number, condition, driver, departure time, and vehicle license number.

5.5.1 All contractor equipment (dragline, backhoe, bulldozer, manual equipment) is to be decontaminated using city water, into Buffalo Color's Process Waste Sewer.

5.5.2 Buffalo Color personnel will inspect to make sure all equipment is properly cleaned, and that the ensuing runoff does not migrate to the surrounding water basin.

5.5.3 When all the hazardous material is removed from Lagoon #3, the equipment can be washed right in that lagoon with the runoff being pumped to Lagoon #1.

5.6 Loads shall not exceed New York State maximum legal weight.

5.7 All loads shall be tarp covered and vehicles shall be in a proper state so as not to track sludge upon any public highway. A water hose connection shall be provided by Buffalo Color Corporation to ensure equipment cleanliness prior to leaving Buffalo Color Corporation property. Washings will be collected and pumped to either Lagoon #1 or to the process waste sewer which leads to Lagoons #1 and #2. A list of equipment requiring washing is presented in Appendix 7. Security will inspect each truck before it leaves the property.

5.8 The contractor shall be responsible for public highway protection.

5.9 Truck routing shall conform to New York DEC requirements.

5.10 Trucks shall be gross and tare weighed with copies issued to Buffalo Color Corporation on a daily basis.

5.11 Trucks will enter and leave through the Maurice Street gate and shall abide by all plant traffic rules and any directives of the Buffalo Color Corporation security force.

5.12 Trucks will be permitted to enter the plant between 8:00 A.M. and 4:00 P.M. All trucks must leave the plant by 4:30 P.M.

5.13 Days of work shall be Monday through Friday. Buffalo Color Corporation holidays will be observed unless the contractor obtains approval through the Buffalo Color Corporation Project Engineer at least three days prior to the holiday.

5.14 Viable alternatives will be considered as additions or deletions to this specification but changes are ONLY authorized through the Buffalo Color Corporation Purchasing Department via written documents.

5.15 Buffalo Color Corporation will supply a guard at the Maurice Street gate from 8:00 A.M. to 4:30 P.M. or to 6:30 P.M. if necessary.

5.16 Buffalo Color Corporation will supply a staging area for the contractor's use during this project.

5.17 Buffalo Color Corporation will provide all line disconnects of incoming effluent, exit and air piping prior to initiation of work.

5.18 All luggers and trucks must be approved for water tight service and include appropriate tarping.

5.19 All vehicles will be provided by the contractor. Vehicles used for hauling will have licenses with appropriate DEC permits. Detailed routing will be provided by the contractor and approved by the NYDEC and Buffalo Color Corporation.

5.20 Buffalo Color Corporation will provide personal wash-up facilities (Bldg. 351) but the contractor must provide all other sanitation facilities. Buffalo Color Corporation will provide water for non-drinking purposes only.

5.21 Buffalo Color Corporation will provide one portable safety shower/eyewash station.

5.22 All other supplies and utilities required by the project shall be supplied by the contractor.

5.23 Buffalo Color Corporation Project Engineer shall visit the disposal site prior to initiation, during, and at the completion of the project.

6. Clay Removal

6.1 The contractor shall provide a certified geologist who will sample the clay surface after the sludge is removed to determine the extent, if any, of contamination of the clay. The geologist shall prepare documents directing the contractor in the amounts and area of removal of the contaminated clay. These documents shall be reviewed with and approved by the Buffalo Color Corporation Project Engineer prior to the start of clay removal. He shall continue testing and the contractor shall continue removing clay until the geologist is satisfied that all the contaminated clay has been removed (any increase in the volume of clay removal beyond the original estimate must be reviewed with Buffalo Color Corporation Project Engineer). He shall then prepare a report for submittal to the NYDEC. A protocol for clay/subsoil testing is found in Appendix 5.

6.2 The clay will be considered decontaminated when it is found to be:

6.2.1 Non-corrosive
6.2.2 Non-reactive
6.2.3 Non-ignitabile
6.2.4 EP Non-toxic
6.2.5 Additional Parameters on EP Extract.

6.2.5.1	Aniline	Less than 1.0 mg/liter
6.2.5.2	N-Methylaniline	Less than 1.0 mg/liter
6.2.5.3	N,N-Dimethylaniline	Less than 1.0 mg/liter
6.2.5.4	Cyanide	Less than 0.2 mg/liter

6.2 The contractor shall follow the same procedures for the removal of contaminated clay as he did for the sludge removal (5.1 to 5.23).

6.3 The contractor shall notify Buffalo Color Corporation when this portion of the project is completed. The contractor shall not proceed with closure (section 2.8 above) until approval from NYDEC is obtained.

6.4 Buffalo Color will notify NYDEC when closure is complete.

D30.

APPENDICES

APPENDIX 1

ANALYSIS OF CONTENTS OF LAGOON

SEE PART 373 APPLICATION APPENDIX F.6

APPENDIX 2

CLOSURE COST ESTIMATE

DATE: January 23, 1986

SUBJ: Updated Cost Estimate of Lagoon #3 Closure Plan

TO: R.J. Kovalski

1.0 Decontamination of System Components

1.1 Provide connections to city water to flush system through to Lagoon #3 from outlet wet wells through all equipment and BSA Weir.

1.2 Cost of Labor

Estimated labor required	= 60 hours
BCC labor rate with overheads (incl. supervision	= $25.70/hour
Total	= $1,542

1.3 Cost of Water

Estimate need for	1,000,000 gal.
Current city water rate	$ .675/1000 gal.
Current BSA rate	$ .4693/1000 gal.
Total rate	$1.1443/1000 gal.
Total	$1,144

1.4 Decontamination Cost $2,686

1.5 Adjusted for 15% Contingency $3,089

4.0 Lagoon #3 Closure

4.1 Sludge Removal

Lagoon will be drained of all water to thoroughly dewater sludge
Bottom sludge thickeness is 20 inches = 1.67 ft.

4.1.A Volume of Sludge

77.34' x 56.76'	=	4,390 sq. ft.
21.76' x 67.58'	=	1,470 sq. ft.
55.58' x 67.58' x 1/2	=	1,878 sq. ft.
Total Covered Area		7,738 sq. ft.
Times Depth of Sludge		1.67 ft.
Sludge volume		12,923 cu. ft.
Round to		479 cu. yd.

4.1.B Weight of Sludge

Assume density of	80 lbs/cu. ft.
Times sludge volume	12,923 cu. ft.
Sludge weight	1,033,840 lbs.
Round to	517 tons

4.1.C Cost to excavate and load sludge

Excavate bid	$30/ cu. yd.
Times sludge volume	479 cu. yd.
Excavation cost	$14,370
Loading bid	$5/ton
Times sludge weight	517 tons
Loading cost	$2,585
Total Cost	$16,955

4.1.D Cost to Haul Away and Dispose of Sludge

Hauling and disposal bid	$85/ton
Times weight of sludge	517 tons
Total cost	**$43,945**

4.1.E Total Sludge Removal Cost **$60,900**

4.2 Clay Removal

Assume first 4 inches of clay liner will be removed due to contamination.

4.2.A Volume of Clay

121.34' x 78.76'	=	9,557 sq. ft.
22.00' x 99.58'	=	2,191 sq. ft.
77.58' x 99.58' x 1/2	=	3,863 sq. ft.
Total covered area		15,611 sq. ft.
Times thickness to be removed		0.33 ft.
Clay volume		5,204 cu. ft.
Round to		193 cu. yd.

4.2.B Weight of Clay

Assume density of	105 lbs/cu. ft.
Times clay volume	5,204 cu. ft.
Clay weight	546,420 lbs.
Round to	273 tons

4.2.C Cost of Excavate and Load Clay

Excavation bid	$30/cu. yd.
Times clay volume	193 cu. yd.
Excavation cost	$5,790
Loading bid	$5/ton
Times clay weight	273 tons
Loading cost	**$1,365**
Total cost	**$7,155**

4.2.D Cost to Haul Away and Dispose of Clay

Hauling and disposal bid	$85/ton
Times weight of clay	273 tons
Total cost	$23,205

4.2.E Total Clay Removal Cost $30,360

4.3 Break up remainder of clay liner to allow natural drainage.

4.3.A Cost to breakup liner

Bulldozer w/operator rental	$80/hr
Times hours required	8 hours
Total Cost	$640

4.4 Level Lagoon to Existing Grade

4.4.A Volume of Fill

99.34 x 67.76 x 9'	= 60,582 cu. ft.
77.88 x 32.06 x 9'	= 22,472 cu. ft.
77.88 x 65.88 x 9' x 1/2	= 23,089 cu. ft.
Lagoon volume	= 106,143 cu. ft.
Round to	= 3,931 cu. yd.
Plus replacement volume of clay	= 193 cu. yd.
Total volume of fill	= 4,124 cu. yd.

4.4.B Purchase, Haul, Spread and Compact Fill

Contractor bid	$15/cu. yd.
Volume of fill	$4,124 cu. yd.
Total Cost	$61,860

4.5 Grade, 6" Topsoil, Fertilize and Seed

4.6.C Soil Sampling Analysis

Anilines cyanides and hazardous characteristics		$648/Sampling
Number of Samplings	2 Samplings	
Total Costs		$1,296

4.6.D Total Sampling and Monitoring

Total S and M Cost		$1,982

4.7 Certification by a Professional Engineer

4.7.A Cost of Services of P.E.

Professional Fee		$45/Hour
Estimated Hours	80 Hours	
Total Cost		$3,600

4.8 Evaluation by a Registered Geologist to Monitor Removals

4.8.A Cost of services of R.B.

Professional Fee		$45/Hour
Estimated hours	160 Hours	
Total Costs		$7,200

4.9 Summary of Lagoon #3

4.1	Sludge Removal	$ 60,900
4.2	Clay Removal	30,360
4.3	Breakup Clay Liner	640
4.4	Level Lagoon to Grade	61,860
4.5	Grade Topsoil	13,263
4.6	Sampling and Monitoring	1,982
4.7	Certification by P.E.	3,600
4.8	Evaluation by Geologist	7,200
	Sub Total	$179,805
	15% Contingency	26,971
	Total Cost of Closure	206.775
	Round to	$210,000

5.0 Estimation Standards

5.1 Cost of excavating and loading using figures from Dick Radel of Herbert Darling Construction.

Excavating $30/cu.yd.

Loading $5/ton

5.2 Cost of hauling and disposal of sludge and contaminated clay (assuming that it is non-hazardous) from Tricil of Canada = $85/ton

5.3 Cost of a Professional Engineer to monitor closing activities and certify that the closure plan is complied with. Per John Berry of Acres International - $45/hour (fully loaded rate) cost of Registered Geologist is the same.

5.4 Plant labor cost for sampling is $20.56/hour (fully loaded) plus 25% for supervision and administration = $25.70/hour.

5.5 City water cost from BCC water bills of $0.4693/1,000 gal. Sewer rates = $0.67/1,000 gal.

5.6 Cost of 6" topsoil grading and seeding form Herbert Darling Construction - seeding $0.034/sq. ft., hauling, spreading topsoil $25/yd.
Hauling, spreading & compacting fill $15/cu. yd.

5.7 Contingency of 15% added as recommended by Draft Report #1RT-21600. Draft Guidance for Sub Part H of the Interim Status Standard for Owners and Operators of Hazardous Waste Treatment, Storage, and Disposal Facilities.

5.8 Cost of D-7 bulldozer and operator - $70/hour from Herbert Darling Const.

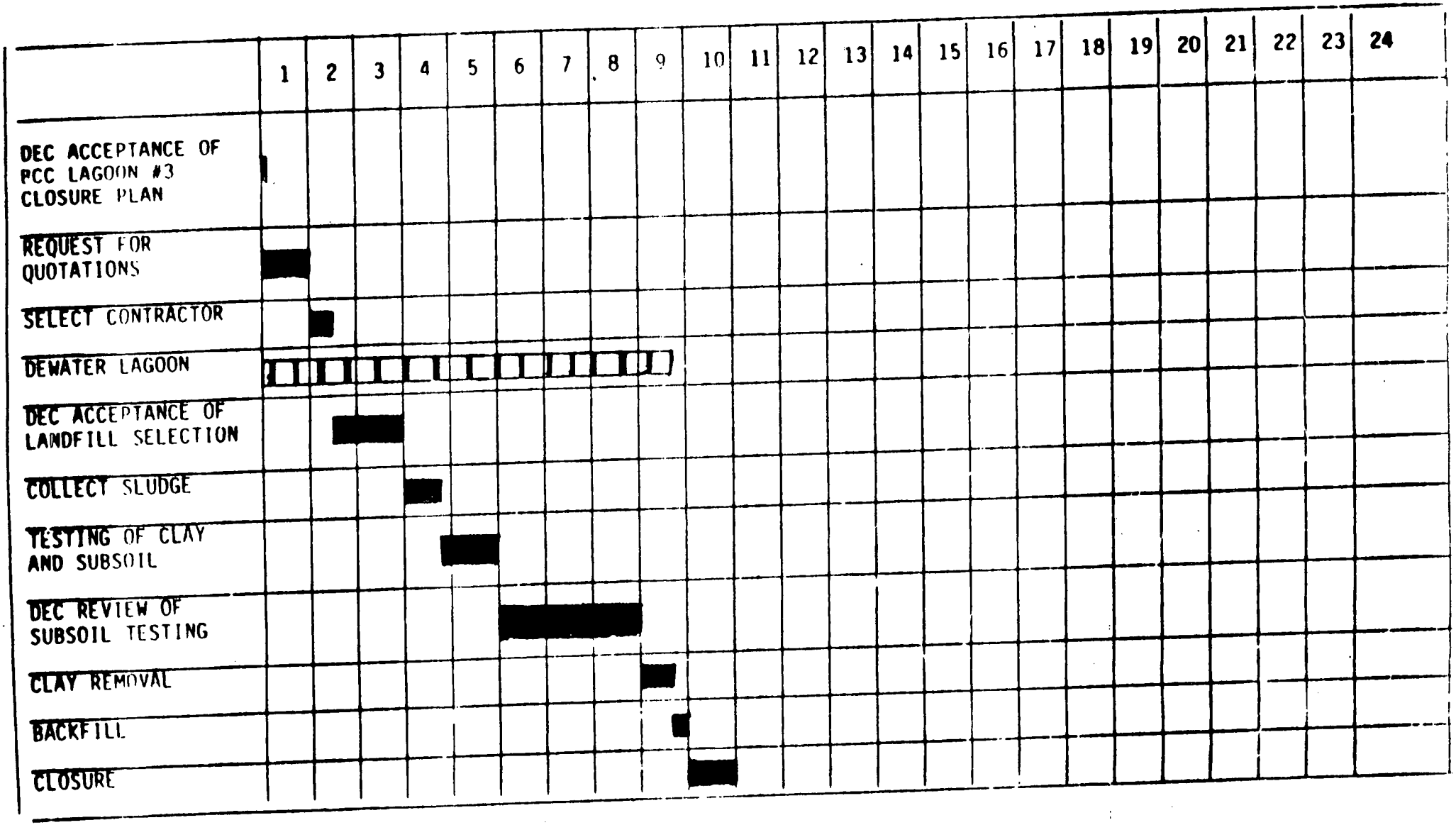
*Herbert Darling - low bidder on Lagoon #3 project.

APPENDIX 3

CLOSURE SCHEDULE

APPENDIX 3

LAGOON NO. 3 CLOSURE SCHEDULE



APPENDIX 4

FINANCIAL ASSURANCE

The annual report for the fiscal year ending September 30, 1985 is still in preparation by the auditors. Upon completion of this report the preparation of the 1985 financial assurance document will be executed and forwarded to NYDEC. The new document will reflect the new language based on the New York State Law as well as the new financial numbers.

Both the 1984 and the 1985 calculations are based on the sum of the closure and post closure costs for both Lagoon #3 and the still operating Lagoons #1 and #2.

APPENDIX 4

Buffalo
COLOR CORPORATION
p o box 7027 / buffalo, new york 14240
716-827-4500

December 17, 1984

CERTIFIED/RETURN RECEIPT

U. S. Environmental Protection Agency
Region 2
Grants Administration
26 Federal Plaza
New York, NY 10278

RE: Facility I.D. No. NY-D080335052

Gentlemen:

Buffalo Color Corporation is using the financial test and guarantee to demonstrate closure and post-closure financial assurance as required by the EPA. In compliance with the Code of Federal Regulations, I am enclosing the following documents:

1. A letter signed by me as Chief Financial Officer that includes the required data from the firm's independently audited, year-end financial statements and the cost estimates for closure and post-closure care; and

2. A copy of Coopers & Lybrand's report on examination of Buffalo Color Corporation's financial statements for the latest completed fiscal year; and

3. A special report from Coopers & Lybrand, our independent certified public accountant, to the Board of Directors of Buffalo Color Corporation stating that they have compared the data which my letter specifies as having been derived from the independently audited, year-end financial statements for the latest fiscal year, with the amounts in such financial statements and, in connection with this procedure, no matters came to their attention which caused them to believe that the specified data should be adjusted.

executive and sales offices

U. S. Environmental Protection
Agency
December 17, 1984

The financial information provided in order to comply with the EPA requirement for closure and post-closure financial assurance is confidential. This data should be used only by the EPA and only in conjunction with the corporate guarantee of closure and post-closure financial assurance.

Very truly yours,

BUFFALO COLOR CORPORATION

L. E. Schenk
Corporate Controller

LES:mak

Encl.

cc: Mr. L. J. Franckowiak (w/o report on examination)
Mr. D. E. Sauer (w/o report on examination)
Mr. T. J. Wlodarczak (w/o report on examination)

Buffalo
COLOR CORPORATION
p o box 7027 / buffalo, new york 14240
716-827-4500

November 5, 1984

U.S. Environmental Protection Agency
Region 2
Grants Administration
26 Federal Plaza
New York, NY 10278

RE: Facility I.D.
No. NY-D080335052

Gentlemen:

I am the chief financial officer of Buffalo Color Corporation, 340 Elk Street, Buffalo, New York 14210. This letter is in support of this firm's use of the financial test to demonstrate financial assurance, as specified in Subpart H of 40 CFR Parts 264 and 265.

1. This firm is the owner or operator of the following facilities for which financial assurance for closure or post-closure care is demonstrated through the financial test specified in Subpart H of 40 CFR Parts 264 and 265. The current closure and/or post-closure cost estimates covered by the test are shown for each facility:

EPA Identification number: NY-D080335052

Buffalo Color Corporation
340 Elk Street
Buffalo, New York 14210

Closure cost estimate	$1,111,770
Post-closure care cost estimate	52,915
Total	$1,164,685

2. This firm guarantees, through the corporate guarantee specified in Subpart H of 40 CFR Parts 264 and 265, the closure or post-closure care of the following facilities owned or operated by subsidiaries of this firm. The current cost estimates for the closure or post-closure care so guaranteed are shown for each facility:

None.

executive and sales offices
[illegible]
[illegible]
201 [illegible]
[illegible] 631 0121

3. In States where EPA is not administering the financial requirements of Subpart H of 40 CFR Parts 264 or 265, this firm, as owner or operator or guarantor, is demonstrating financial assurance for the closure or post-closure care of the following facilities through the use of a test equivalent or substantially equivalent to the financial test specified in Subpart H of 40 CFR Parts 264 and 265. The current closure and/or post-closure cost estimates covered by such a test are shown for each facility:

None.

4. This firm is the owner or operator of the following hazardous waste management facilities for which financial assurance for closure or, if a disposal facility, post-closure care, is not demonstrated either to EPA or a State through the financial test or any other financial assurance mechanism specified in Subpart H of 40 CFR Parts 264 and 265 or equivalent or substantially equivalent State mechanisms. The current closure and/or post-closure cost estimates not covered by such financial assurance are shown for each facility:

None.

This firm is not required to file a Form 10K with the Securities and Exchange Commission (SEC) for the latest fiscal year.

The fiscal year of this firm ends on September 30. The figures for the following items marked with an asterisk are derived from this firm's independently audited, year-end financial statements for the latest completed fiscal year, ended September 30, 1984.

ALTERNATIVE I

1. Sum of current closure and post-closure cost estimates	$ 1,164,685
*2. Total liabilities	19,506,000
*3. Tangible net worth	23,742,000
*4. Net worth	27,041,000
*5. Current assets	29,153,000
*6. Current liabilities	8,299,000
7. Net working capital	20,854,000
*8. The sum of net income plus depreciation, depletion, and amortization	12,771,000
*9. Total assets in U.S. (required only if less than 90% of firm's assets are located in the U.S.)	not required

Alternative 1 (cont'd)

	YES	NO
Is line 3 at least $10 million?	X	
11. Is line 3 at least 6 times line 1?	X	
12. Is line 7 at least 6 times line 1?	X	
*13. Are at least 90% of firm's assets located in the U.S.? If not complete line 14.	X	
14. Is line 9 at least 6 times line 1?		
15. Is line 2 divided by line 4 less than 2.0?	X	
16. Is line 8 divided by line 2 greater than 0.1?	X	
17. Is line 5 divided by line 6 greater than 1.5?	X	

I hereby certify that the wording of this letter is identical to the wording specified in 40 CFR 264.151(f) as such regulations were constituted on the date shown immediately below.

Leslie E. Schenk
Corporate Controller
November 5, 1984

ANNUAL REPORT BY AUDITOR

Buffalo Color Corporation's annual report was submitted under separate cover and is not included here.

Coopers
&Lybrand

To the Board of Directors
Buffalo Color Corporation

We have examined the consolidated balance sheet of Buffalo Color Corporation and Subsidiaries as of September 30, 1984, and the related consolidated statements of income, changes in shareholder's equity, and changes in financial position for the year then ended, and have issued our report thereon dated November 1, 1984. Our examination was made in accordance with generally accepted auditing standards and, accordingly, included such tests of the accounting records and such other auditing procedures as we considered necessary in the circumstances.

We have compared the information in the above mentioned financial statements to that presented in the Corporate Guarantee of EPA Closure and Post-Closure Financial Assurance, dated November 5, 1984, in conformity with Section 264.151(f) of the Code of Federal Regulations.

In connection with our examination and subsequent comparison, nothing came to our attention that caused us to believe that the information presented in the Corporate Guarantee of EPA Closure and Post-Closure Financial Assurance should be adjusted to properly reflect the balances which appeared in the Consolidated Financial Statements as of September 30, 1984.

Coopers & Lybrand

Rochester, New York
December 17, 1984

APPENDIX 5

CALCULATION OF SLUDGE VOLUME

ALTERNATE VOLUME CALCULATION

.. Depth of sludge by field investigation.

10 1/2" Sludge depth estimated by sighting on drain pipe.

10.5" = .87 Ft.

.. Area of Lagoon #3 from cost calculation - Appendix 2 7738 Ft^2

.. Volume of sludge in Lagoon #3

7738 ft^2 .87 ft = 6732 ft^3
= 249 yd^3

.. Depth of clay _____ Less conservative estimate

6" Clay = .5 Ft. (est. orign. 4" + side material)

.. Volume of clay =

7738 Ft^2 X 0.5 Ft = 3869 Ft^3
= 143 Yd^3

Tonage	Sludge	6732 Ft^3 @ 80 lbs/ft^3	= 538,560 lbs	=	270 Tons
	Clay	3869 Ft^3 @ 105 lbs/ft^3	= 406,245 lbs	=	203 Tons
	Total				473 Tons

APPENDIX 6

SOIL SAMPLING AND TESTING PLAN

RECRA RESEARCH, INC.

Hazardous Waste And Toxic Substance Control

November 14, 1985

Buffalo Color Corporation
P.O. Box 7027
Buffalo, NY 14240

ATTN: Mr. Michael Lindaman

Re: Buffalo Color Corporation Lagoon 3 Closure Plan

Dear Mr. Lindaman:

Enclosed please find a soil sampling procedure and methods of liquid/solid analysis as per your request. I have also written our recommendation concerning the sampling program for your lagoon excavation.

Clay Removal

This task includes sampling of clay materials, field logging of the samples obtained, analytical testing of the samples, evaluation and interpretation of the analytical results, consultation with Buffalo Color Corporation and their general contractor regarding the results of analyses, and our recommendations, and preparation of a report. The following paragraphs describe the scope of work associated with completion of these items, and the assumptions upon which our cost estimate is based. All Recra Research, Inc., work will be performed under the direct supervision of our certified professional geologist (the Geologist).

Sludge and clay removal will be performed by Buffalo Color or your contractor. It will be your responsibility to notify the Geologist when all sludge materials have been removed so that the sampling of clay materials may commence.

Working under the direct supervision of the Geologist, a geologist will sample the remaining clay materials. Sample locations will be determined by the Geologist and Buffalo Color Corporation. For estimating purposes, we have assumed samples will be collected at ten locations. Based on our experience, we believe it will be in the best interest of Buffalo Color Corporation to determine what the New York State Department of Conservation's thoughts are regarding the number of samples to be obtained. The actual number of samples obtained for analysis will be authorized by Buffalo Color Corporation.

Samples will be obtained using pre-cleaned soil sampling equipment. All materials and equipment coming in contact with the materials sampled will be thoroughly cleaned and rinsed between all sampling points. Samples obtained will be inspected for visual and physical characteristics and this information recorded on sample log forms. The samples will then be placed in laboratory prepared pre-cleaned glass sample bottles with teflon coated caps. Sample labels will be affixed to the sample bottles which will include such information as: Date, Time, Weather Conditions, Sampler Identification, Sample Identifier, Sample Location and Depth and a brief sample description.

We recommend that three samples, representing materials at incrementally increasing depths, be obtained at each sample location. Sample intervals would be 0-6", 6-12" and 12-18". Only those samples from the 0-6" interval at each sample location would be analyzed. The remaining samples (i.e. 6-12" and 12-18" samples) would be archived for potential future analysis.

We make this recommendation as a cost saving measure in the event the initial set of analytical results indicate additional excavation is required. There will be a time lag between the date samples are obtained and analytical results are available. Also, if the initial results indicate additional excavation is required in certain areas, the initial results will not, by themselves, indicate how much additional materials should be removed.

So as to avoid repeated re-mobilization of the excavation contractor and to provide data by which Buffalo Color Corporation may assess the added costs of additional excavation, the Geologist would review the initial results with Buffalo Color Corporation and make recommendations for laboratory analysis of the 6-12" interval samples at selected locations of interest (i.e. those locations where the initial results showed contaminants to be present). The results of the second round of analyses would provide the data by which the Geologist could determine to what depths additional materials should be excavated and by which Buffalo Color Corporation could assess additional costs. There is very little cost difference between obtaining one sample or three samples at each location. We believe the additional samples would be a cost effective way for Buffalo Color Corporation to reduce project costs associated with re-mobilization and provide a mechanism to evaluate project cost escalations as the project proceeds. Analytical work beyond the initial set of analyses will not be performed without consultation and authorization by Buffalo Color Corporation.

When the process of analysis and excavation is complete to the satisfaction of the Geologist and Buffalo Color Corporation, the Geologist will prepare a report. The report will include a discussion of sample locations and descriptions, methodologies and analytical results and present our interpretations and recommendations based on these results. If the data are supportive, the Geologist will state within the report that based on the available data, closure specifications have been met and backfilling and capping may begin.

The cost estimate assumes only one sampling episode will be required, including one meeting with Buffalo Color Corporation to discuss initial analytical results and includes costs for only the first round of analytical testing. Our estimate does not include provisions for any modifications to

the scope of work which might be made at the request of regulatory agencies. The proposal assumes that by the time the Geologist needs to make a decision regarding whether or not additional excavation will be required, there will exist guidance from Buffalo Color Corporation as to what are acceptable levels of the contaminants to be tested and what levels may be allowed to remain in place.

As you know, sampling and analytical procedures are very site specific and require precise site and waste stream information. The collection of these data is very time consuming due to the regulatory agency scrutiny usually associated with this type of endeavor. We at Recra have been involved in many similar projects and offer the qualified personnel necessary to address your specific needs and requirements.

Sincerely,

RECRA RESEARCH, INC.

David M. Urbanski
Director of Program Development

DMU:pal
Enclosure

APPENDIX 7

LIST OF EQUIPMENT REQUIRING DECONTAMINATION

1	Bulldozer
1-2	Backhoes
1-2	Bucket Loaders
2-5	Roll-off Vehicles
4-8	Lugger boxes

F.3

CONTINGENCY

CLOSURE AND POST CLOSURE PLAN

SURFACE IMPOUNDMENTS #1 AND #2

BUFFALO COLOR CORPORATION

1. General Provisions

1.1 The contingency procedure for the closure of the surface impoundments includes core sampling and analytical testing of surrounding soil to determine any traces of contamination, leveling of above grade dikes, backfill remaining area with clean soil to grade and seed.

The following steps outline the exact procedure as proposed.

1.2 Notification

1.2.1 Official notification of intent to close an impoundment under the contingency plan will be forwarded to the DEC by Buffalo Color Corporation's Environmental and Safety Office. This office will be responsible for the filing of all required documents and the obtainment of all permits required prior to any closure start. This submission will also include all available technical data and procedures to be followed.

1.3 Engineering Requirements After Approval

1.3.1 BCC Project Engineering will prepare a qualified bidders list in conjunction with representative of Environmental staff.

1.3.2 BCC Project Engineering will prepare and issue a request for quotation for the work required on this project with the coordination of BCC Purchasing Department. Manager Environmental Affairs will review the request for completeness prior to issuance.

1.3.3 Bids will be reviewed by both Purchasing and Project Engineering to insure complete understanding by contractor.

1.3.4 A contractor will be selected based on bid and previous experience. The final vendor selection will be the responsibility of BCC Project Engineering.

1.3.5 The selected contractor will supply a list of all/any subcontractors to be used on this project prior to start-up with BCC retaining the right of rejecting any proposed subcontractor.

2. Liquid Removal

2.1 No sludge is removed under the contingency closure plan.

2.2 Buffalo Color shall pump out as much of the supernatent liquid as is possible, treat it, and send it forward to the BSA.

3. Safety

3.1 Wet sludge can be highly alkaline with a pH range of 8-13. It includes various chemicals: primarily, mixed organics with metal salts and water. The alkalinity, however is in the supernatent liquid, not the solids. All personnel who will be coming in contact with wet sludge shall wear:

3.1.1 Disposable chemical suit (light weight).
3.1.2 Rubber boots (high top)
3.1.3 Rubber gloves
3.1.4 Safety glasses with side shields
3.1.5 Hard hats

4. Surrounding Soil

4.1 Testing of Soil

Samples of soil from the area around surface impoundment will be sent to a certified laboratory to determine EP toxicity as listed in 40 CFR 261.20 - 261.24. This determination will dictate the method disposal if it is found to be toxic, the material will go to an approved secure bulk landfill, if it is found to be non-toxic it will go to an approved sanitary landfill (methods for handling will be tailored to the type of landfill selected by the NYDEC).

4.2 Determination for contaminated soil shall be done by checking for:

4.2.1 Excessive discoloration (Blue/Purple color).

4.2.2 pH (a reading of less than 5 or equal to background material).

4.2.3 Final determination shall be by testing the composite sample for EP Toxicity (metals and pesticides) and EP Extract for the following:

4.2.3.1 Aniline

4.2.3.2 N-Methylaniline

4.2.3.3 N,N-Dimethylaniline

4.2.3.4 N-Ethylaniline

4.2.3.5 N,N-Diethylaniline

4.2.3.6 Cyanide

4.2.3.7 Sulfide

4.2.3 This testing and resulting data will be reviewed with the NYDEC to insure correct methodology is used and interpretation of results are agreed upon. All tests will be performed in a certified laboratory and approved by NYDEC. Test methods followed will be SW846 and in-house methods.

4.3 The contractor shall notify Buffalo Color Corporation when this portion of the project is completed. The contractor shall not proceed until directed to by the Buffalo Color Corporation Project Engineer.

5. Lagoon Closure

5.1 Once notification from Buffalo Color Corporation is received the contractor shall proceed to close surface impoundment.

5.2 The contractor shall push the mounded sides of the lagoon into the central depression, covering the sludge with clay. The clay will be compacted on top of the sludge.

5.3 The contractor shall then supply enough clean fill to completely raise the elevation of the lagoon center so that it conforms with the surrounding topography. In no case will the contractor leave the lagoon area such that standing water forms after a rain or during the spring thaw.

5.3.1 The surface shall be graded to assure run-off drainage toward Orlando, Prenatt, and Maurice Streets.

5.3.2 The top two inches of fill shall be topsoil capable of supporting vegetation.

5.3.3 Contractor shall provide a pump and operator to keep the lagoon as dry as possible during working hours.

5.3.4 Any air and effluent lines shall remain intact and open.

5.3.5 A water hose connection shall be provided by Buffalo Color Corporation to ensure truck cleanliness prior to leaving Buffalo Color Corporation property. The contractor shall be responsible for public highway protection.

5.3.6 Trucks will enter and leave through the Maurice Street gate and shall abide by all plant traffic rules and any directives of the Buffalo color Corporation Security Force. This gate will be manned by a guard during working hours.

5.3.7 Trucks will be permitted to enter the plant between 8:00 A.M. and 4:00 P.M. all trucks must leave the plant by 4:30 P.M.

5.3.8 Days of work shall be Monday through Friday. Buffalo color corporation holidays will be observed unless the contractor obtains approval through the Buffalo Color Corporation Project Engineer at least three days prior to the holiday.

5.3.9 Buffalo color Corporation will supply a staging area for the contractor's use during this project.

5.3.10 Buffalo Color Corporation will provide all line disconnects of incoming effluent, exit and air piping prior to initiation of work.

5.3.11 All vehicles will be provided by the contractor. Vehicles used for hauling will have licenses with appropriate New York State permits. Detailed routing will be provided by the contractor and approved by Buffalo Color Corporation.

5.3.12 Buffalo Color Corporation will provide personal wash-up facilities (Bldg. 351) but the contractor must provide all other sanitation facilities. Buffalo Color Corporation will provide water for non-drinking purposes only.

5.3.13 Buffalo Color Corporation will provide one portable safety shower/eyewash station.

5.4 The contractor shall then grade and rake the surface and plant it with grass. The contractor shall give a guarantee of one year on the germination and life of the grass.

6. Impoundment Post Closure Maintenance

6.1 Buffalo Color will notify the NYDEC when work is complete so that any post closure inspections can be made.

6.2 The existing groundwater monitoring wells will be used and will be sampled semi-annually for thirty years for those parameters required by 40 CFR 265.92

6.3 At all times Buffalo Color will keep the area well kept by grass cutting and free of debris so that erosion can be visually checked and also to insure nothing is being pushed to the surface.

6.4 Dependent on date of application of finish cover on impoundment, a topigraphical survey after a fall and spring season shall be done. Any significant depressions caused by settling will be filled in the survey process repeated once every four years.

COST OF CLOSURE/POST CLOSURE

Vern Heiler

DATE: January 17, 1986

SUBJ: Updated Cost Estimate for Closure Plans for Lagoons 1 and 2

TO: R.J. Kovalski

1.0 Decontamination of System Components

1.1 Provide connections to city water to flush system through the ponds, from outlet wet wells through all equipment and BSA Weir.

1.2 Cost of Labor

Estimated Labor Required	=	120 hrs.
BCC labor rate with overheads (includes supervision)	=	$25.70
Total	=	3,084

1.3 Cost of city water and sewer rate for flushing water. (estimate need for 2,000,000 gallons)

2,000,000 x $1.14/1,000 gal. = $2,280

1.4 Decontamination Cost = 5,364

1.5 Total Adjusted for 15% Contingency = $6,169

2.0 Lagoon #1 Closure

2.1 Lagoon will be drained of all water. Sludge will be piled in one end to aid in dewatering (assume that all sludge is settled to the bottom and that it is 20" (1.67') thick.

2.1.A Volume of sludge

31.5' x 290' x 1.67' = 15,255 cu.ft. = 565 cu.yd.

2.1.B Assume density of sludge = 80 lbs./cu. ft.

15,255 cu.ft. x 80 lbs/cu.ft. = 1,220,400 lbs.

= 610.2 tons

2.1.C Cost to excavate and load sludge –

565 cu.yd. x $30/cu.yd = $16,950

load – $5/ton x 610.2 tons = $ 3,051

2.1.D Cost to haul away and dispose of sludge

$85/ton x 610.2 tons = $51,867

2.2 Contaminated Clay Removal Cost

2.2.A This lagoon has 3" round river glazed gravel embedded in the clay liner, therefore, must remove. First 6" of clay liner – assume river gravel same density as wet dense clay (105 lbs/cu.ft) (assume first 3" below gravel is contaminated.

2.2.B Volume of contaminated clay

(290 x 31.5' x 0.5') + 2 (333.5' x 25.5' x 0.5')

+ 2 (31.5' x 22.0' x 0.5') = 13,765 cu.ft.
= 509.8 cu.yd.

2.2.C Cost to excavate and load contaminated clay and river gravel =

excavate = 509.8 cu.yd x $30/yd = $15,294

$$\text{load} = 13{,}765 \text{ cu.ft.} \times 105 \text{ lbs/cu.ft.} \times \frac{1 \text{ ton}}{2{,}000 \text{ lbs}} \times \$5/\text{ton} = \$3{,}613$$

2.2.D Cost to dispose of contaminated clay and river gravel =

$$13{,}765 \text{ cu.ft.} \times \frac{105\#}{\text{cu.ft.}} = 1{,}445{,}325 \text{ lbs.}$$

$$= 772 \text{ tons}$$

$$722 \text{ tons} \times \frac{\$85}{\text{ton}} = \$61{,}426$$

2.3 Break up remainder of clay liner to allow natural drainage.

2.3.A Eight hours – bulldozer and operator @ $70/hr. = $560

2.4 Level pond to existing grade

2.4.A Volume required

(31.5' x 290 x 13) +2 [0.5(13 x 25.5)(333.5)]

+2 [0.5(13 x 25.5)(51)] = 246,217 cu.ft.
= 9,119 cu.yd.

2.4.B Purchase, haul, spread and compact fill

9,119 cu.yd. x $15/cu.yd. = $136,785

2.5 Grade, 6" topsoil, fertilize and seed.

Topsoil = 333.5' x 82.5' x .5 x $\frac{\text{cu.yd.}}{27 \text{ cu.ft.}}$ x $25/cu.yd. = $12,783

Fertilize and seed - 333.5 x 82.5 = 27,514 cu.ft. x $0.34/sq. ft. = $9,355

2.6 Ground water and soil.

Sampling - (assume four (4) samples each)

2.6.A Sampling - 4 samples x 8 hr/sample

= 32 hrs. x $25.70/hr. = $822

2.6.B Well sampling analysis -

2 samplings @ $342/sampling = $684

2.6.C Soil sampling analysis

2 samplings @ $684/sampling = $1,296

2.7 Certification by an independent Professional Engineer 10 hours per week

x 8 weeks x $45/hr. = $3,600

2.8 Services of Registered Geologist to monitor removals

20 hours/week x 8 weeks x $45/hr. = $7,200

Summary Lagoon #1

2.1	Sludge removal	-	$ 71,868
2.2	Contaminated clay removal	-	80,333
2.3	Break up remainder of clay liner	-	560
2.4	Level pond to existing grade	-	136,785
2.5	6" Topsoil - fertilize and seed	-	22,093
2.6	Ground water and soil sampling	-	1,980
2.7	Certification by independent P.E.	-	3,600
2.8	Registered Geologist monitoring	-	7,200
	Sub total	=	$324,419
	+15% Contingency	=	48,663
			$373,082

3.0 Lagoon #2 Closure

3.1 Lagoon will be drained and sludge de-watered as in lagoon #1. Assume depth of sludge = 20" (1.67')

3.1.A Volume of sludge

31.5' x 290' x 1.67' = 15,525 cu.ft. = 565 cu.yd.

3.1.B Assume density of sludge = 80 lbs./cu.ft.

15.525 cu.ft. x 80 lbs/cu.ft. = 1,220,400 lbs.

= 610.2 tons

3.1.C Cost to excavate and load sludge

excavate = 565 cu.yd x $30/cu.yd. = $16,950

load = $5/ton x 610.2 tons = $3,051

3.1.D Cost to haul away and dispose of sludge

$85/ton x 610.2 tons = $51,867

3.2 Clay removal cost

3.2.A Assume 4" of clay liner is contaminated and density is 105 lbs/cu.ft.

3.2.B Volume of contaminated clay

(290 x 31.5 x 0.33) +2 (333.5 x 25.5 x 0.33)

+2 (31.5 x 22.0 x 0.33) = 9084.7 cu.ft.

= 336.5 cu.yd.

3.2.C Cost to excavate and load contaminated clay

excavate - 336.5 cu.yd. x $30/cu. yd. = $10,095

load 336.5 cu.yd. x $\frac{105\#/\text{cu.ft} \times 27 \text{ cu.ft./cu.yd.} \times 5}{2000} = \$2,385$

3.2.D Cost to dispose of contaminated clay

9084.7 cu.ft. x 105 lbs/cu.ft. = 953,894 lbs.

= 477 tons

477 tons x $85/ton = $40,545

3.3 Break up remainder of clay liner to allow natural drainage.

3.3.A Eight (8) hours bulldozer and operator @ $70/hr. = $560

3.4 Level pond to existing grade

3.4.A Volume required

(31.5 x 290 x 13) +2 (0.5(13 x 25.5)(333.5)

+2 [.5(13 x 25.5)(51)] = 246,217 cu.ft. = 9,119 cu.yd.

3.4.B Purchase, haul, spread and compact fill –

9,119 cu.yd. x $15/cu.yd. = $136,785

3.5 Grade, 6" topsoil, fertilize and seed

Topsoil – (333.5 x 82.5 x 5) $\frac{1 \text{ yd}}{27 \text{ cu.ft.}}$ $25/cu.yd = $12,738

Fertilize and seed (333.5 x 82.5) ($0.34/sq.ft) = $9,355

3.6 Groundwater and soil sampling (assume 4 samples each)

3.6.A Sampling 4 samples @ 8 hours

per sample = 32 hours x 25.70/hr.

= $822

3.6.B Well sampling analysis

two (2) samplings at $342/sampling = $684

3.6.C Soil sampling analysis

two (2) samplings at $684/sampling = $1,296

3.7 Certification by an independent professional engineer
10 hours/week x 8 weeks x $45/hour = $3,600

3.8 Services of registered geologist to monitor removals.

20 hours/week x 8 weeks x $45/hour = $7,200

Summary Lagoon #2

3.1	Sludge removal	–	$ 71,868
3.2	Contaminated clay removal	–	53,025
3.3	Break up remainder of clay line	–	560
3.4	Level pond to existing grade	–	136,785
3.5	6" Topsoil – fertilize and seed	–	22,093
3.6	Groundwater and soil sampling	–	1,980
3.7	Certification by independent P.E.	–	3,600
3.8	Registered geologist monitoring	–	7,200
	Subtotal	=	297,111
	+15% Contingency	=	44,567
	Total	=	341,678

5.0 Estimation Standards

5.1 Cost of excavating and loading sludge using figures from Dick Radel of Herbert Darling Construction.

excavating $30/cu.yd.

loading $5/ton

5.2 Cost of hauling and disposal of sludge and contaminated clay (assuming that it is non-hazardous) from Tricil of Canada = $85/ton

5.3 Cost of a professional engineer to monitor closing activities and certify that the closer plan is complied with, per John Berry of Acres International - $45/hour (fully loaded rate) cost of registered geologist is the sam.

5.4 Plant labor cost for sampling is $20.56/hour (fully loaded) plus 25% for supervision and administration = 25.70/hr.

5.5 City water and sewer cost from BCC water bills of $0.4693/1,000 gal., sewer rates = $0.67/1,000 gal.

5.6 Cost of 6" topsoil grading and seeding from Herbert Darling Construction - seeding $0.034/sq.ft.,

hauling spreading topsoil $25/cu.yd.

hauling, spreading and compacting fill $15/cu.yd.

5.7 Contingency of $15% added as recommended by Draft Report #1RT-21600 Draft Guidance for Sub part H of the Interim Status Standard for Owners and Operators of Hazardous Waste Treatment, Storage and Disposal Facilities.

5.8 Cost of D-7 bulldozer and operator = $70/hour from Herbert Darling Construction.

*Herbert Darling - low bidder - Lagoon #3 project.

L.B. Heiler 1/26/86

COST OF CONTINGENCY CLOSURE/POST CLOSURE

CONTINGENCY CLOSURE AND POST CLOSURE COST

1. The following plan includes those costs that would be incurred if sludge removal was prohibited and surface impoundments were filled, clay capped and seeded. These costs were developed from the March 25, 1983 estimated cost of closure.

1.1	Cost to decontaminate operating sections of system.	$ 3,200.
1.2	Cost to fill to grade cap	261,000.
1.3	Cost to dispose of 1500 remaining drums from solid waste area	112,500.
1.4	Post closure monitoring and administration	250,500.
	Sub total	627,200.
	Plus 15% contingency	94,080.
	Total	721,280.

2. Cost To Decontaminate Operating Sections of System

2.1 Decontamination of system components

Provide connections to city water to flush system thru to ponds, and then from outlet wet wells through all equipment and BSA Weir.

2.2	Cost of Labor 120 man-hours @ 18.50/hour	2,220.
2.3	Cost of City Water 2,000,000 Gallon X $0.47/1000 gallon	940.
2.4	Total equipment decontamination cost	3,160.
	Round off to:	3,200

3. Cost of Haul in Fill - Dump, Grade and Seed

3.1	Purchase and haul in 14216 yards^3 X 1.42 tons/yd^3 X $8/ton	161,494.
3.2	Grade and Seed 14216 yards^3 X $7/yard^3	99,512.
	Total to fill, dump, grade	261,000.

4. Solid Waste Storage Area

4.1	Dispose of remaining 1500 drums at sludge landfill. *1500 drums X $75/drum =	$112,500.

5. Post Closure Monitoring and Administration

5.1	Administration cost and sample processing	40,000.
5.2	Ground water sampling - 1000 hrs @ $18.50/hour	18,500.
5.3	Analytical costs quarterly analysis @ 5 monitoring wells for 30 years	192,000.
	Total	$250,500.

6. Since the contingency closure cost is less than the closure cost the latter should be used for the financial test.

ANALYSIS OF CONTENTS OF LAGOON

1.1 Process Waste Water Analysis

1.2 Lagoon #3 Sludge Analysis 12-11-1984

1.3 Lagoon #3 Sludge Analysis 11-01-1984

1.4 Lagoon #3 Sludge Analysis 08-02-1985

1.5 Lagoon #3 Acute Oral Toxicity (DOT) 03-08-1985

1.6 Methods Employed in Analysis

1.7 Rationale for Methods Selected

CHEMICAL AND PHYSICAL ANALYSIS OF THE HAZARDOUS WASTES PLACED IN THE SURFACE IMPOUNDMENTS

The material entering the surface impoundment was waste water from chemical processes. The rationale for the selection of parameters, sample collection procedures, and analytical methods are discussed in Appendix 1.7

Sampling Commenced November 2, 1984

	Number Of Samples	Average Result	High Result	Date of High Result	Number At Limit of Detection
A.1 Physical/Chemical Criteria					
A.1.1 Corrosivity					
A.1.1.1 (pH)	5	12.2-12.8	12.8	02-22-85	0
A.1.2 Ignitability					
A.1.2.1 (Flash pt ^{o}F)	6	> 201	> 201	02-21-85	7
A.1.3 Reactivity					
A.1.3.1 (Total Cyanide)			See A.4.1.1 below		
A.1.3.2 (Sulfide)			See A.4.3.1 below		
A.2 Hazardous Waste Streams From Production Activities (mg/liter)					
A.2.1 Aniline	7	158.0	262	11-06-84	0
A.2.2 N-Methylaniline	7	28.9	48	11-07-84	0
A.2.3 N,N-Dimethylaniline	7	73.0	90	11-06-84	0
A.2.4 N-Ethylaniline	7	< 2.1	3	11-06-84	2
A.2.5 N,N-Diethylaniline	7	12.1	21	11-02-84	0
A.2.6 Sodium Hydroxide		See A.4.2.3 below			
A.2.7 Potassium Hydroxide		See A.4.2.3 below			
A.2.8 Sodium Cyanide		See A.4.1.2 below			
A.2.9 Potassium Cyanide		See A.4.1.2 below			
A.2.10 Cyanides (Complexed)		See A.4.1.3 below			
A.2.11 Methanol	7	1.754	2.900	02-19-85	
A.2.12 Ethanol	7	2.954	5.890	02-19-85	
A.2.13 Formaldehyde	7	0.490	0.970	02-21-85	
A.2.14 1,3 Butadiene	7	< 0.0117	0.016	02-19-85	
A.2.15 Methylcyclopentadiene	7	< 0.0173	0.0270	11-01-84	2
A.2.16 Nickel	7	0.459	0.7210	11-02-84	0
A.2.17 Sodium Sulfide		See A.4.3.1 below			

		Number Of Samples	Average Result	High Result	Date of High Result	Number at Limit of Detection
.3 Possible Hazardous Constituents						
A.3.1 Metals (mg/liter)						
A.3.1.1	Chromium	7	<0.0207	0.059	02-21-85	1
A.3.1.2	Lead	7	<0.0362	0.124	02-21-85	3
A.3.1.3	Mercury	7	<0.0003	0.0005	02-19-85	3
A.3.1.4	Arsenic	7	<0.001	<0.001	11-07-84	7
A.3.1.5	Barium	7	0.0879	0.330	02-21-85	0
A.3.1.6	Cadmium	7	<0.0063	0.011	02-19-85	1
A.3.1.7	Selenium	7	<0.0026	0.007	02-21-85	3
A.3.1.8	Silver	7	<0.001	<0.001	11-07-84	7
A.3.2 Pesticides (mg/liter)						
A.3.2.1	Endrin	5	<0.00002	<0.00002	11-07-84	5
A.3.2.2	Lindane	5	<0.00002	<0.00002	11-07-84	5
A.3.2.3	Methoxychlor	5	<0.00002	<0.00002	11-07-84	5
A.3.2.4	Toxaphene	5	<0.0005	<0.0005	11-07-84	5
A.3.2.5	2,4-D	5	<0.0001	<0.0001	11-07-84	5
A.3.2.6	2,4,5-TP Silvex	5	<0.0001	<0.0001	11-07-84	5
A.4 Secondary Analysis						
A.4.1 Cyanide (mg/liter)						
A.4.1.1	Total Cyanide	7	1.824	2.890	11-07-84	0
A.4.1.2	Free Cyanide	7	1.22[illegible]	2.070	11-07-84	0
A.4.1.3	Complex Cyanide	7	0.600	1.130	11-02-84	0
A.4.2 Alkalinity (mg/liter)						
A.4.2.1	Alkalinity (Total)	2	1670.9	1969.8	02-21-85	0
A.4.2.2	Alkalinity (CO_3)	2	1407.1	2251.4	02-22-85	0
A.4.2.3	Alkalinity (OH)	2	879.9	1055.9	02-21-85	0
A.4.3 Sulfide (mg/liter)						
A.4.3.1	Sulfide	6	23.36	26.80 *	02-21-85	0

* Second highest result. The highest result was an outlier which exceeded the average of the other five results by more than 158 standard deviations.

Appendix updated December 1, 1985

TERMINI ASSOCIATES
TECHNICAL CONSULTANTS

1965 Sheridan Drive
Buffalo, New York 14223
716-877-3155

1.2

LAGOON No.3 SLUDGE ANALYSIS

Prepared for:

BUFFALO COLOR CORPORATION

Henry R. Borkowski
Quality Control Department

December 11, 1984

TERMINI ASSOCIATES

Rocco Termini

C. R. Termini
President

Project Code: BC-206-096

TECHNICAL REPORT

1.0 TITLE

Lagoon No.3 Sludge Analysis

2.0 PURPOSE

Determine total and leachable concentrations of toxic constituents on a sample of lagoon sludge.

3.0 SAMPLE

Two composite samples of Lagoon No.3 sludge were collected by Buffalo Color Corporation personnel on December 5, 1984. The samples, labeled respectively "North" and "South", were received at TERMINI ASSOCIATES' facility on December 5, 1984 from Mr. Henry R. Borkowski, Buffalo Color Corporation, 340 Elk Street, Buffalo, New York 14210. Work proceeded under authorization of Order Release Number R-403. Rush analysis was requested. The samples were assigned Log Numbers 40852 and 40853.

4.0 RESULTS

Although Log Numbers were assigned to each sample container, at the request of Mr. Henry R. Borkowski, the "North" and "South" samples were combined into a single composite prior to analysis. The analytical test results, reported under Log Number 40852, are presented in Table I.

5.0 METHODOLOGY

The requested analytical testing was conducted on a portion of the "as received" Lagoon No.3 final composite sludge sample (Log Number 40852). A second portion of the final composite sample was subjected to the RCRA Extraction Procedure (40CFR 261.24). A third portion of the final composite sample was similarly extracted with distilled water only (i.e., no acetic acid was added) for subsequent leachable cyanide analysis. The leachate generated by this protocol were subsequently analyzed for the same requested parameters. All testing and sample preparation was performed in accordance with procedures established in "Test Methods for the Evaluation of Solid Waste, Physical/Chemical Methods "(EPA SW-846, July 1982) except as noted above.

TABLE I

LAGOON No.3 SLUDGE

Parameter / Log Number	As Received (mg/kg) 40852	Leachate (mg/L) 40852
Aluminum, mg/L	2.14	0.077
Arsenic, mg/L	0.24	0.009
Barium, mg/L	2.30	0.066
Cadmium, mg/L	0.23	0.007
Chromium, mg/L	1.44	0.050
Chromium, hexavalent, mg/L	0.25	< 0.010
Copper, mg/L	3.25	0.110
Total Cyanide, mg/L	1.20	0.024 (1)
Cyanide, amenable to chlorination, mg/L	0.65	0.022 (1)
Iron, mg/L	3.95	0.122
Lead, mg/L	2.17	0.062
Manganese, mg/L	3.05	0.099
Mercury, mg/L	0.055	0.0017
% Moisture	17.1	- -
Nickel, mg/L	4.41	0.133
pH Units	8.30 (2)	8.75
Selenium, mg/L	.0177	0.005
Silver, mg/L	< 0.01	< 0.001
Zinc, mg/L	4.23	0.132
Total Organic Carbon, mg/L	427000	321.
1,3 Butadiene, mg/L	0.37	< 0.010
Methylcyclopentadiene, mg/L	0.84	0.022
Aniline, mg/L	10.4	0.303
n,n-Dimethyl aniline, mg/L	0.95	0.037
n-Monomethyl aniline, mg/L	0.63	0.028
n,n-Diethyl aniline, mg/L	0.87	0.040
n-Monoethyl aniline, mg/L	0.39	0.015
Methanol, mg/L	0.44	< 0.010 (3)
Ethanol, mg/L	0.30	< 0.010 (3)
Formaldehyde, mg/L	0.11	< 0.010 (3)

(1) EP TOX with distilled water only
(2) 5% Slurry
(3) Probably volatized during extraction procedure

TERMINI ASSOCIATES

TERMINI ASSOCIATES
TECHNICAL CONSULTANTS

1.3

1963 Sheridan Drive
Buffalo, New York 14223
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LAGOON #3 SLUDGE ANALYSIS

Prepared for:

BUFFALO COLOR CORPORATION

Mr. Henry R. Borkowski
Quality Control Department

November 1, 1984

TERMINI ASSOCIATES

Rock Termini

C. R. Termini
President

Project Code: BC-206-068

TECHNICAL REPORT

1.0 TITLE

Lagoon #3 Sludge Analysis

2.0 PURPOSE

Determine total available and leachable concentration values for routine inorganic species on a sample of lagoon sludge.

3.0 SAMPLE

One composite sample of Lagoon #3 sludge was collected by Buffalo Color Corporation personnel on September 27, 1984. The sample was received at TERMINI ASSOCIATES' facility on September 27, 1984 from Mr. Henry R. Borkowski on Order Release Number R-366. The sample was assigned Log Number 40692.

4.0 RESULTS

The analytical test results for Sample 40692 are presented in Table I.

5.0 METHODOLOGY

The requested analytical testing was conducted on a portion of the "as received" Lagoon #3 sludge sample (Log Number 40692). A second portion of the sample was subjected to the RCRA Extraction Prodecure (40CFR 261.24). The leachate generated by this protocol was subsequently analyzed for the same requested parameters. All testing and sample preparation was performed in accordance with procedures established in "Test Methods for the Evaluation of Solid Waste, Physical/Chemical Methods "(EPA SW-846, July 1982).

TABLE I

LAGOON #3 SLUDGE

Parameter	As Received (mg/kg)	Leachate (mg/L)
Log Number	40692	40692
Calcium	40,000	1460
Carbonate, as CaCO3	55,335	155
Chloride	1263	63.0
Nitrate	1168	12.2
Phosphate, as P	1.30	0.146
Potassium	2020	88
Sodium	2680	134
Sulfate	1039	43.4
Initial pH units, (5% slurry)	8.42	

TERMINI ASSOCIATES

TERMINI ASSOCIATES 1.4
TECHNICAL CONSULTANTS

1965 Sheridan Drive
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LAGOON NO. 3 SLUDGE EVALUATION

Prepared For:

BUFFALO COLOR CORPORATION

Henry R. Borkowski
Quality Control Department

August 2, 1985

TERMINI ASSOCIATES

C. R. Termini
President

Project Code: BC-206-157

TECHNICAL REPORT

1.0 TITLE

Lagoon No. 3 Sludge Evaluation

2.0 PURPOSE

To evaluate proper disposal in accordance with 40 CFR, Part 260.

3.0 SAMPLE

One composite sample of Lagoon No. 3 Sludge was collected by Buffalo Color Corportion personnel on June 24, 1985. The sample was received at TERMINI ASSOCIATES' facility on June 25, 1985, from Mr. Henry R. Borkowski, Buffalo Color Corporation, 340 Elk Street, Buffalo, New York 14210, on Order Release Number R-473. The sample was assigned Log Number 50455. The Chain of Custody Record for this sample is included with this report.

4.0 RESULTS

4.1 IGNITABILITY: Title 40 CFR, Part 261.21

The material in Sample Log Number 50455 is a solid containing no free liquid, compressed gases or oxidizers. The solid sample, under standard temperature and pressure, does not cause fire through friction, absorption of moisture or spontaneous chemical changes. When ignited, the solid sample does not burn so vigorously as to create a hazard.

4.2 CORROSIVITY: Title 40 CFR, Part 261.22

The material in Sample Log Number 50455 is a solid containing no free liquid.

4.3 REACTIVITY: Title 40 CFR, Part 261.23

The material in Sample Log Number 50455 is stable and does not react violently nor form explosive mixtures with water. The material as received does not contain significant levels of sulfide. The total cyanide was 43.6 mg/K.

5.0 METHODOLOGY

The IGNITABILITY, CORROSIVITY and REACTIVITY evaluations were conducted in accordance with procedures established in "Test Methods for the Evaluation of Solid Waste, Physical/Chemical Methods," (EPA SW-846, April 1985).

6.0 DISCUSSION

The total cyanide value of the material is 43.6 mg/K as received. Typically with this waste stream, a significant portion of the cyanide is complexed. The material is stored in a pit which is open to the air and will be transported to the landfill by truck in open air. If exposed to the pH range of 2 - 12, the worst case cyanide release into the air from a 20-ton load would not exceed the OSHA ceiling limit in a theoretical "box" 30 truck lengths in size.

7.0 DECLARATION

The above sample of Lagoon No. 3 Sludge (Sample Log Number 50455) received on June 25, 1985, when analyzed in accordance with the procedures established in "Test Methods for the Evaluation of Solid Waste, Physical/Chemical Methods," (EPA SW-846, April 1985) does NOT EXHIBIT the hazardous waste characteristics of IGNITABILITY, CORROSIVITY OR REACTIVITY.

Proj. No. B-206-157

Project Name: Buffalo Color Corporation
SLUDGE: Lagoon #3

SAMPLERS. (Signature)
B Kuyanka

STA. NO.	DATE	TIME	COMP.	GRAB	STATION LOCATION	NO. OF CONTAINERS	REMARKS / PARAMETERS
WTP	6/24/85		X		WASTE TREATMENT PLANT Lagoon #3	1	Reactivity, Corrosivity, Ignitability

Relinquished by: (Signature)
B Kuyanka

Relinquished by: (Signature)
B. Gates

Relinquished by: (Signature)

Date/Time: 6-25-85

Date/Time: 6-25-85 9 AM

Date/Time

Received by: (Signature)
HC Borkowski

Received by: (Signature)

Received for Laboratory by: (Signature)
D Cotrell

Date/Time

Relinquished by: (Signature)
HC Borkowski

Relinquished by: (Signature)

Date/Time: 6/26/85 9:00 AM

Date/Time: 6/25 11:00

Received by: (Signature)
B. Gates

Received by: (Signature)

Remarks

FOOD & DRUG RESEARCH LABORATORIES, INC.
ROUTE 17C, P. O. BOX 107, WAVERLY, NY 14892-0107 607 565-8131

1.5

ACUTE ORAL TOXICITY (DOT)
OF
COMPOSITE; LAGOON #3 ; LUDGE
IN
SPRAGUE-DAWLEY RATS

Submitted to: Buffalo Color Corporation
P.O. Box 7027
Buffalo, NY 14240

FDRL Study No. 8461A

Date: March 8, 1985

Elizabeth L. Reagan, B.A.S.
Associate Toxicologist/
Study Director

Peter J. Becci, Ph. D.,
President

Acute Oral Toxicity in Rats
(DOT)

FDRL Test Article ID: 85-0100

Sponsor Test Article ID: Composite; Lagoon #3 Sludge

RESULTS:

Dosage Level (mg/kg BW)	No. rats dosed	Mortality after 48 hours
50.0	10	0/10

CONCLUSION: All animals survived the 48 hour post-treatment observation period and all appeared normal during the study.

According to 49 CFR 173.343, the above referenced test article is not considered a Class B poison.

Acute Oral Toxicity Study
(DOT)

Purpose:

To determine the acute oral toxicity of the test article following administration to male and female Sprague-Dawley rats.

Compliance with Government Regulations:

This study was conducted in accordance with the regulations for Good Laboratory Practice as described by the FDA (21 CFR Part 58), DOT (49 CFR 173.343) and FDRL Standard Operating Procedures. All data and pertinent records are retained by FDRL and are available upon request.

Experimental Design:

Animals and Animal Care

Five male and 5 female Sprague-Dawley rats were obtained from Charles River Breeding Laboratories, Inc., Wilmington, MA. Animals were individually housed in wire mesh bottom cages in environment-controlled rooms as per "Guide for the Care and Use of Laboratory Animals" DHEW Publication No. (NIH) 78-23. Food and fresh tap water were available ad libitum.

Procedure

After an acclimation period of at least 5 days, animals were assigned to the test. Animals were fasted overnight prior to receiving a single oral dose of 50.0 mg/kg body weight of the test article.

Observations

All animals were observed for mortality and toxic signs for 48 hours following dose administration. Animals were weighed and body weights were recorded prior to dosing and at study termination.

Necropsy

All animals that died during the study were subjected to a gross necropsy and abnormalities were noted.

Appendix I

DOT Requirements

DOT Requirements*

Acute Oral Toxicity

- If 50% or more of a group of 10 animals die within 48 hours when given a single oral dose of 50.0 mg/kg of the test article, then the test article is considered a Class B poison.

* As defined in 49 CFR 173.343

Appendix II

Raw Data

...al + final body wts.

Species S.D. Rats (CR. Diet65) I. D. No.: 82-0100

Article: Distilled / Organic Mix

Density: N/A

Concentration: N/A

Form: Suspension

Animal Number Sex	Time Dosed	Body Weight (g) at Day 1	Body Weight (g) at Day 15	Body Weight (g) at Day WAD	Level Dosage mg/kg	Dose ml (Total)	Date of Death	Comments
001	12:50	303	341		50	0.15 ✓		Daw-Debbie
002		304	340			0.15 ✓		Webster
003		305	327			0.15 ✓		NT-Nancy
004		296	324			0.15 ✓		Trout
005		298	327			0.15 ✓		LS-Lori
								Simonbaugh
006F		204	261			0.12 ✓		
007		232	232			0.11 ✓		
008		208	227			0.11 ✓		
009		206	223			0.10 ✓		
010		200	221		↓	0.11 ✓		
								@ Duration of study 45 days
Initials	NT Daw 2/28/85	DAWN 3-2-85		Daw 3-2-85			via 24hr fast Debbie Daw	

Reviewed by: BR Date: 3/4/85

Study Title: Acute Oral

FDRL Study No.: 9461A

Species: RAT

FDRL Test Article I.D.: 95-0100

Concentration Prepared: 10 %

Test Article Density: N/A gm/ml

Diluent: Distilled / Deionized H2O

Total Amount Dispensed: 10.0ml

Prepared Physical State: Suspension

Preparation Procedures

_____ Test article dispensed undiluted.

✓ Weighed 10 (gm) ml test article, Q.S. to 100 ml with diluent.

_____ Test article ground with mortar and pestle.

_____ Test article blended at _____ speed for _____.

Balance: _____

Dosing Information

Level	Coefficient[a]	Level	Coefficient[a]
500 mg/kg	1.50		

Special Instructions: Store container at room temp.

Comments:

Calculations: [illegible] 3/28/85 (Initials/Date)

Preparation: [illegible] 3/25/85 (Initials/Date)

Review: [illegible] 3/29/85 BR 3/4/85 (Initials/Date)

[a] Coefficient x kg body weight = dose N/A - Not Applicable

Study Title: Acute Oral FDRL Study No.: 8461A

FDRL Identification No.: 85-0100

Balance Calibration and Work Log

Date	Weight Applied	Weight Read	Difference	Scale No.	Technician Initials
2/28/85	200/500	200/500	0/0	1	Daw 8:57
3/2/85	200/500	200/500	0/0	1	Daw 7:49
					BCS 3/4/85

Note: Scales not complying with SOP specifications are not to be used. Report to study directors.

Study Title: Acute Oral FDRL Study No.: 3466

FDRL Identification No.: 85-0100

Balance Calibration and Work Log

Date	Weight Applied	Weight Read	Difference	Scale No.	Technician Initials
2/28/85	200/500	200/500	0/0	1	DAW 8:57
3/2/85	200/500	200/500	0/0	1	DAW 9:49
					BC 3/4/85

Note: Scales not complying with SOP specifications are not to be used. Report to study directors.

FDRL Material

I.D. No. 85-0100

Dose Level 50mg/kg.

Initiation Date 2/25/85

ACUTE ORAL TOXICITY STUDY

OBSERVATIONS

(DOT)

Animal No.	Day 1 Initial	Day 1 No and	Day 1 3:51	24 hr.	48 hr.
8461000101	✓	obs. — dosed late	✓	✓	✓
0002	✓		✓	✓	✓
0003	✓		✓	✓	✓
0004	✓		✓	✓	✓
0005	✓		✓	✓	✓
0006	✓		✓	✓	✓
0007	✓		✓	✓	✓
0008	✓		✓	✓	✓
0009	✓		✓	✓	✓
0010	✓	✓	✓	✓	✓
Tech & Date	NT Daw 2/28/85		NT Daw 2/28/85	Daw 3/1/85	Daw 3/2/85

Comments:

Reviewed by: BR Date: 5/4/85

Abbreviations and Symbols used in Recording Observations

AD - accidental death
Ad - activity decreased
Ai - activity increased
Al - hair loss
An - anorexia (loss of appetite)
At - ataxia, wobbly gait
B - blood
C - clinicals
COP - corneal opacity
Cy - cyanosis
D - died
DB - dried blood (give location)
DME - dark material around eyes
DMN - dark material around nose
Di - diarrhea
Em - emaciated
FD - found dead
G - gasping
Lac - lacrimation greater than normal (tearing)
NC - no change

✓ - normal
Nd - nasal discharge
Rd - respiratory rate decreased
Ri - respiratory rate increased
Ppp - pin point pupils
S - sacrificed
Sal - salivation
Sb - appears to have blood in stools
Sh - shallow breathing
SM - sacrificed moribund
SS - soft stools
T - tremors
Ub - appears to have blood in urine
Us - urine stain (state location)
V - vomiting
X - escaped, lost, missing
NNF - no noteworthy findings.

Use L - left, R - right, M - middle plus numbers 1-12 for locations of nodules or other conditions where appropriate.

Use +1, +2, +3 after appropriate abbreviations to indicate degree of severity of that condition (+1 - slight, +2 - moderate, +3 - extreme), i.e. moderately increased activity would be Ai +2.

Appendix III

Quality Assurance Unit Statement

This final report was reviewed as required by Good Laboratory Practice Regulations for non-clinical laboratory studies, 21 CFR Part 58 and the study protocol. Inspections were accomplished as noted, and reported to the study director and management immediately following their completion. Based on these inspections and the review of the report, this study was conducted and reported in conformance with the Good Laboratory Practice regulations.

STUDY NO. 8461 QAU INSPECTION SCHEDULE (ACUTES)

Type Test	Inspection Dates				
A Oral	Final report reviewed 3/7/85 LEG				

Susan E. Albert
Quality Assurance Unit

Methods Employed in Sludge Analysis and Waste Water Analysis

A.1 Physical/Chemical Parameters

A.1.1 Corrosivity (D002)

Corrosivity is determined by measuring pH using Method 150.1 from Methods for Chemical Analysis of Water and Wastes, USEPA, (Cincinnati, Ohio March 1983). This reference will be hereinafter refered to as MCAWW.

A.1.2 Ignitability (D001)

Ignitability is determined by measuring flash point using a Pensky-Martens Closed Cup Tester by the method specified in ASTM Standard D-93-79.

A.1.3 Reactivity (D003)

Reactivity is determined by measuring cyanide and sulfide in the waste water. Cyanides are discussed in A.2.10 and Sulfides are discussed in A.2.17 below.

A.2 Known Hazardous Constituents from Current Usage or Analysis

A.2.1 Aniline (U102)
A.2.2 N-Methylaniline
A.2.3 N,N-Dimethylaniline
A.2.4 N-Ethylaniline
A.2.5 N,N-Diethylaniline

These five constituents are determined by EPA Method 625.

A.2.6 Sodium Hydroxide (D002)
A.2.7 Potassium Hydroxide (D002)

The combined impact of these two materials is determined by measuring alkalinity using MCAWW Method 310.1 after precipitating carbonates with Barium Chloride.

A.2.8 Sodium Cyanide (P106)
A.2.9 Potassium Cyanide (P098)
A.2.10 Cyanides (P030)

Free cyanides (P106 and P098) are determined using MCAWW Method 335.1 while total cyanide (P030) is determined using MCAWW Method 335.2. The quantity of complex (non-reactive) cyanide can be obtained as the difference between the two analyses.

A.2.11 Methanol (U154)
A.2.12 Ethanol (D001)

Methanol and Ethanol are determined by EPA Method 602 (modified).

A.2.13 Formaldehyde (U122)

Formaldehyde concentration is determined by EPA Method 602 (modified)

A.2.14 1,3 Butadiene (D001)
A.2.15 Methylcyclopentadiene (D001)

Concentrations of these materials are determined by EPA Method 602 (modified).

A.2.16 Nickel

Nickel is determined by MCAWW 249.2

A.2.17 Sodium Sulfide (D003)

Sulfide is determined by MCAWW Method 376.2

A.2.18 Chromium (D007)

Chromium is determined by MCAWW Method 218.3

A.2.19 Lead (D008)

Lead is determined by MCAWW Method 239.2

A.2.20 Mercury (D009)

Mercury is determined by MCAWW Method 245.1

A.3 Other hazardous constituants which may be present in the waste stream:

A.3.1 Arsenic (D004)

Arsenic is determined by MCAWW Method 206.2

A.3.2 Barium (D005)

Barium is determined by MCAWW Method 208.2

A.3.3 Cadmium (D006)

Cadmium is determined by MCAWW Method 213.2

A.3.4 Selenium (D010)

Selenium is determined by MCAWW Method 270.2

A.3.5 Silver (D011)

Silver is determined by MCAWW Method 272.2

A.3.6 Endrin (D012)

A.3.7 Lindane (D013)

A.3.8 Methoxychlor (D014)

A.3.9 Toxaphene (D015)

A.3.10 2,4-D (D016)

A.3.11 2,4,5-TP Silvex (D017)

Pesticides are determined by EPA-600 4-79-020 "Methods for Benzidine, Chlorinated Organic Compounds, Pentachlorophenol, and pesticides". Appendix III page 7 and page 115.

Rationale for Parameters Selected for Analysis

A.1 Physical Chemical Criteria

These were run on both the process waste water and the settled solids. They are the RCRA tests for corrosivity, ignitability, and reactivity.

A.2 Hazardous Streams from Production Activities

These represent listed wastes from the RCRA regulations or raw materials which are hazardous materials in the DOT regulations. These were analyzed in both the process waste water and in the settled solids.

A.3.1 Possible Hazardous Constituents - Metals

These are the metals from the EP Toxicity Criteria of the RCRA regulations. They were sampled in the waste water and in the settled solids.

A.3.2 Possible Hazardous Constituents - Pesticides

These are the pesticides from the EP toxicity criteria.

September 4, 1985

Mr. K. Hintz
New York State Department of
Environmental Conservation
Region 9
600 Delaware Avenue
Buffalo, New York 14210

Dear Mr. Hintz:

This is in reference to our request of August 7, 1985 and your reply of August 26, 1985.

Per a request from F. Langone of USEPA - Region II, we consulted our contracted laboratory, Termini Associates as to the procedures which had been followed in making the reactivity determination in their August 2, 1985 report on the Lagoon #3 sludge which was attached to our August 7 request.

Cyanide was determined by EPA Method 9010 and Sulfide was determined by EPA Method 9030 as indicated in "Test Methods for the Evaluation of Solid Waste - Physical/Chemical Methods". (EPA SW-846, April 1985). Both of these methods involve the strong-acid treatment procedure which the newly defined EPA procedure for reactivity determination requires. In the original Termini report the sulfide was referred to as being present in non-significant quantity.

The Termini results are thus expressable as total liberatable cyanide and sulfide and are given as follows: Sulfide 2.1 mg/kg, Cyanide 43.6 mg/kg

Both of these results are far below the hazardous levels indicated in the new federal procedures.

By copy of this letter we are requesting that EPA inform you as to their determination as to whether this waste meets their criteria of being hazardous.

Yours truly,

David E. Sauer
Manager Environmental Affairs

DES:dt

cc: T. Wlodarczak
R. Kovalski
D. Kautz
F. Langone USEPA - Region II
R. Mitrey NYDEC - Region 9
J. Moran NYDEC - Albany

4.3.1.11
D29.

buffalo
COLOR CORPORATION

p.o. box 7027 / buffalo, new york 14240
716-827-4500

August 7, 1985

Mr. K. Hintz
New York Department of
Environmental Conservation
Region 9
600 Delaware Avenue
Buffalo, New York 14210

Dear Mr. Hintz:

Per a request from Mr. F. Langone of USEPA - Region II an additional sample of sludge from Lagoon #3 was sent to Termini Associates for reevaluation for ignitability, corrosivity, and reactivity. The waste was found to be not ignitable, not corrosive and not reactive.

This is the same material for which we made application for sanitary landfill disposal on February 26, 1984 on the basis of the de minimus agrument (also attached) EPA now informs us that the material does not meet the definition of hazardous waste.

Given the fact that the constituents present are in such small quantities we, therefore, request that the Lagoon #3 sludge be approved for disposal in sanitary landfills.

Yours truly,

D. E. Sauer
Manager, Environmental Affairs

DES:dt

cc: T. Wlodarczak
R. Kovalski
D. Kautz
F. Langone USEPA - Region II
R. Mitrey NYDEC - Region 9
J. Moran NYDEC - Albany

Attach.
D28

executive and sales offices
one garret mountain plaza
west paterson, new jersey 07424
201-881-1700
toll free 800-631-0171

buffalo
COLOR CORPORATION
p o box 7027 / buffalo, new york 14240
716 827-4500

February 26, 1985

Mr. K. Hintz
New York State Department of
Environmental Conservation
Region 9
600 Delaware Avenue
Buffalo, New York 14202

Dear Mr. Hintz:

Resubmitted herewith is Buffalo Color's application for disposal of the sludge from Lagoon #3 at a sanitary landfill. Approximately one-third of all of the process waste water from manufacturing operations has passed through this lagoon from when it went on line in July 1977 to when usage stopped in November 1984. The waste water passed through the lagoon leaving a sludge residual which is not enriched in the hazardous constituents.

Due to the low measured concentrations, Buffalo Color claims exemption from the hazardous waste classification on the basis of 40 CFR 261.3(a).

261.3(a) (2) (i) The material is neither ignitable, corrosive, reactive, nor EP toxic.

261.3(a) (2) (iv) The material is a mixture of solid waste and the following hazardous wastes listed in Subpart D.

261.31 None
261.32 None
261.33 P030 Cyanides
P098 Potassium Cyanide
P106 Sodium Cyanide
U102 Aniline
U122 Formaldehyde
U154 Methanol
~~U225 N,N-Dimethylaniline~~

261.3(a) (2) (iv) (d) But all of these are discarded commercial chemical products arising from de minimus losses of these materials from manufacturing operations in which they were used either as raw materials or were produced in the manufacturing process.

- cont. -

A quantitative comparison is presented as follows:
(Basis 250 tons as is sludge)

MATERIAL	POUNDS USED OR MADE JUL 1977 - NOV 1984	POUNDS PRESENTLY IN LAGOON #3 SLUDGE
Total Cyanides	23,862,053	0.60
Aniline	78,482,569	5.20
N,N-Dimethylaniline	51,448,316	0.48
Formaldehyde	10,868,239	0.05
Methanol	30,674,570	0.22

In all cases the quantity in the sludge is de minimus.

If there are any questions, please contact me at 827-4525.

Yours truly,

David E. Sauer
Manager
Environmental Affairs

DES:dt

cc: T. J. Wlodarczak
R. J. Kovalski
D. Kautz

4.3.1.11
D24.

APPENDIX F.7

FINANCIAL ASSURANCE

F.7.1 Cover Letter to NYDEC

F.7.2 Letter from CFO to NYDEC

F.7.3 BCC Annual Report

F.7.4 Letter from Auditors

F.7.5 Certificate of Liability Insurance

buffalo
COLOR CORPORATION
p.o. box 7027 / buffalo, new york 14240
716-827-4500

December 20, 1985

CERTIFIED/RETURN RECEIPT

Mr. Robert J. Haggerty, Jr.
New York State Department of
Environmental Conservation
Division of Solid and Hazardous Waste
Bureau of Hazardous Waste Technology
Permit Section, Room 401
50 Wolf Rd.
Albany, NY 12233

RE: Facility I.D. No. NY-D080335052

Dear Mr. Haggerty:

Buffalo Color Corporation is using the financial test and guarantee to demonstrate closure and post-closure financial assurance as required by the DEC. In compliance with the Environmental Conservation Law, I am enclosing the following documents:

1. A letter signed by me as Chief Financial Officer that includes the required data from the firm's independently audited, year-end financial statements and the cost estimates for closure and post-closure care; and

2. A copy of Coopers & Lybrand's report on examination of Buffalo Color Corporation's financial statements for the latest completed fiscal year; and

3. A special report from Coopers & Lybrand, our independent certified public accountant, to the Board of Directors of Buffalo Color Corporation, stating that they have compared the data which my letter specifies as having been derived from the independently audited, year-end financial statements for the latest fiscal year, with the amounts in such financial statements and, in connection with this procedure, no matters came to their attention which caused them to believe that the specified data should be adjusted.

executive and sales offices
one garret mountain plaza
west paterson, new jersey 07424
201 881 1700
toll free 800 631-0171

NYS Department of Environmental
Conservation
December 20, 1985

The financial information provided in order to comply with the DEC requirement for closure and post-closure financial assurance is confidential. This data should be used only by the DEC and only in conjunction with the corporate guarantee of closure and post-closure financial assurance.

Very truly yours,

BUFFALO COLOR CORPORATION

L. E. Schenk
Corporate Controller

LES:mak

Encl.

cc: Mr. L. J. Franckowiak (w/o report on examination)
Mr. D. E. Sauer (w/o report on examination)
Mr. T. J. Wlodarczak (w/o report on examination)

buffalo
COLOR CORPORATION
p.o. box 7027 / buffalo, new york 14240
716-827-4500

December 10, 1985

Mr. Robert J. Haggerty, Jr.
New York State Department of
Environmental Conservation
Division of Solid and Hazardous Waste
Bureau of Hazardous Waste Technology
Permit Section, Room 401
50 Wolf Rd.
Albany, NY 12233

RE: Facility I.D.
No. NY-D080335052

Dear Mr. Haggerty:

I am the chief financial officer of Buffalo Color Corporation, 100 Lee Street, Buffalo, New York 14210. This letter is in support of this firm's use of the financial test to demonstrate financial assurance, as specified in 6 NYCRR Subparts 373-2 and 373-3.

1. This firm is the owner or operator of the following facilities for which financial assurance for closure and post-closure care is demonstrated through the financial test specified in 6NYCRR Subparts 373-2.8 and 373-3.8. The current closure and/or post-closure cost estimates covered by the test are shown for each facility:

EPA Identification number: NY-D080335052

Buffalo Color Corporation
100 Lee Street
Buffalo, New York 14210

Closure cost estimate	$1,202,490
Post-closure care cost estimate	55,032
Total	$1,257,522

2. This firm guarantees, through the corporate guarantee specified in 6NYCRR Subparts 373-2 and 373-3, the closure and post-closure care of the following facilities owned or operated by subsidiaries of this firm. The current cost estimates for the closure or post-closure care so guaranteed are shown for each facility:

None.

executive and sales offices
one garret mountain plaza
west paterson new jersey 07424
201-881-1700
toll free 800-631-0171

NYS Department of Environmental Conservation
December 10, 1985

This firm is not required to file a Form 10K with the Securities and Exchange Commission (SEC) for the latest fiscal year.

The fiscal year of this firm ends on September 30. The figures for the following items marked with an asterisk are derived from this firm's independently audited, year-end financial statements for the latest completed fiscal year, ended September 30, 1985.

ALTERNATIVE I

1.	Sum of current closure and post-closure cost estimates	$ 1,257,522
*2.	Total liabilities	20,030,000
*3.	Tangible net worth	14,127,000
*4.	Net worth	17,219,000
*5.	Current assets	18,429,000
*6.	Current liabilities	10,486,000
7.	Net working capital	7,943,000
*8.	The sum of net income plus depreciation, depletion, and amortization	7,637,000
*9.	Total assets in U.S. (required only if less than 90% of firm's assets are located in the U.S.)	not required

		YES	NO
10.	Is line 3 at least $10 million?	X	
11.	Is line 3 at least 6 times line 1?	X	
12.	Is line 7 at least 6 times line 1?	X	
*13.	Are at least 90% of firm's assets located in the U.S.? If not complete line 14.	X	
14.	Is line 9 at least 6 times line 1?	not applicable	
15.	Is line 2 divided by line 4 less than 2.0?	X	
16.	Is line 8 divided by line 2 greater than 0.1?	X	
17.	Is line 5 divided by line 6 greater than 1.5?	X	

NYS Department of Environmental
Conservation
December 10, 1985

I hereby certify that the wording of this letter is identical to the wording specified in Paragraph 373-2.8(j)(5) as such regulations were constituted on the date shown immediately below.

Leslie E. Schenk
Corporate Controller
December 10, 1985

F.6.3

The BCC Annual Report for the year ending September 30, 1985 was submitted to the NYDEC under separate cover.

Coopers
&Lybrand

certified public accountants

To the Board of Directors
Buffalo Color Corporation

We have examined the consolidated balance sheet of Buffalo Color Corporation and Subsidiaries as of September 30, 1985, and the related consolidated statements of income, changes in shareholder's equity, and changes in financial position for the year then ended, and have issued our report thereon dated November 1, 1985. Our examination was made in accordance with generally accepted auditing standards and, accordingly, included such tests of the accounting records and such other auditing procedures as we considered necessary in the circumstances.

We have compared the information in the above mentioned financial statements to that presented in the Financial Test and Corporate Guarantee of Closure and Post-Closure Care, dated December 10, 1985.

In connection with our examination and subsequent comparison, nothing came to our attention that caused us to believe that the information presented in the Financial Test and Corporate Guarantee of Closure and Post-Closure Care should be adjusted to properly reflect the balances which appeared in the Consolidated Financial Statements as of September 30, 1985.

Coopers Lybrand

Rochester, New York
December 12, 1985

CERTIFICATE OF LIABILITY INSURANCE

1. Name of Insurer: National Union Fire Insurance Company of Pittsburgh, PA
Address of Insurer: 70 Pine Street, New York, New York 10270

hereby certifies that it has issued liability insurance covering bodily injury and property damage to:

Name of Insured: Hillside Industries Incorporated,et al
Address of Insured: 405 Park Avenue, New York, New York 10022

in connection with the insured's obligation to demonstrate financial responsibility under 6 NYCRR 370 et seq. The coverage applies at

EPA ID# NYD080335052
Buffalo Color Corporation
340 Elk Street
Buffalo, NY 14210

EPA ID# ILD005174404
Teepak, Inc.
915 North Michigan Avenue
Danville, Illinois 61832

EPA ID# (NOT APPLICABLE)
Teepak, Inc.
Highway 176-Swansca Star Route
Sandy Run, South Carolina 29160

for sudden and nonsudden accidental occurrences. The Limits of Liability are $5,000,000 each loss/$10,000,000 total for all losses, exclusive of legal defense costs. The coverage is provided under Policy Number PLL 7074049, issued on January 1, 1986. A copy of the policy, with all applicable endorsements, in effect as of the date of this certificate of liability insurance is annexed hereto as Schedule A.

2. The Insurer further certifies the following with respect to the insurance described in Paragraph 1:

(a) Bankruptcy or insolvency of the insured shall not relieve the Insurer of its obligations under the Policy.

(b) The Insurer is liable for the payment of amounts within any deductible applicable to the Policy, with the right of reimbursement from the Insured for any payment made by the Insurer. This provision does not apply with respect to that amount of any deductible for which coverage is demonstrated by virtue of the insured's satisfying the financial test for liability coverage as established by the New York State Department of Environmental Conservation (hereinafter "NYSDEC") or by the Commissioner of NYSDEC (hereinafter referred to as the "Commissioner,") and as specified in 6 NYCRR 370 et seq.

(c) Whenever requested by the Commissioner, the Insurer agrees to furnish to the Commissioner a signed duplicate original of the Policy and all endorsements.

(d) Cancellation of the insurance, whether by the Insurer or the Insured, will be effective only upon wirtten notice, certified mail, return receipt requested, and only after the expiration of sixty (60) days after a copy of such written notice is received by the Commissioner.

(e) Any other termination of this insurance will be effective only upon written notice, certified mail, return receipt requested, and only after the expiration of thirty (30) days after a copy of such written notice is received by the Commissioner.

I hereby certify that the wording of this instrument is identical to the wording specified in 6 NYCRR 370 et seq.,as such regulation was constituted on the date first above written, and that the Insurer is authorized by the Superintendent of the New York State Department of Insurance to conduct the business of an Insurer or is eligible to provide insurance as an excess or surplus lines insurer in the State of New York.

Mark Vuono, Assistant Secretary

Date:

G

PLANT -A-

PLANT -B-

PLANT -C-

PLANT -F-

NORFOLK AND WESTERN RAILWAY

D.L.&W.R.R.

BUFFALO RIVER

SOUTH PARK AVENUE

PVS CHEMICAL

BCC PARKING LOT

LEE PLACE

STREET

ALLIED CORP. FENCE LINE

ALLIED SIGNAL CORP.

ROOT NEAL COMPANY

PEABODY STREET

PERRY STREET

WALTER STREET

MAURICE STREET

ORLANDO STREET

STANDARD OIL COMPANY

N.Y.P.

TANK PARK No. 30

ABANDONED DEEP WELL

METERING STATION

SAMPLING POINT

L.L. PUMP STATION SC 70081

BSA WEIR

PARKING LOT

BUFFALO CREEK RAILROAD

INACTIVE IRON OXIDE PONDS

D.L.&W. R.R.

WEATHERING AREA

PLANT -D

SCALE 1"=200'-0"

GATE

~LEGEND~

- INDUSTRIAL WASTE SEWER-EXISTING
- INDUSTRIAL WASTE SEWER-NEW
- CLEAR WATER SEWER- EXISTING
- CLEAR WATER SEWER- NEW

NOTICE

THIS DRAWING, AND ALL FEATURES SEPARATELY OR COLLECTIVELY DISCLOSED THEREBY OR EMBODIED THEREIN, ARE THE PROPERTY OF BUFFALO COLOR CORPORATION. THE DRAWING SHALL NOT BE REPRODUCED OR COPIED, AND MUST BE RETURNED IMMEDIATELY UPON REQUEST. NO INFORMATION EMBODIED THEREIN SHALL BE COMMUNICATED, DISCLOSED, OR USED IN ANY MANNER, IN WHOLE OR IN PART, EXCEPT AS AND TO THE EXTENT PREVIOUSLY EXPRESSLY AUTHORIZED IN WRITING BY THE COMPANY.

NO.	REVISION	BY	APP.	DATE
1	UPDATED PER PRESENT INFORMATION	TEP		11/1/84

1. 2. 3. 4. 5. 6. 7. 8. 9. 10. 11. 12.

REFERENCE	DWG. NO.	REFERENCE	DWG. NO.	APPROVED	DATE

JOB NO.
ITEM
BLDG.
APP. NO.
T-
SCALE 1"=100'-0"

ENGINEERING DEPARTMENT, BUFFALO, N.Y.

INDUSTRIAL WASTE SEWERS
CLEAR WATER SEWERS
PLANTS A, B, C, E

buffalo COLOR CORPORATION

SC-89241-1

REV.

DRN. CMP DATE 2-27-78 CH. DATE

SEWERS

M

APPENDIX M

GROUNDWATER MONITORING

M.1 Ground Water Monitoring Plan

M.2 Ground Water Monitoring System and Ground Water Quality Assessment Outline

M.3 Ground Water Monitoring Results

M.4 Special Reports

M.5 Groundwater Quality Assessment Plan

M.6 Groundwater Quality Assessment Report

APPENDIX M.1

BUFFALO COLOR CORPORATION

GROUNDWATER MONITORING PLAN

I Introduction

Buffalo Color Corporation was formed July 1, 1977. At that time the company took over the site formerly used to manufacture dyestuffs and organic chemicals by Allied Corporation.

Currently, facility operations involve the organic synthesis of two dyestuffs, three alklanilines, and five anhydrides. Approximately 70.0% of the company's present production entails the manufacture of indigo dye. Since the take over by Buffalo Color Corporation there has been no manufacture of azo, anthraquinone, sulfur, wool dyes or their intermediates required at the site.

All process waste water is collected in the process sewer system and is delivered to two surface impoundments (lagoons). The equalized process waste water is pumped to three series reactors where it is neutralized before being sent to the Buffalo Sewer Authority, a POTW (Publicly Owned Treatment Works).

The purpose of this system definition is to specify the steps to be taken with respect to well installation and operation, sampling, analysis, and recordkeeping for groundwater monitoring, so as to comply with RCRA interim status requirements for surface impoundments, 40 CFR 265.91,92, and 94 and to form the basis for ground water monitoring for operation of the surface impoundments under a Part B permit.

II Lagoon Area - 265.90 (a)

The waste management (surface impoundment) area of Buffalo Color Corporation consists of two clay lined surface lagoons adjacent to the process waste treatment plant (Appendix 1). The dimensions of the area are 400 ft. X 450 ft. These surface impoundments serve as flow equalization basins and for spill control. Functional throughput lagoon capacity is 1.5 million gallons. Site process flow to the surface impoundments averages 450,000 gallons per day with an equal amount being discharged to the POTW on a daily basis. The extra capacity is used to cover night shifts, holidays and maintenance outages. The ground water monitoring system will be located on the border of this waste management area.

III Well Site Selection - 265.91

Initially, cased holes were drilled in the following three locations to determine underground water flow characteristics (upgradient/downgradient wells):

1. A point about 350 feet north of Lagoon #1.
2. Near the property lines south-east of Lagoon #2.
3. Near the property line south-west of Lagoon #3.

(Refer to Appendix II)

Water levels in these three wells were monitored until at least five sets of water elevations were obtained. On the basis of these data, a contour map showing the gradient of the water table in the lagoon area was provided. On the basis of the direction of flow of groundwater, the adequacy of any of these three wells as either upgradient or downgradient monitoring wells was evaluated. If adequate, the cased hole was replaced with a well installed according to the protocol in Section IV. If inadequate, the casing was removed and the hole back filled. Additional wells were added at the outset to meet the minimum requirement of one upgradient and three downgradient wells and additional wells will be installed as necessary to ensure a sound ground water monitoring system to meet the requirements of 265.91 or other regulations.

IV Monitor Well Installation Protocol - 265.91

A Introduction:

Wells were installed in the Plant E area adjacent to the surface impoundments. The first three wells were installed at locations specified in Section III above. Subsequent wells were installed at locations determined on the bases of ground water gradients determined by already installed wells.

B Scope

This protocol was used to install all lagoon area wells and covers all aspects of the procedures to be used.

a. Pre-Cleaning Equipment

1. Hollow stem augers, drilling rig and drill rods

Steam clean with a detergent washing and brushing followed with a tap water rinse. The detergent may have been aspirated along with the steam, or applied separately. This was done for all equipment used above or in the holes. The equipment was brush cleaned with detergent solution and rinsed with tap water between holes.

2. Split Spoons

The split spoons were cleaned carefully and thoroughly at the outset to insure that contaminants were not brought onto the site. Enough spoons were brought in and cleaned to complete one hole. Used equipment was cleaned as follows:

a. Soak the split spoon in detergent solution for one hour.

b. Scrub with a brush inside and out and rinse with hot tap water.

c. Air dry

3. Monitoring Wells

The metal well casing was steam cleaned and rinsed with a distilled water.

4. Well Screens

Well screens were steam cleaned with a detergent washing and brushing, followed with a tap water rinse and then a distilled water rinse.

5. Well Casing

Well casings were steam cleaned with detergent, rinsed with tap water inside and out and distill water rinsed (the inside only) by capping the ends clean and agitating, or by pulling a clean cloth through to thoroughly clean away any oil or grease. Any threads and threaded couplings were wiped clean.

b. Disposal of Auger Debris

1. The auger fill and soil debris were disposed of in a sanitary landfill.

c. Installation of Wells

1. The wells were installed in pre-augered holes and the screen portion extended five feet into the upper most aquifer. A sand pack and betonite cement seal were placed at appropriate depths around the well casing and screen. The sand pack consists of No. 4 Ottawa sand. The cement is Portland cement that contains up to 10% bentonite. This was placed at appropriate depths around well casing and screen dependent on site conditions. A sample of the sand pack and bentonite cement slurry was retained for future analysis if required. The bentonite cement slurry extended from sand pack to grade. Each well consists of a 3" I.D. black pipe attached to a 3" I.D. five foot long No. 10 slotted stainless steel well screen, with a five foot stainless steel riser. All connections are teflon thread-taped. A lockable protective cap and a 1/8" vent hole is provided for each well.

d. Recording Information

1. Continuous split spoon sample was taken from the surface to at least 7.5 feet into the first aquifer. Well depth is dependent on site fill - soil - water condition. The fill soil samples obtained were observed and described by a professional soil scientist who determined when the necesssary depth was reached. In addition the drilling log includes:

   a. Geologic-characteristics of each soil sample; terminology in accordance with NYS Department of Transportation Soil Description Procedure No. 741-5 STP 2/75.

   b. Physical description of each core sample, particularily for anomolies present.

e. Safety

All outside contracting people were required to conform to all existing safety regulations of Buffalo Color Corporation. Basic requirements are full eye protection, hard hats, long sleeve shirts and proper gloves. Additional preotection included disposable outer garments. All protective clothing was left on site at the end of a work day. As required, rubber boots were worn during the drilling.

f. Retention of Soil Samples

Samples of the materials collected by each set of split spoons were retained in labeled glass jars showing the location and depth where collected.

V Monitoring Well Sampling Protocol - 265.92

A Objective

The sampling of these groundwater wells according to EPA approved practice.

B Scope

Every effort is made to assure that the samples are representative of the ground water. To prevent collecting non representative samples the following guidelines are adhered to:

1. Monitoring wells are pumped out prior to sampling.

2. If recovery rates of wells are adequate, up to five well volumes of water are evacuated, the minimum is one volume if well goes dry.

3. One sampling device is provided for each well.

4. Wells are locked between sampling and pump out activities.

C Sampling Equipment

1. Pump out is accomplished using fresh clean tubing for each well.

2. Samplers to be used are made of Schedule 40 PVC. One inch in diameter, three foot in length. Each sampler is equipped with a marble valve at bottom to hold sample. Submersible well pumps may also be used.

3. Initial sample containers used are specially cleaned five gallon wide mouth glass jars provided with a teflon seal. After collection samples are taken to the Q.C. Laboratory where they are divided into the correct type of bottle and preservatives as specified in Table 4.

D. Cleaning

1. Sampling devices (Bailers)- Before use each sampling device is precleaned using the following procedure:

    1. Washed with laboratory grade detergent.
    2. Rinsed with tap water.
    3. Rinsed with distilled water.
    4. Rinsed with acetone.
    5. Air dried.

2. Sample bottles - all bottles are precleaned using the following procedure:

    1. Washed with laboratory grade detergent.
    2. Rinsed with tap water.
    3. Rinsed with Distilled water.
    4. Rinsed with acetone.
    5. Distilled water rinsed.
    6. Air dried.

E. Sampling Procedure

The sampling events are scheduled at least quarterly for the first year following well installation and then following the schedule in Table #5.

Day 1 - Before actual sampling, the following events occur:

1. Water level in each monitoring well is determined and recorded on the log sheet.

2. Dependent on recovery rates, one to five well volumes are pumped out of each well. Four volumes is ideal.

3. Water collected is sent to the plant process waste sewer system.

Day 1 or 2 - The following procedure is used for sampling.

1. Water level in each monitoring well is determined and recorded on the sample log sheet by the site supervisor.

2. Approximately five and one-half liters of water are taken for analysis. This composite sample is iced down and taken to the Q.C. Laboratory (Bldg. 322) immediately.

3. Sample log sheet and chain of custody records are started and continued. Copies of Chain of Custody Form and Sampling Log Sheets can be found in Appendicies II and III.

4. The large sample is divided into the required aliquots and preservatives are added in the Q.C. Lab as per Table #4.

5. The analysis for pH and specific conductance are run immediately upon receipt of the samples to the Q.C. laboratory.

6. All aliquots being sent to outside laboratories are sealed.

VI Analytical Procedure Protocol - 265.92

A Scope

Ground water samples from the monitoring wells upgradient and downgradient of the surface impoundment area is analyzed individually for the parameters listed in Tables 1,2, and 3.

B Procedure

The analytical methods to be used, chain of custody procedure, quality assurance and quality control, laboratory safety and sample disposal are all found in the attached protocol.

C Laboratory

A certified outside laboratory is retained to provide all necessary analytical services except those analyses performed at the BCC Quality Control Laboratory. Four replicates of the pH and specific conductance analysis are performed immediately and four replicates of the TOC analysis are performed later at the BCC Quality Control Laboratory.

D Sample Holding

pH is run immediately at the Quality Control Laboratory. All samples to be analyzed outside are delivered to the laboratory at the end of each sampling day under chain of custody procedure described in Section G.

E Records

The quality assurance and control records pertaining to groundwater monitoring are kept in a bound log book and will be available for inspection. General recordkeeping of analytical results is discussed in Section VII below.

F Sample Container Supplies

Extractable Organics

Glass bottles and teflon liners are washed with laboratory grade detergent, rinsed several times with tap water, and then rinsed. The bottles and liners are rinsed again with acetone and dried in an oven at 105^{o} for one hour. The bottles then are sealed with the teflon-lined caps.

Metals

Polyethylene bottles and caps are washed with laboratory grade detergent, rinsed several times with tap water, then cleaned with diluted, metals grade nitric acid. The bottles are then rinsed with distilled water, allowed to air-dry, and then capped.

Quality Control Procedures

Consistent quality of cleaned containers is documented as part of the quality assurance effort specified in Section I below. Containers which have been subjected to the cleaning procedures described in Section V - D, above are used in the quality assurance procedure. Containers subjected to quality tests are randomly selected from each lot and are equally representative of that lot.

G Chain of Custody Procedure

To maintain and document sample possession, the laboratory follows chain of custody procedures for all samples received.

The field sampler is personally responsible for the care and custody of the collected samples until they are transferred to the Quality Control Laboratory. The Q.C. Laboratory applies the custody seal to the container being shipped out upon completion of sample collection, labels the container, and completes the chain of custody record. An indelible ink pen is used for labeling purposes.

Samples are accompanied by a chain of custody record (see Appendix II). When transferring the possession of samples, the individuals relinquishing and receiving then sign, date, and note the time record. This record documents the transfer of custody of the samples from the sampler to another person.

The Quality Control Laboratory and the outside laboratory assure that the possession of samples is traceable from the time the samples are received. To maintain and document sample possession, the laboratories follow chain of custody procedures. A sample custodian or a designated alternate receives samples from each laboratory and verifies that the information on the sample label matches that on the chain of custody record. The custodian then signs the custody record in the appropriate space.

The sample is stored in a secure area with access limited to the sample custodian. The removal of samples for analysis is documented by a chain of custody form kept by the sample custodian.

Samples forwarded for analysis are retained after the analyses are completed. These samples may be disposed of only upon the orders of the the direction of BCC. All chain of custody forms will become part of the Quality Control Laboratory records.

H Methods of Analysis

EPA approved methods of analysis for each parameter are listed in Tables 1,2, and 3.

I Quality Assurance

The following discussion concerns how quality is achieved and maintained for the analytical work described in this proposal.

The internal audits consist of intralaboratory control checks as well as routine interlaboratory participation in round robins and proficiency testing whenever applicable programs are available. The intralaboratory control checks include:

- Evaluation of daily performance:
- One blank on water and reagents;
- Replicate analysis, whereby one sample in six is analyzed in replicate to determine whether the analytical system is in control;
- Spiked sample recover, whereby when applicable, one sample in six is spiked with known amounts of selected chemicals and analyzed for recovery; and
- A review of precision and accuracy control charts of reach parameter for comparison with project specific data.

Inclusion of externally prepared QC samples are used to assess equipment and operator performance. Specifically, EPA primary dilutions and quality control check samples are utilized.

Written reports of the quality assurance audits are kept with notations as to findings, recommendations, and actions.

J Quality Control

The Quality Control Program is utilized on a daily basis to insure defensible and reproducible data. Program areas specifically applicable to this project include the following:

- All glassware used is washed with soap and rinsed with distilled water. The glassware that is used for organics analysis is rinsed again with acetone and dried in an oven. The glassware that is used for metals analysis is rinsed with metals-grade nitric-acid followed by a distilled water rinse.

- Low working level standards are prepared daily from stock standards. The stock standards are prepared fresh monthly from pure analytical standards.

- Consistent with the quality control program, sample blanks are analyzed to determine whether any interferences are present that may have been contributed by the solvents, the glassware, or the procedure itself.

- The accuracy of the analytical method is determined by the use of spiked samples (i.e., those that have a known quantity of chemical added and are used to estimate accuracy through percent recovery) and is calculated as the percent recovery. Spikes of varying amounts are analyzed to further ensure the accuracy of the method.

- In order to further assure the accuracy of the analyses for the various parameters tested. EPA quality assurance materials are analyzed along with the samples.

- The precision of the analytical method is determined by the analysis of replicate samples within the appropriate concentration ranges.

K Laboratory Safety

Laboratory personnel are familiar with both the safety procedures necessary for routine work, as well as the specific procedures required for handling each of the various hazardous situations that may be encountered.

Preventive measures are always taken when possible to minimize hazardous conditions.

The laboratory supervisor routinely inspects the daily activities of the employees to insure compliance with standard operating procedures, safety guidelines, and levels of personal protection as required by the nature of the chemicals or samples.

L Disposal of Laboratory Waste

Buffalo Color has a policy that mandates:

- Samples that are retained are subsequently disposed of according to applicable state and federal rules and; e.g., hazardous liquid samples are placed in approved lab packs and transported and disposed of by approved disposal facilities;
- All contaminated organic solvents are containerized and disposed of via a certified liquid waste disposal operator.

M Frequency of Sampling

Samples are collected at such times as is shown in Table 5. Records will be kept as per the protocol listed in Section VII

TABLE 1

GROUND WATER QUALITY

Parameter	1974 EPA (1) Methods	15th Edition (2) Standard Methods	Pt 31 1975 (3) ASTM	USGS (4) Methods	Other Approved Methods
Chloride	29,31	407	267,265		615 (5)
Iron	110	303	345,326	102	619 (5)
Manganese	116	303,319	345	111	619 (5)
Phenols	241	510	529,545		
Sodium	147	303	403	143	621 (5)
Sulfate	277,279	426A	425		623 (5)

See notes at end of Table 3

TABLE 2

GROUND WATER CONTAMINATION INDICATORS

PARAMETER	1974 EPA (1) METHODS	15TH EDITION STANDARD (2) METHODS	Pt 31 1975 ASTM (2)	USGS METHODS (4)	OTHER APPROVED METHODS
pH	239	150.1	178	129	606 (5)
Specific Conductance	275	205	120	148	606 (5)
Total Organic Carbon	236	415.1	467	4 (6)	
Total Organic Halogen		450.1			

See Notes at the end of Table 3.

TABLE 3

INTERIM PRIMARY DRINKING WATER STANDARDS

PARAMETER	EPA (1) METHODS	STANDARD (2) METHODS	ASTM (3)	USGS (4) METHODS	OFFICAL METHODS
Arsenic	9,95	-	-	31,37	-
Barium	97	303C	-	52	-
Cadmium	101	303B	345	62	619 (5)
Chromium	105	303B	345,286	78,77	619 (5)
Fluoride	65,59,61	413	307,305	93	-
Lead	112	303B	345	105	619 (5)
Mercury	118	-	338	51 (7)	
Nitrate (as N)	201,197,207	418	358	119	614 (5)
Selenium	145	303.1	-	-	-
Silver	146	303B	-	142	619 (5)
Endrin	-	509A	-	-	-
Lindane	-	509A	-	-	-
Methoxychlor	-	509A	-	-	-
Toxaphene	-	509A	-	-	-
2,4,-D	-	509A	-	-	-
2,4,5, TP Silver	-	509A	-	-	-
Radium	-	707	661	81(7)	-
Gross Alpha	-	703	591	75,78(7)	-
Gross Beta	-	703	601	75,78(7)	-
Turbidity	-	214	-	-	-
Coliform Bacteria	-	909	-	35(8)	-

(1) USEPA "Methods for Chemicl Analysis of Water and Wastes" (1974).

(2) APHA/AWWA/WPCF "Standard Methods for the Examination of Water and Wastewater" 15th Edition (1980)

(3) ASTM "Annual Book of ASTM Standards - Part 31 Water" (1981)

(4) USGS "Techniques of Water Resources Inv. Book 5, Chapter A1 (1970)

(5) Association of Official Analytical Chemists, "Official Methods of Analysis", 12th Edition (1975) Page indicated.

(6) USGS "Techniques... Book 5, Chapter A3 (1972).

(7) USGS "Selected Methods for Analysis of Waste Waters", (1976) Open File Report 76-177

(8) USGS "Techniques...." Book 5, Chapter A4 (1973)

TABLE 4

PRESERVATIVE REQUIREMENTS

COMPOUND OR GROUP	CONTAINER SIZE	CONTAINER MATERIAL	CHEMICAL PRESERATIVE	MAXIMUM ALLOWABLE RETENTION TIME	HOLDING TEMPERATURE
Heavy Metals	1 Quart	Polythylene	Nitric Acid to pH<2	6 months	$4^{o}C$
Total Organic Carbon	125 ml	Glass	H_3PO_4 to pH<2	7 Days	$4^{o}C$
Total Organic Halide	1 Quart	Glass	None	28 Days	$4^{o}C$
pH	1 Pint	Glass	None	ASAP at O.C.	N/A
Chloride	125 ml	Glass	None	None	$4^{o}C$
Sulfate	250 ml	Glass	None	None	$4^{o}C$
[illegible]ol	1000 ml	Glass	H_3PO_4 to pH<4.0	24 Hours	$4^{o}C$
Conductivity	500 ml	Glass	N/A	N/A	$4^{o}C$
Pesticides	1000 ml	Glass	N/A	7 Days	$4^{o}C$
Radium 228	1000 ml	Glass	2ml HNO_3/liter	N/A	$4^{o}C$
Gross Alpha & Beta Radioactivity	1000 ml	Glass	N/A	N/A	$4^{o}C$
Turbidity	500 ml	Glass	N/A	N/A	$4^{o}C$
Nitrogen	150 ml	Glass	Sulfuric Acid to pH < 2	24 Hours	$4^{o}C$
Coliform	500 ml	Glass	N/A	N/A	$4^{o}C$

VII Record Keeping Protocol - 265.94

Records are kept in the Environmental Services Department for all of the parameters for which data is collected.

1. Ground Water Quality (Table 1)

   One anlaysis per parameter per sampling
   One sample per quarter for the first four quarters after well installation and thereafter annually.

2. Ground Water Contamination Indicators (Table 2)

   Four analyses per parameter per sampling.
   One sample per quarter for the first four quarters after well installation and semi-annually thereafter.

3. Interim Primary Drinking Water Standards (Table 3)

   One analysis per parameter per sampling.
   One sample per quarter for first four quarters.

4. Ground water elevations determined each time a sample is obtained from each well.
   The sampling schedule is indicated in Table 5

Statistical Calculations are executed as the data is obtained in accord with 265.93(b). These calculations are also be logged and kept in the Environmental Services Department files.

If statistical calculations indicate that notifictions are required, records of these notifications are also kept in the files of the Environmental Services Department.

VIII Reporting Requirements (265.94)

Report to the regional administrator:

1. Quarterly:

   a. During the first year, 15 days after data is received, concentrations or values for drinking water parameters for each well (Table 3).

   b. Identify for each well any drinking water parameter in excess of maximum levels as stated in 265.94 (2)(i).

2. Annually (No later than the third month of the following year).

   a. Concentrations of groundwater contamination parameters (Table 2) for each well.

   b. Statistical evaluation of these parameters is outlined in 265.93(b)

   c. Any significant difference found versus the initial data in the upgradient well.

3. Annually (No later than the third month of the following year)

   a. Results of evalauations of groundwater surface elevations for each well.

   b. If a significant change in elevation is occurring, what BCC proposes to do.

TABLE 5

GROUND WATER MONITORING
SAMPLING SCHEDULE (For each well)

	Quarters Subsequent to Well Installation									
	1	2	3	4	5	6	7	8	9	10
Ground Water Quality	X	X	X	X			X			
Ground Water Contamination Indicators	X	X	X	X		X		X		X
Drinking Water Quality	X	X	X	X						
Ground Water Surface Elevations	X	X	X	X		X	X	X		X

Semi annually thereafter until 2 years past closure of the last lagoon under post closure plan or semi annually for thirty years or until equality with background groundwater is achieved under contingency post closure plan.

D14.13

M.2

GROUNDWATER MONITORING SYSTEM

AND

GROUNDWATER QUALITY ASSESSMENT OUTLINE

EMPIRE
SOILS INVESTIGATIONS INC.

BUFFALO COLOR CORPORATION
GROUNDWATER MONITORING SYSTEM
AND GROUNDWATER QUALITY ASSESSMENT OUTLINE

4.3.4.2 Y
M.2

FOR
Buffalo Color Corporation
Buffalo, New York

Job No. GTA-85-33
January 1986

M6

105 CORONA AVENUE, GROTON, NY 13073, 607-898-5881

TABLE OF CONTENTS

THOMSEN ASSOCIATES

BUFFALO COLOR CORPORATION
GROUNDWATER MONITORING SYSTEM
AND GROUNDWATER QUALITY ASSESSMENT OUTLINE

1.0 INTRODUCTION

1.1 Project Initiation

Thomsen Associates and Empire Soils Investigations, Inc. were retained by Buffalo Color Corporation on November 11, 1985 under Purchase Order #26-51967 to prepare portions of the Groundwater Monitoring Plan needed to satisfy the requirements of Part 265, Subpart F-Groundwater-Monitoring for the three waste water treatment lagoons at their facility in Buffalo, New York. This plan is based on previous investigations at the facility by Empire-Thomsen and information provided by Buffalo Color regarding subsurface conditions. The results from our previous investigations are contained in our reports entitled "Buffalo Color Corporation Groundwater Monitoring System and Groundwater Quality Assessment Outline, June 1984", and "Buffalo Color Corporation Groundwater Monitoring System, October, 1985".

1.2 Project Location

Buffalo Color Corporation is located in Buffalo, New York, north of the Buffalo River. The facility contains three wastewater treatment lagoons south of Elk Street (see Drawing No. 1). Topography

in the vicinity of the lagoons is relatively flat with less than 5 feet of difference in elevation between borings. A railroad track south of the lagoons separates the Buffalo Color Corporation property from the adjacent PVS Chemical Property. The location of the monitoring wells installed in June 1984 (MW-1 through MW-7) and the monitoring wells installed in October, 1985 (MW-8 through MW-12) is shown on Drawing No. 2.

2.0 GROUNDWATER MONITORING SYSTEM

2.1 Monitoring Well Installation

A groundwater monitoring system consisting of eight deep wells (MW-1 through MW-7 and MW-12) and four shallow wells (MW-8 through MW-11) were installed at the Buffalo Color Corporation facility by Empire Soils Investigations, Inc. in May, 1984 and October, 1985 (see Drawing No. 2). The monitoring wells were installed around the wastewater treatment lagoon to provide a monitoring system capable of yielding representative groundwater samples from the upper aquifer system and the deep aquifer system to satisfy requirements of Part 265.91.

The methodology used to drill the borings and install the wells is described in detail in our two previous reports. (Thomsen Associates, June, 1984 and Thomsen Associates, October, 1985). The boring logs and well construction diagrams for all twelve wells are contained in Appendix A. All wells are constructed with stainless steel well screens and galvanized steel riser pipe with welded joints.

2.2 Subsurface Conditions

The borings encountered 0 to 10.5 feet of fill. Below the fill at borings MW-2, MW-4, MW-6, MW-8, MW-9 and MW-10 and directly beneath the topsoil in boring MW-7 is a layer of silt and silty fine sand. Beneath the silt and silty fine sand deposit, in borings MW-2, MW-4, MW-6, MW-7, MW-8, MW-9 and MW-10 is a silty clay deposit which is 26 to 40 feet thick beneath the site. At borings MW-3, MW-5, MW-11 and MW-12 the silty clay deposit is directly beneath fill, and at boring MW-1 the silty clay deposit is directly beneath the topsoil. The silty clay deposit is a varved lacustrine deposit. The top of the silty clay deposit appears to dip to the southeast beneath the lagoons. The top of the silty clay is 6 to 13 feet below ground surface in the vicinity of Lagoon No. 3 and 19 feet below ground surface at MW-8. A thin sand and gravel deposit is found between the bottom of the silty clay deposit and bedrock. The sand and gravel layer is two to seven feet thick.

Bedrock beneath the site is part of the Onondaga Limestone formation of Devonian Age. Bedrock was encountered at a depth of 42 to 52 feet below ground surface.

A double row of sheet piling is found along the southern property boundary from approximately 30 feet west of MW-2 to Babcock Street [on the eastern property boundary]. (see Drawing No. 1 for location of Babcock Street) The sheet piling is believed to have been installed in 1938 by the Buffalo Sewer Authority

when the sewers were built. It was discovered in the vicinity of MW-11 by Buffalo Color (see Appendix B) and consists of two sets of parallel steel sheet piles, 5 feet apart, separated by sand. The western portion of the sheet piles is believed to be wood. The sheet piles are assumed to extend from a few feet below ground surface to bedrock. An outfall from Buffalo Color crosses the southern property west of Lagoon No. 1. There is believed to be a breach in the sheet piling to accommodate the outfall 30 feet west of the western edge of Lagoon No. 1 (see Drawing No. 2).

2.3 Water Table Aquifer

Four shallow wells (MW-8, MW-9, MW-10 and MW-11) were installed to investigate the shallow groundwater flow regime. Water level measurements from these wells are summarized in Table 1. Well MW-11 was inadvertently removed while fixing a sewer line damaged during installation of MW-12 (see Appendix B). A new well (MW-13) will be installed near the outfall to replace MW-11.

Water level measurements indicate the direction of groundwater flow in the shallow aquifer system is generally southward. (See Drawing No. 2). The water level measurements also indicate a trough in the water table near MW-3. The water level measured at MW-8 was 4 feet below that measured at MW-9. The trough in the water table is believed to be due to a breach in the sheet piling in this vicinity for the outfall for Buffalo Color. Since the sheet piling is believed to extend from a few feet below ground surface to bedrock it would form a barrier to the normal groundwater flow

direction from Buffalo Color toward the Buffalo River. A hole in the sheet piling would cause the observed groundwater flow pattern.

The only known shallow wells in the area which could influence ground water flow direction in the shallow aquifer are a system of well points on the Mobil Oil Corporation facility, southeast of Buffalo Color Corporation. Mobil Oil Corporation has a system of 160 well points along the Buffalo River, approximately 700 feet southeast of Lagoon No. 2. These well points pump approximately 150/gpm and discharge the water into the Buffalo Sewer Authority. However, due to the sheet piles, the well point system should have no effect on groundwater flow beneath the Buffalo Color Lagoons.

Results of field tests performed using the methodology of Bouwer and Rice (1976) indicate the hydraulic conductivity of the silt and fine sand layer beneath the fill is about $5x10^{-4}$cm/sec.(see Table 2). The horizontal hydraulic conductivity of the confining layer of silty clay measured by the "field tests" was about $7x10^{-5}$cm/sec. The horizontal gradient beneath the site is between 0.03 ft/ft and 0.06 ft/ft.

Applying Darcy's law to estimate the average linear velocity of flow ($\bar{v} = Ki/n$, where $\bar{v}$ is average linear velocity of flow, k is hydraulic conductivity, i is hydraulic gradient and n is effective porosity) results in an average rate of flow of 0.7 ft/day (assuming $k = 5x10^{-4}$cm/sec, i = 0.05 ft/ft, and n = 0.1).

The deep borings in the vicinity of the lagoons (MW-1 through MW-7) and MW-12 indicate the silty clay layer separating the water table aquifer from the deep aquifer is 26 to 40 feet thick. The vertical gradient measured between MW-11 and MW-12 on October 17 and 18, 1985 was 0.0075 ft/ft and 0.005 ft/ft downward. Assuming a vertical hydraulic conductivity of 1×10^{-7} cm/sec for the silty clay, a vertical hydraulic gradient of 0.006 and a porosity of 0.1, the average vertical linear velocity of groundwater flow is about 1.7×10^{-5} ft/day. Based on the measured vertical gradients between MW-11 and MW-12 there is some connection between the upper water table aquifer and the deep aquifer beneath the silty clay. However, the slow rate of ground water flow through the silty clay and the thickness of the silty clay unit minimizes the connection between the two aquifers.

2.4 Deep Aquifer

The deep aquifer referred to in this report consists of the sand unit above bedrock and the top of the bedrock. Water level measurements were taken in the deep wells installed at Buffalo Color (MW-1, MW-2, MW-3, MW-4, MW-5, MW-6, MW-7, MW-12) and, in two wells on PVS Chemicals property (B-1 and B-2) to evaluate the direction of ground water flow in the deeper aquifer (see Table 1).

The water level elevations indicate the direction of groundwater flow in the deep aquifer system beneath the Buffalo Color lagoons is toward the east, parallel to the sheet piling (see Drawing No. 3).

There are no known water supply wells which pump water from the bedrock/soil interface within one quarter mile of Buffalo Color Corporation.

2.5 Groundwater Monitoring Program

The groundwater monitoring program will include sampling both the shallow and the deep aquifers. To evaluate the effect of the lagoons on the shallow water table system, water samples will be taken from three shallow downgradient wells (MW-8, MW-9 and MW-13) and one shallow upgradient well (MW-10). To evaluate the effect of the lagoons on the deep aquifer system, water samples will be taken from three deep downgradient wells (MW-3, MW-4 and MW-6) and one deep upgradient well (MW-7). Both the deep and shallow downgradient wells which will be sampled are directly downgradient of the wastewater lagoons in their respective groundwater flow systems, (see Drawings No. 2 and 3) so should provide an early warning system to detect any statistically significant amounts of hazardous waste constituents that migrate from the wastewater treatment lagoons to either aquifer.

At the time water samples are taken for analysis, water level measurements will be taken at all wells (MW-1 through MW-13) to determine the direction of groundwater flow in both aquifers.

During the first year of water sampling, the purpose of the monitoring program will be to determine background concentrations of parameters. Following the first year of monitoring, the water sample results will be statistically analyzed in accordance with Part 265.93(b) to evaluate whether there is a statistically significant difference between the upgradient well and downgradient wells in each groundwater flow system. Each groundwater flow system will be evaluated separately.

The first year of sampling for the shallow aquifer will not be completed until the end of 1986, so the statistical evaluation of whether there is significant difference between the upgradient and downgradient wells would not be performed until 1987. The first year of water sampling of the deep aquifer has been compelted so the statistical evaluation of whether there is a significant difference between the upgradient and downgradient well is being done.

3.0 GROUNDWATER QUALITY ASSESSMENT OUTLINE

3.1 Purpose

The purpose of this outline is to provide a basis for a more detailed program to evaluate (1) whether hazardous waste constituents have entered groundwater, (2) the rate and extent of migration of hazardous waste in groundwater and (3) the concentrations of hazardous waste in groundwater, if the analyses performed in accordance with Part 265.93(c),(d) for either aquifer system indicate the facility may be affecting groundwater quality.

The outline which follows describes the technical approach which would be taken for a groundwater quality assessment of both the shallow and deep aquifers. The specific methodologies which would be followed when implementing the programs would be included in the plans submitted to the Regional Administrator. The plans would also include a schedule of implementation.

3.2 Outline of Groundwater Quality Assessment Program

The groundwater quality assessment will be performed in phases for both the deep and shallow aquifers. Phase I of the assessment program for either aquifer will be to evaluate whether hazardous constituents have entered groundwater from the wastewater treatment lagoons and determine the concentrations of these constituents. Phase II will be to investigate the rate and extent of migration of any hazardous constituents which the Phase I investigation concludes have migrated into groundwater from the wastewater treatment lagoons.

Phase I - Shallow Aquifer

In order to evaluate whether hazardous constituents have entered the shallow groundwater sytem from the waste water treatment lagoons and determine the concentrations of these constituents, the Phase I investigation will include taking water samples from three downgradient wells (MW-8, MW-9 and MW-13) and the upgradient monitoring well (MW-10) and analyzing these samples for chemicals specific to Buffalo Color Corporation. These chemicals will include aniline, dimethylaniline, cyanide, N-ethylaniline, N, N diethylaniline, N-methylaniline, and ammonia-N. Four samples from each welll will be analyzed to provide a statistical basis for comparing concentration of the downgradient wells to the upgradient well. Groundwater quality data from the Phase I investigation and all previously gathered groundwater quality data will be evaluated and a report prepared containing conclusions

as to whether hazardous constituents have entered groundwater and their concentrations. If the data indicate contaminants from the wastwater treatment lagoons have migrated into the shallow groundwater system, the report will also contain a specific plan and time schedule for the Phase II investigation. If the data indicate that hazardous constituents have not migrated into the shallow aquifer system, the report will notify the Regional Administer that the water sampling program will return to the semiannual indicator evaluation program in accordane with Part 265.92.

Phase II - Shallow Aquifer

The Phase II investigation will be initiated to evaluate the rate and extent of contaminant migration if the results of the Phase I investigation indicate contaminants from the wastewater treatment lagoons have migrated into the shallow groundwater regime. The vertical extent of migration will be evaluated by taking additional samples from deep wells MW-3, MW-4, MW-6, MW-7 and MW-12. MW-12 willl be sampled along with the other deep wells because it will provide a fourth downgradient monitoring point.

The horizontal extent of migration of contaminants and rate of migration in the shallow groundwater system will be evaluated by using analytical techniques. The groundwater flow pattern encountered at the facility indicates groundwater in the shallow aquifer system funnels toward the breach in the sheet piles west of MW-3. Since MW-13 will be installed at

the property boundary next to the outfall, there is no place on the Buffalo Color property to install additional downgradient wells. Therefore, analytical techniques will be used to evaluate the extent and rate of contaminant migration. Results from field permeability tests on the shallow wells would be used in data analysis.

Data gathered during the Phase II investigation, as well as all other previouosly gathered data on groundwater quality in the shallow and deep aquifers, will be analyzed and a report will be prepared containing conclusions as to the rate and extent of contaminant migration and concentrations of contaminants in both the deep and shallow aquifers. If results indicate contaminants have migrated vertically downward into the deeper aquifer, the report will also contain a specific plan and time schedule for further investigation of the rate and extent of contaminant migration in the deeper aquifer systemf and hydraulic connection between the deep and shallow aquifers.

Phase I - Deep Aquifer

The Phase I investigation for the deep aquifer will be similar to the Phase I investigation of the shallow aquifer. Water samples will be taken from three deep downgradient wells (MW-3, MW-5 and MW-6) and the deep upgradient well (MW-7) and analyzed for chemicals specific to Buffalo Color Corporation. The water samples will be analyzed for aniline, dimethylaniline, cyanide, N-ethylaniline, N, N diethylaniline, N-methylaniline and ammonia-N. Four samples from each well will be analyzed to provide a statistical basis for comparing concentrations in the downgradient wells

to the upgradient well. Groundwater quality data from the Phase I investigation and all previously gathered groundwater quality data will be evaluated and a report prepared containing conclusions as to whether hazardous constituents have entered groundwater and their concentrations. If the data indicate contaminants from the wastewater treatment lagoons have migrated into groundwater, the report will also contain a specific plan and time schedule for the Phase II investigation. If the data indicate that hazardous constituents have not migratred into the shallow aquifer system, the report will notify the Regional Administrator that the water sampling program will return to the semiannual indicator evaluation program in accordance with Part 265.92.

Phase II - Deep Aquifer

The Phase II investigation of the deep aquifer will include gathering additional hydrogeologic data so that 1) the rate and extent of migration in the deep aquifer and 2) whether the shallow aquifer system is contributing to contamination in the deep aquifer system can be evaluated. To evaluate the rate of migration in the deep aquifer system, data will be needed on the hydraulic conductivity of the sand deposit and hydraulic gradient. Hydraulic conductivity of the sand deposit will be estimated by performing field permeability tests on the upgradient wells (MW-2, MW-7) and MW-1 (cross gradient well).

Using the results of the field permeability tests and measured hydraulic gradients from the potentiometric surface map, the average linear velocity of groundwater flow will be calculated. The rate of migration would be estimated from the average linear velocity of groundwater flow.

The extent of migration of contaminants in the deeper aquifer system will be evaluated by installing additional wells downgradient of the wastewater treatment lagoons, and analyzing water samples from these wells for the parameters determined to be contaminating groundwater. Three wells will be placed in the sand deposit east of MW-5 and MW-6 (downgradient) to evaluate the horizontal extent of contaminant migration. The location of the wells will be determined based on the estimated rate of migration. Two wells will be placed downgradient of the wastewater treatment lagoons, but within the estimated extent of the contaminant plume; while the third well will be placed further downgradient and outside of the expected limit of the contaminant plume. To evaluate the vertical extent of migration, three wells will be placed in bedrock, one well upgradient and adjacent to MW-7 and two wells downgradient and adjacent to MW-5 and MW-6. These wells will be cased to bedrock so that the wells will monitor water quality in the bedrock.

To provide sufficient statistical data to compare water quality in the downgradient wells to water quality in the upgradient wells in both the lower sand and bedrock aquifers, four water samples will be taken from the three new bedrock wells, three new wells in the deep sand aquifer and wells MW-7, MW-3, MW-4 and MW-6. These samples will be analyzed for the parameters determined to be contaminating groundwater in Phase I. Results of the chemical analysis will be used to evaluate the extent of contaminant migration.

In order to evaluate whether the shallow aquifer system is contributing to contamination of the deep aquifer system additional hydrogeologic data will be gathered and water samples will be taken from the four shallow monitoring wells. Four relatively undisturbed thin-walled samples of the silt and clay unit will be taken in accordance with ASTM Method D 1587 and tested in the laboratory for vertical permeability using a triaxial cell with backpressure saturation to evaluate the hydraulic connection between the deep and shallow aquifers. The four samples will be taken from one boring placed on the east side of Lagoon 3 and one boring placed on the east side of Lagoon 2. Four water samples will also be taken from each of the shallow monitoring wells and anlayzed for the parameters determined to be contaminating ground water in Phase I. Results from the permeability tests and chemical analysis will be used to evaluate whether the shallow aquifer system is contributing to contamination in the deep aquifer system.

Data gathered during the Phase II investigation, as well as all other previously gathered data on groundwater quality, will be analyzed and a report prepared containing conclusions as to the rate and extent of contaminant migration in the deeper aquifer, concentrations of contaminants in both the shallow and deep aquifers, and the hydraulic connection between the deep and shallow aquifers.

4.0 REFERENCES

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2. Thomsen Associates, 1984, "Buffalo Color Corporation Groundwater Monitoring System and Groundwater Quality Assessment Outline".

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Respectfully submitted,

EMPIRE-THOMSEN

Marjory B. Rinaldo-Lee

Marjory Rinaldo-Lee, C.P.G.S.

Charles T. Gaynor, II

Charles T. Gaynor, II, P. E.

TABLES

TABLE 1

Summary of Water Level Elevations

Well	Reference Elevation	Water Level 10-10-85	10-11-85	10-12-85	10-14-85	10-17-85	10-18-85	11-06-85	11-07-85	11-11-85	11-14-85	11-18-85	11-25-85
MW-1	585.38	-	-	-	-	-	575.77	-	-	-	-	-	-
MW-2	586.65	-	-	-	-	-	577.58	-	-	-	-	-	-
MW-3	587.69	-	-	-	-	-	576.25	-	-	-	-	-	-
MW-4	587.48	-	-	-	-	-	574.48	-	-	-	-	-	-
MW-5	587.78	-	-	-	-	-	574.73	-	-	-	-	-	-
MW-6	587.19	-	-	-	-	-	574.61	-	-	-	-	-	-
MW-7	588.74	-	-	-	-	-	577.52	-	-	-	-	-	-
MW-8	589.88	572.28	572.28	572.28	572.37	572.43	572.63	574.91	574.99	574.89	575.39	575.30	574.68
MW-9	589.59	576.12	576.79	575.49	576.45	576.61	576.64	578.54	578.55	578.47	578.64	578.61	578.17
MW-10	589.45	571.55	-	580.15	580.26	580.65	580.73	581.87	582.01	581.95	582.33	578.36	581.99
MW-11	588.46	-	573.16	573.21	576.00	577.89	577.51	580.09	574.16	581.26	580.53	578.02	579.09
MW-12	587.11	-	-	-	577.49	577.33	577.32	-	-	-	-	-	-
B-1	586.46	-	-	-	-		575.12	-	-	-	-	-	-
B-2	584.57	-	-	-	-		573.67	-	-	-	-	-	-
"A"	585.58	-	-	-	-		570.90	-	-	-	-	-	-
"B"	585.12	-	-	-	-		570.87	-	-	-	-	-	-
"C"	585.65	-	-	-	-		570.26	-	-	-	-	-	-
River	-	-	-	-	-		574.23	-	-	-	-	-	-

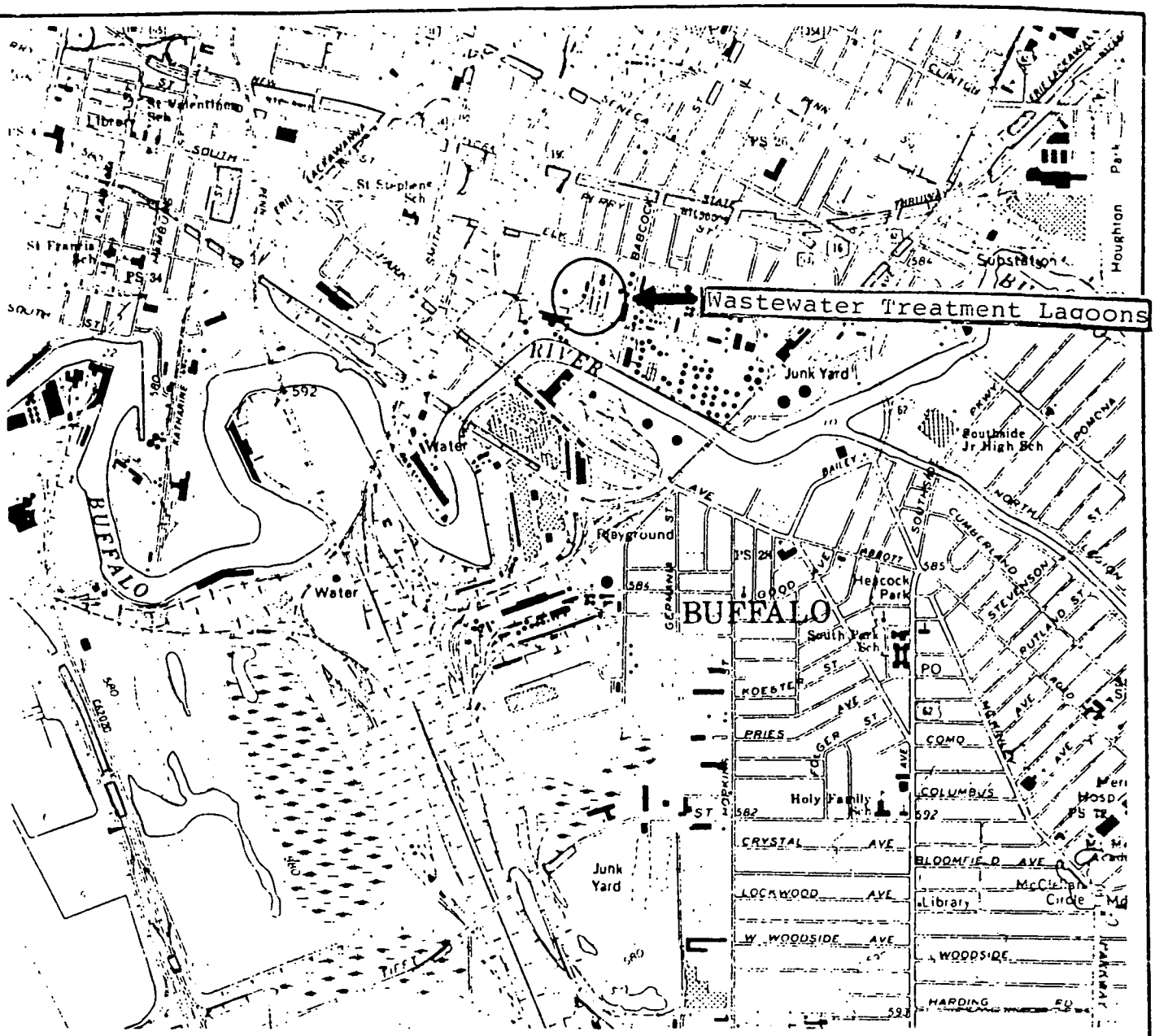
NOTES:
1. All elevations are referenced to USGS Mean Sea Level.
2. "-" indicates no water level reading
3. River elevation measured from top of well "C"
4. Well MW-11 was removed in November, 1985

TABLE 2

Field Hydraulic Conductivity Test Results

Well	Soil Type	Hydraulic Conductivity (cm/sec)
MW-8	Silt	8.4×10^{-4}
MW-9	Silt	2.8×10^{-4}
MW-10	Silty Clay	6.5×10^{-5}
MW-11	Silty Clay	7.1×10^{-5}

Note: See Boring Logs in Appendix A for complete description of soil type.



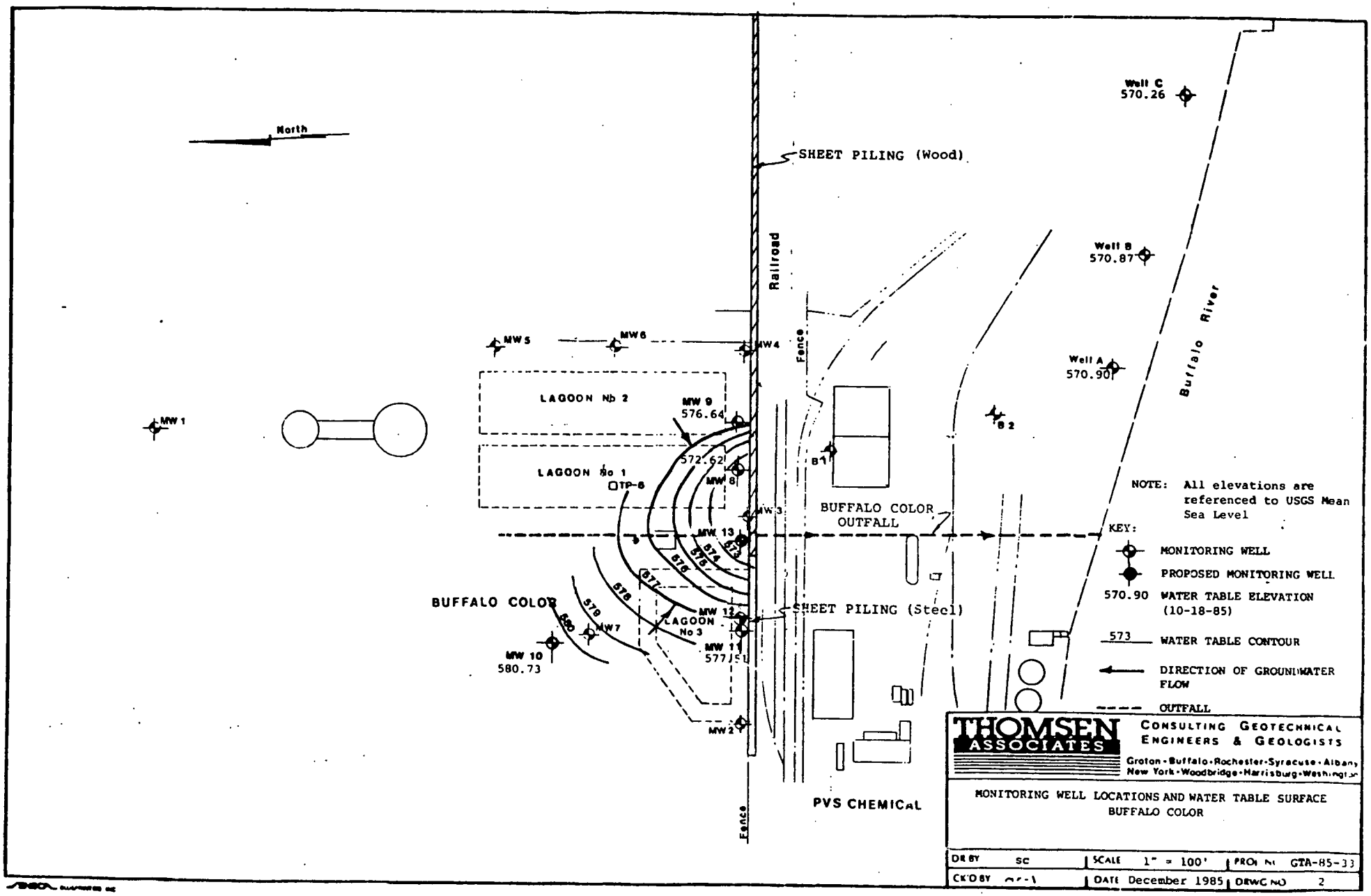
BUFFALO SE QUADRANGLE
NEW YORK – ERIE CO.
7.5 MINUTE SERIES PLANIMETRIC

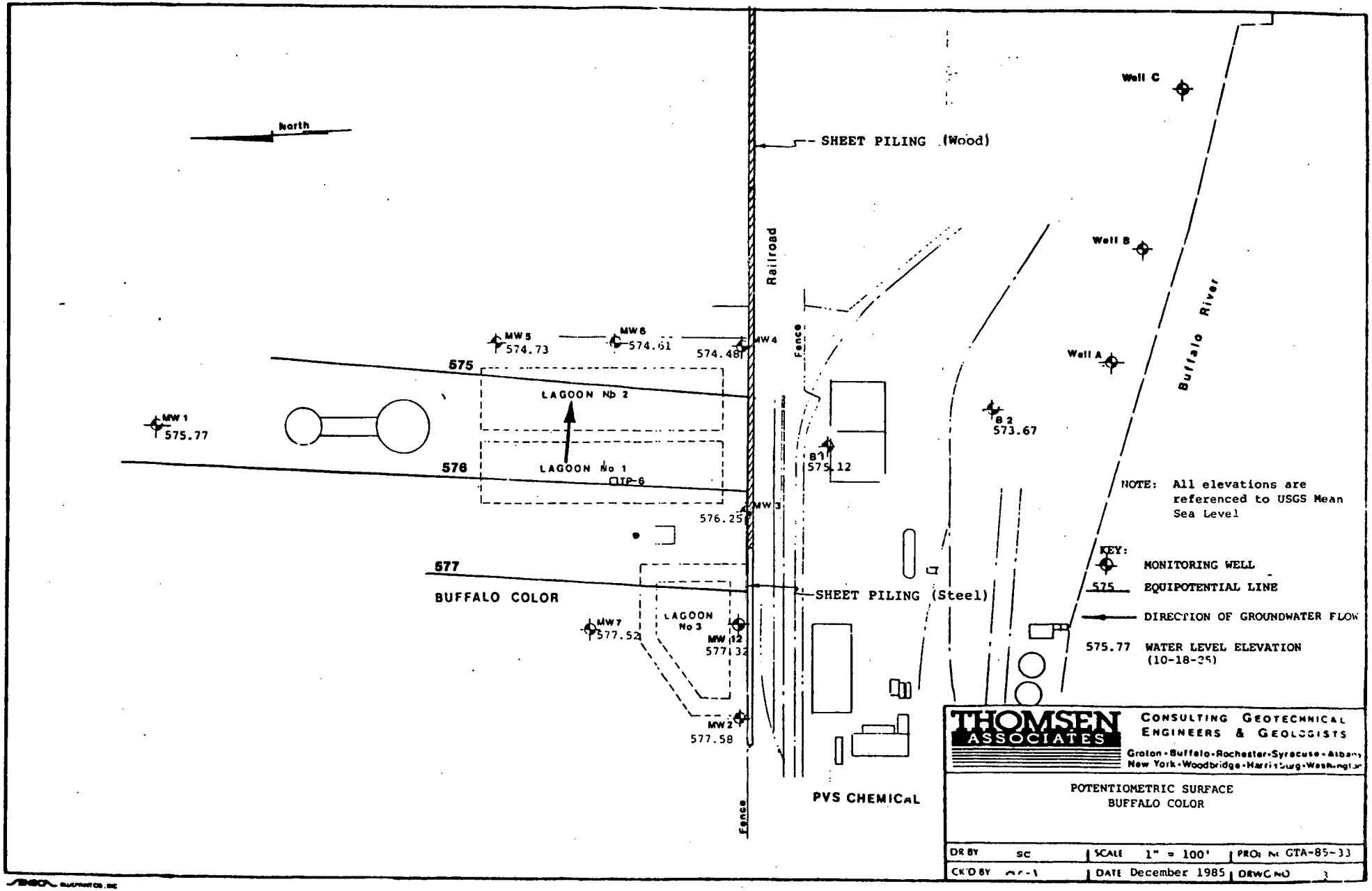
EMPIRE SOILS INVESTIGATIONS INC

SUBSURFACE INVESTIGATION PLAN

BUFFALO COLOR CORPORATION
SITE LOCATION

DR BY MR-L	SCALE 1"=2000'	PROJ NO BD-84-53
CK'D BY	DATE April 1984	DRWG NO 1


North
SHEET PILING (Wood)
Well C
570.26
Well B
570.87
Well A
570.90
Buffalo River
Railroad
Fence
MW 5
MW 6
MW 4
MW 1
LAGOON No 2
LAGOON No 1
MW 9
576.64
572.62
MW 8
TP-6
B 1
B 2
MW 3
MW 13
BUFFALO COLOR
OUTFALL
574
575
576
577
578
579
580
BUFFALO COLOR
MW 12
LAGOON
No 3
MW 7
MW 10
580.73
MW 11
577.51
SHEET PILING (Steel)
MW 2
PVS CHEMICAL
Fence
NOTE: All elevations are referenced to USGS Mean Sea Level
KEY:
MONITORING WELL
PROPOSED MONITORING WELL
570.90 WATER TABLE ELEVATION (10-18-85)
573 WATER TABLE CONTOUR
DIRECTION OF GROUNDWATER FLOW
OUTFALL
THOMSEN ASSOCIATES
CONSULTING GEOTECHNICAL ENGINEERS & GEOLOGISTS
Groton · Buffalo · Rochester · Syracuse · Albany
New York · Woodbridge · Harrisburg · Washington
MONITORING WELL LOCATIONS AND WATER TABLE SURFACE
BUFFALO COLOR
DR BY SC
SCALE 1" = 100'
PROJ NO GTA-85-33
CK'D BY
DATE December 1985
DRWG NO 2


North
SHEET PILING (Wood)
Railroad
Fence
Well C
Well B
Well A
Buffalo River
MW 5
574.73
MW 6
574.61
MW 4
574.48
575
LAGOON No 2
MW 1
575.77
576
LAGOON No 1
RIP-6
B 2
573.67
B 1
575.12
MW 3
576.25
NOTE: All elevations are referenced to USGS Mean Sea Level
KEY:
MONITORING WELL
575 EQUIPOTENTIAL LINE
DIRECTION OF GROUNDWATER FLOW
575.77 WATER LEVEL ELEVATION (10-18-85)
577
BUFFALO COLOR
SHEET PILING (Steel)
MW 7
577.52
LAGOON No 3
MW 12
577.32
MW 2
577.58
PVS CHEMICAL
Fence
THOMSEN ASSOCIATES
CONSULTING GEOTECHNICAL ENGINEERS & GEOLOGISTS
Groton · Buffalo · Rochester · Syracuse · Albany
New York · Woodbridge · Harrisburg · Washington
POTENTIOMETRIC SURFACE
BUFFALO COLOR
DR BY SC
SCALE 1" = 100'
PROJ NO GTA-85-33
CK'D BY
DATE December 1985
DRWG NO 3

DEPTH	ELEVATION	SAMPLES	SAMPLE NO.	CHEM. SMPL.	RECOVERY	N	SOIL or ROCK CLASSIFICATION	UNIFIED SOIL CLASSIF.	DENSITY (PCF)	WATER CONTENT (Percent)	PERMEABILITY (cm/sec)	MONITOR, PIEZOMETER CONSTRUCTION DETAILS				WATER PROBE READINGS				NOTES
																Temp. (°C)	Cond. (µmho cm)	Eh (mV)	pH	
1	2	3	4	5	6	7	8	9	10	11	12	13	14			15	16	17	18	19

The figures in the Column 1 defines the scale of the Subsurface Log.

The associated elevation is shown in the second column.

The third column graphically shows the exact depth range from which a soil sample or rock core was recovered.

See Table I for a description of the symbols used to signify the various types of samples.

The Sample or Run No. is used for identification on sample containers and/or Laboratory Test Reports.

The Chemical Sample column graphically shows the depth range from which a sample was removed for chemical analysis.

The recovery column shows the recovery in inches for a soil sample. Rock core recovery is shown in percent.

N shows the number of blows required to drive a split spoon sampler into the soil. Unless otherwise stated, the results are for a "Standard Penetration Test", driving a two-inch diameter spoon 12 inches with a 140 pound hammer dropped 30 inches. RQD is the Rock Quality Designation for rock core. This equals the sum of the length of pieces greater than 4 inches divided by the length of the core run.

All recovered soil samples are reviewed in the laboratory. The visual descriptions are made on basis of the sample as recovered and in accordance with the Unified Classification System shown on Table VI. The Unified group symbol is shown in Column 9.

Guidelines for the terms used in descriptions are presented in Tables II and III. The description of the relative soil compactness or consistency is based upon the penetration records as defined in Table IV. The description of the soil moisture is based upon the condition of the sample as recovered. The moisture condition is described as dry, damp, moist or wet. Water used to advance the boring may have affected the in-situ moisture content of the sample. Special terms are used as required to describe materials in greater detail; several such terms are listed in Table V. When sampling gravelly soils with a standard two-inch diameter split spoon, the true percentage of gravel is often not recovered due to the relatively small sampler diameter. The presence of boulders and large gravel is sometimes, but not necessarily, detected by an evaluation of the casing and sampler blows or through the "action" of the drill rig as reported by the driller.

The results from nuclear field tests or laboratory tests for soil density and moisture are shown in Columns 11 and 12.

Soil or rock permeability, the testing method, and the depth range tested are shown in Column 12.

Column 13 is a graphic description of the monitor or piezometer installation. A key to the description is presented on Table VII. Details of materials are noted in the NOTES column. The static water level (SWL) and date measured are noted in the adjacent column.

Columns 15 to 18 indicate the results of field tests at the depth tested. The date of the test is noted below the readings.

TABLE I

- Split Spoon Sample
- Shelby Tube Sample
- Auger or Pit Sample
- Rock Core

TABLE II

Identification of soil type is made on basis of an estimate of particle sizes, and in the case of fine grained soils also on basis of plasticity.

Soil Type	Soil Particle Size	
Boulder	>12"	
Cobble	3"-12"	
Gravel-Coarse	3"-3/4"	Coarse Grained (Granular)
-Fine	#4-#10	
Sand-Coarse	#10-#40	
-Medium	#40-#200	
-Fine		
Silt-Non Plastic (Granular)		
Clay-Plastic (Cohesive)	<#200	Fine Grained

TABLE III

The following terms are used in classifying soils consisting of mixtures of two or more soil types. The estimate is based on weight of total sample.

Term	Percent of Total Sample
and	35-50
some	20-35
little	10-20
trace	less than 10

(When sampling gravelly soils with a standard split spoon, the true percentage of gravel is often not recovered due to the relatively small sampler diameter.)

TABLE IV

The relative compactness or consistency is described in accordance with the following terms:

Granular Soils		Cohesive Soils	
Term	Blows per Foot, N	Term	Blows per Foot, N
Loose	<10	Very Soft	<2
Firm	11-30	Soft	3-5
Compact	31-50	Medium	6-15
Very Compact	>51	Stiff	16-25
		Hard	>25

(Large particles in the soils will often significantly influence the blows per foot recorded during the Penetration Test.)

TABLE V

Varved	Alternating layers, seams, and partings of soils.
Layer	Soil deposit more than 6" thick.
Seam	Soil deposit less than 6" thick.
Parting	Soil deposit less than 1/8" thick.
Uniform	All grains are of about the same diameter

TABLE VI

UNIFIED SOIL CLASSIFICATION

Major Division		Group Symbol	Soil Description
Coarse-grained (over 50% by weight coarser than No. 200 sieve)	Gravelly soils (over half of coarse fraction larger than No. 4)	GW	Well-graded gravels, sandy gravels. Little or no fines.
		GP	Gap-graded or uniform gravel, sandy gravels. Little or no fines.
		GM	Silty gravels, silty sandy gravels.
		GC	Clayey gravels, clayey, sandy gravels.
	Sandy soils (over half of coarse fraction finer than No. 4	SW	Well-graded sand, gravelly sands. Little or no fines.
		SP	Gap-graded or uniform sands, gravelly sands. Little or no fines.
		SM	Silty sands, silty gravelly sands.
		SC	Clayey sands, clayey gravelly sands.
Fine-grained (over 50% by weight finer than No. 200 sieve)	Low compressibility (liquid limit less than 50)	ML	Silts, very fine sands, silty or clayey fine sands, rock flour.
		CL	Low plasticity clays, sandy or silty clays.
		OL	Low plasticity organic silts and clays.
	High compressibility (liquid limit more than 50)	MH	Micaceous or diatomaceous silts.
		CH	Highly plastic clays and sandy clays.
		OH	Organic silts and highly plastic clays.
Organic Soils			

TABLE VII

- Curb Box
- Riser
- Well Screen
- Point Piezometer
- Sand Pack
- Bentonite Seal
- Concrete Seal
- Granular Fill

KEY TO HYDROGEOLOGIC LOG

DEPTH	ELEVATION	SAMPLES	SAMPLE NO.	CHEM. SMPL	RECOVERY (inches)	N	SOIL or ROCK CLASSIFICATION	UNIFIED SOIL CLASSIF.	DENSITY (PCF)	WATER CONTENT (Percent)	PERMEABILITY (cm/sec)
0	95.3						Topsoil 0.4'				
5			1			15	Brown Silty CLAY, occasional Silt partings (Moist-Medium)				
10			2			3	Grades gray, soft				
15			3			2	Very soft				
20			4			2					
25			5			-	Grades gray with red-brown varves				
30			6			-					
			7			3					
35			8			-					
			9			4					
			10			4	40'				
40			11			29	Gray fine-coarse SAND, Some Silt				
			12		100/ 0.5'		Some fine Gravel (Wet-Firm) 42' Limestone				

MONITOR/PIEZOMETER CONSTRUCTION DETAILS

Water Level 6-7 6-17

Water Level 6-13 6-19

WATER PROBE READINGS

Temp. (°C)	Cond. (µmho/cm)	Eh (mV)	pH
			6.0 to 6.5
			6.0 to 6.5
			6.0 to 6.5
			7.0

NOTES

pH of soil samples measured in field

Well Construction Details

Riser Pipe:3" I.D.Galvanized steel
Well Screen:3"I.D.Stainless steel,slot size=0.01" 45.75' to 40.75'
Bentonite Seal:40.45'to 38.45'
Bentonite-Cement Seal from 38.45' to ground surface
Locking 6" I.D. Iron Pipe cemented over riser pipe
Stick up: 3" Galvanized steel=1.45'
6" Protector Pipe=1.8'
Top of Galvanized Steel Riser Pipe= 585.38

Roller Bit from 42.0'to 46.0'
5 7/8" bit

NOTE: See reverse side for key and explanation to log.

RUN NO. | RECOVERY (Percent) | ROD

Surface Elevation 583.93
Date Started 5/15/84
Date Completed 5/17/84
Number of Installations in Boring 1
Method of Installation Hollow Stem Auger & Roller Bit

Project No. 3D-84-53
Project Title Buffalo Color
Location Buffalo, N.Y.
Classified By AK Checked MR-L

HYDROGEOLOGIC LOG

THOMSEN ASSOCIATES

MONITOR NO. MW-1

Sheet 1 of 2

DEPTH	ELEVATION	SAMPLES	SAMPLE NO.	CHEM. SMPL.	RECOVERY (Inches)	N	SOIL or ROCK CLASSIFICATION	UNIFIED SOIL CLASSIF.	DENSITY (PCF)	WATER CONTENT (Percent)	PERMEABILITY (cm/sec)	MONITOR/PIEZOMETER CONSTRUCTION DETAILS	WATER PROBE READINGS: Temp. (°C)	Cond. (µmho/cm)	Eh (mV)	pH	NOTES
	50.3						Limestone Boring Terminated @ 46.0'										
50																	

NOTE: See reverse side for key and explanation to log.

RUN NO.

RECOVERY (Percent)

ROD

Surface Elevation 583.93
Date Started 5/15/84
Date Completed 5/17/84
Number of Installations in Boring 1
Method of Installation Hollow Stem Auger & Roller Bit

Project No. BD-84-53
Project Title Buffalo Color
Location Buffalo, N.Y.
Classified By AK Checked MR-L

HYDROGEOLOGIC LOG

THOMSEN ASSOCIATES

MONITOR NO. MW-1

Sheet 2 of 2

DEPTH	ELEVATION	SAMPLES	SAMPLE NO.	CHEM. SMPL	RECOVERY (inches)	N	SOIL or ROCK CLASSIFICATION	UNIFIED SOIL CLASSIF.	DENSITY (PCF)	WATER CONTENT (Percent)	PERMEABILITY (cm/sec)	MONITOR/PIEZOMETER CONSTRUCTION DETAILS	WATER PROBE READINGS				NOTES
												Water Level 6-7 / 6-11 / Water Level 6-13 / 6-19	Temp. (°C)	Cond. (µmho/cm)	Eh (mV)	pH	
0	97.1						Red-Brown Silty CLAY trace gravel, roots & bricks (FILL) (Moist) 2.5'±										pH of soil samples measured in field
5		1				4	Gray fine-medium SAND, Some Silt trace roots (Moist-Loose) 8.5'±										Well Construction Details
10		2				6	Gray Silty CLAY, occasional silt partings (Moist-Medium)									6.0	Riser Pipe: 3" I.D. Galvanize Steel Well Screen: 3"I.D. Stainless Steel, slot size=0.01" 50.7'to45.7' Bentonite Seal:45.7'to44.7' Bentonite-Cement Seal from 44.7'to Ground Surface Locking 6" Iron Pipe cemented over Riser Pipe Stick Up: 3" Galvanized Steel= 1.0' 6" Protector Pipe= 1.6' Top of Steel Riser Pipe= 585.65'
15		3				3	Grades soft									6.0	
20		4				3										6.0	
25		5				2											
30		6				-										6.5	
		7				3											
35		8				-											
		9				3											
		10				4											
40		11				-											
		12				-											
		13				3	Occasional wet sand seams									7.0	

NOTE: See reverse side for key and explanation to log.

RUN NO. | RECOVERY (Percent) | ROD

Surface Elevation 585.05
Date Started 5/21/84
Date Completed 5/22/84
Number of Installations in Boring 1
Method of Installation Hollow Stem Auger & Roller Bit

Project No. BD-84-53
Project Title Buffalo Color
Location Buffalo, N.Y.
Classified By AK Checked MR-L

HYDROGEOLOGIC LOG

THOMSEN ASSOCIATES

MONITOR NO. MW-2

Sheet 1 of 2

DEPTH	ELEVATION	SAMPLES	SAMPLE NO.	CHEM. SMPL	RECOVERY (inches)	N	SOIL or ROCK CLASSIFICATION	UNIFIED SOIL CLASSIF.	DENSITY (PCF)	WATER CONTENT (Percent)	PERMEABILITY (cm/sec)	MONITOR/PIEZOMETER CONSTRUCTION DETAILS	WATER PROBE READINGS Temp. (°C)	Cond. (µmho/cm)	Eh (mV)	pH	NOTES
	52.1						45.4'										
			14			4	Gray fine-coarse SAND and SILT, Occasional clay partings (Wet-Firm)										
			15			17											
50			16			100/	50.4'										
						0.4'	Limestone										
							Boring Terminated @ 51.4'									7.0	Roller Bit from 50.4 to 51.4 5 7/8" bit

NOTE: See reverse side for key and explanation to log.

RUN NO. | RECOVERY (Percent) | ROD

Surface Elevation 585.05
Date Started 5/21/84
Date Completed 5/22/84
Number of Installations in Boring 1
Method of Installation Hollow Stem Auger & Roller Bit

Project No. BD-84-53
Project Title Buffalo Color
Location Buffalo, N.Y.
Classified By AK Checked MR-L

HYDROGEOLOGIC LOG

THOMSEN ASSOCIATES

MONITOR NO. MW-2

Sheet 2 of 2

DEPTH	ELEVATION	SAMPLES	SAMPLE NO.	CHEM. SMPL	RECOVERY (inches)	N	SOIL or ROCK CLASSIFICATION	UNIFIED SOIL CLASSIF.	DENSITY (PCF)	WATER CONTENT (Percent)	PERMEABILITY (cm/sec)	MONITOR/PIEZOMETER CONSTRUCTION DETAILS	WATER PROBE READINGS: Temp. (°C)	Cond. (µmho/cm)	Eh (mV)	pH	NOTES
0	96.6						Crushed Stone 0.3'										pH of soil samples measured in field
							Black CINDERS with gray silty clay seams, trace brick (FILL)										
5			1			5										6.5	
10			2			-	Oily Seams 10.5'										Well Construction Details
							Brown Silty CLAY (Moist-Very Soft)									6.5	Riser Pipe: 3"I.D. Galvanized Steel
15			3			2	Occasional silt partings										Well Screen: 3"I.D. Stainless Steel, Slot Size=0.01" 50.0'to45.0'
																6.5	Bentonite Seal=44.5'to42.5'
20			4			-											Bentonite & Cement Seal from 42.5'to ground surface
																6.5	Locking 6"I.D.Iron Pipe
25			5			-	Grades wet with varves and gray silt partings										Stick Up: 3" Galvanized Steel= 2.5'
																6.5	Top of Galvanized Steel Riser Pipe=587.69'
30			6			-	Grades red-brown										
35			7			-											
40			8			-											
			9			4											
			10			-	Grades some fine-coarse sand										

NOTE: See reverse side for key and explanation to log.

RUN NO. | RECOVERY (Percent) | ROD

Surface Elevation 585.19
Date Started 6/6/84
Date Completed 6/6/84
Number of Installations in Boring 1
Method of Installation Hollow Stem Auger

Project No. BD-84-53
Project Title Buffalo Color
Location Buffalo, N.Y.
Classified By AK Checked MR-L

HYDROGEOLOGIC LOG

THOMSEN ASSOCIATES

MONITOR NO. MW-3

Sheet 1 of 2

DEPTH	ELEVATION	SAMPLES	SAMPLE NO.	CHEM. SMPL	RECOVERY (inches)	N	SOIL or ROCK CLASSIFICATION	UNIFIED SOIL CLASSIF.	DENSITY (PCF)	WATER CONTENT (Percent)	PERMEABILITY (cm/sec)	MONITOR/PIEZOMETER CONSTRUCTION DETAILS	WATER PROBE READINGS Temp. (°C)	Cond. (μmho/cm)	Eh (mV)	pH	NOTES
	51.6						46.0										
			11			3	Gray-Brown fine-coarse SAND, Some Clayey Silt, trace gravel, trace fractured rock									7.0	
			12			7											
50			13		100/1.0'		(Wet-Loose)									7.0	Sampler Refusal at 50.5'
							Boring Terminated @ 50.5'										

NOTE: See reverse side for key and explanation to log.

RUN NO. | RECOVERY (Percent) | RQD

Surface Elevation 585.19
Date Started 6/6/84
Date Completed 6/6/84
Number of Installations in Boring 1
Method of Installation Hollow Stem Auger

Project No. BD-84-53
Project Title Buffalo Color
Location Buffalo, N.Y.
Classified By AK Checked MR-L

HYDROGEOLOGIC LOG

THOMSEN ASSOCIATES

MONITOR NO. MW-3

Sheet 2 of 2

DEPTH	ELEVATION	SAMPLES	SAMPLE NO.	CHEM. SMPL	RECOVERY (Inches)	N	SOIL or ROCK CLASSIFICATION	UNIFIED SOIL CLASSIF.	DENSITY (PCF)	WATER CONTENT (Percent)	PERMEABILITY (cm/sec)	MONITOR/PIEZOMETER CONSTRUCTION DETAILS	WATER PROBE READINGS				NOTES
												Water Level 6-7 6-11	Water Level 6-13 6-19	Temp. (°C)	Cond. (µmho/cm)	Eh (mV)	pH	
0	97.0																	pH of soil samples measured in field
							Crushed Stone (FILL) 1.5											
5			1			4	Black SILT & CINDERS, trace gravel and slag (Fill) (Moist-Loose)										5.5	
							7.5'±											
10			2			5	Gray-Black SILT, Some fine Sand, trace clay and wood										5.5	
							(Moist-Loose) 12.5±											
15			3			2	Gray-Black fine SAND & SILT, trace clay, trace wood										5.5	
20			4			2	Brown Silty CLAY (Moist-Soft)										7.0	
25			5			-												
30			6			-	Grades Red-Brown, occasional silt partings											
			7			-												
35			8			-	Occasional Gray Silt and fine Sand partings											
			9			2												
40			10			3												
			11			-											7.0	
			12			3												
			13			-												

Well Construction Details
Riser Pipe: 3" I.D. Galvanized steel
Well Screen: 3" I.D. Stainless steel, slot size =0.01" 51.7' to 46.7'
Bentonite Seal: 46.0' to 44.9'
Bentonite-Cement seal from 44.9' to ground surface
Locking 6" I.D. Iron Pipe cemented over riser pipe
Stick Up: 3" Glavanized steel=1.8'
6" Proctor Pipe = 2.0'

Top of Steel Riser Pipe = 587.48'

NOTE: See reverse side for key and explanation to log.

RUN NO. | RECOVERY (Percent) | ROD

Surface Elevation 585.48
Date Started 5-18-84
Date Completed 5-21-84
Number of Installations in Boring 1
Method of Installation Hollow Stem Auger

Project No. BD-84-53
Project Title Buffalo Color
Location Buffalo, N.Y.
Classified By AK Checked MR-L

HYDROGEOLOGIC LOG

THOMSEN ASSOCIATES

MONITOR NO. MW-4

Sheet 1 of 2

DEPTH	ELEVATION	SAMPLES	SAMPLE NO.	CHEM. SMPL	RECOVERY (inches)	N	SOIL or ROCK CLASSIFICATION	UNIFIED SOIL CLASSIF.	DENSITY (PCF)	WATER CONTENT (Percent)	PERMEABILITY (cm/sec)	MONITOR/PIEZOMETER CONSTRUCTION DETAILS	WATER PROBE READINGS Temp. (°C)	Cond. (µmho/cm)	Eh (mV)	pH	NOTES
	52.0'						46.0'										
			14			5	Gray-Brown fine-coarse SAND & SILT, little rock fragments, occasional silt partings										
			15			9											
50			16			27	(Wet-Loose)										
			17		100/5"		some fractured Rock Fragments									6.5	
							Boring Terminated @ 52.0'										Auger Refusal at 52.0'

NOTE: See reverse side for key and explanation to log.

RUN NO. | RECOVERY (Percent) | ROD

Surface Elevation 585.48
Date Started 5/18/84
Date Completed 5/21/84
Number of Installations in Boring 1
Method of Installation Hollow Stem Auger

Project No. BD-84-53
Project Title Buffalo Color
Location Buffalo, N.Y.
Classified By AK Checked MR-L

HYDROGEOLOGIC LOG

THOMSEN ASSOCIATES

MONITOR NO. MW-4

Sheet 2 of 2

DEPTH	ELEVATION	SAMPLES	SAMPLE NO.	CHEM. SMPL	RECOVERY (inches)	N	SOIL or ROCK CLASSIFICATION	UNIFIED SOIL CLASSIF.	DENSITY (PCF)	WATER CONTENT (Percent)	PERMEABILITY (cm/sec)	MONITOR/PIEZOMETER CONSTRUCTION DETAILS	WATER PROBE READINGS				NOTES
												Water Level 6-7 / 6-11 / Water Level 6-13 / 6-19	Temp. (°C)	Cond. (μmho/cm)	Eh (mV)	pH	
0	96.5						CRUSHED STONE 0.3'										pH of soil samples measured in field
							Red-Brown Clayey SILT and fine-coarse SAND (FILL) 3.5'										
5			1			2	Olive-Gray Silty CLAY, occasional silt partings (Moist-Soft)									6.6	
10			2			2	Grades Brown, with occasional Gray silt seams, wet									6.0	
15			3			-										6.0	
20			4			-	occasional Red-Brown Silt seams									6.5	
25			5			-										6.5	
30			6			-											
35			7			-	occasional Gray silt partings										
40			8			2	grades varved										
			9			-	grades Red Silt partings, Some fine-coarse Sand 42.3'										
			10			29	Gray fine-coarse SAND, Some Silt Some Gravel (Wet-Compact)									7.0	

Well Construction Details
Riser Pipe: 3"I.D. Galvanized steel
Well Screen: 3"I.D. stainless steel, slot size = 0.01"
47.3' to 42.3'
Bentonite Seal: 41.3' to 40.2'
Bentonite & cement seal from 40.2' to ground surface. Locking 6" ID Iron Pipe cemented over Riser Pipe
Stick up: 3" Glavanized steel = 2.7'

Top of Glavanized Steel Riser Pipe = 587.78'

NOTE: See reverse side for key and explanation to log.

RUN NO. | RECOVERY (Percent) | ROD

Surface Elevation 585.08
Date Started 6-5-84
Date Completed 6-6-84
Number of Installations in Boring 1
Method of Installation Hollow Stem Auger

Project No. BD-84-53
Project Title Buffalo Color
Location Buffalo, N.Y.
Classified By AK Checked MR-L

HYDROGEOLOGIC LOG

THOMSEN ASSOCIATES

MONITOR NO. MW-5

Sheet 1 of 2

DEPTH	ELEVATION	SAMPLES	SAMPLE NO.	CHEM. SMPL	RECOVERY (inches)	N	SOIL or ROCK CLASSIFICATION	UNIFIED SOIL CLASSIF.	DENSITY (PCF)	WATER CONTENT (Percent)	PERMEABILITY (cm/sec)	MONITOR/PIEZOMETER CONSTRUCTION DETAILS	WATER PROBE READINGS: Temp. (°C)	Cond. (µmho/cm)	Eh (mV)	pH	NOTES
	51.5																
			11			50										7.0	
50			12			00/0"	Boring Terminated @ 48.1'										Sampler refusal at 48.1'

NOTE: See reverse side for key and explanation to log.

RUN NO. | RECOVERY (Percent) | ROD

Surface Elevation 585.08
Date Started 6-5-84
Date Completed 6-6-84
Number of Installations in Boring 1
Method of Installation Hollow Stem Auger

Project No. ED-84-53
Project Title Buffalo Color
Location Buffalo, N.Y.
Classified By AK Checked MR-L

HYDROGEOLOGIC LOG

THOMSEN ASSOCIATES

MONITOR NO. MW-5

Sheet 2 of 2

DEPTH	ELEVATION	SAMPLES	SAMPLE NO.	CHEM. SMPL	RECOVERY (inches)	N	SOIL or ROCK CLASSIFICATION	UNIFIED SOIL CLASSIF.	DENSITY (PCF)	WATER CONTENT (Percent)	PERMEABILITY (cm/sec)	MONITOR/PIEZOMETER CONSTRUCTION DETAILS	WATER PROBE READINGS: Temp. (°C)	Cond. (µmhos/cm)	Eh (mV)	pH	NOTES
0	96.9						CRUSHED STONE 0.3'					Water Level 6-13&-19					pH of soil samples measured in field
							Black CINDERS with crushed stone (Fill) (Moist-Loose)										
5			1			3											
							8.2'										
10			2			4	Brown coarse GRAVEL (Fill) 9.0' / Green-Gray Clayey SILT (Wet-Soft)										
							13.2'										
15			3			2	Brown silty CLAY with silt partings									7.0	Well Construction Details Riser Pipe: 3" I.D. Galvanized Steel Well Screen: 3" I.D. stainless steel, slot size = 0.01", 49.5' to 44.5' Bentonite Seal: 44.0' to 42.8' Bentonite & cement seal from 42.8' to ground surface. Locking 6" I.D. Iron Pipe cemented over Riser Pipe Stick up: 3" Galvanized steel = 2.0'
20			4			-											
25			5			-	Grades Gray-Brown occasional Red-Brown silt partings									7.0	Top of Galvanized Steel Riser Pipe = 587.19
30			6			-											
35			7			-	grades varved with Red-Brown and Gray silt partings										
40			8			-											
			9			-											
			10			-											

NOTE: See reverse side for key and explanation to log.

RUN NO. | RECOVERY (Percent) | ROD

Surface Elevation 585.19
Date Started 6-8-84
Date Completed 6-11-84
Number of Installations in Boring 1
Method of Installation Hollow Stem Auger

Project No. BD-84-53
Project Title Buffalo Color
Location Buffalo, N.Y.
Classified By AK Checked MR-L

HYDROGEOLOGIC LOG

THOMSEN ASSOCIATES

MONITOR NO. MW-6

Sheet 1 of 2

DEPTH	ELEVATION	SAMPLES	SAMPLE NO.	CHEM. SMPL	RECOVERY (inches)	N	SOIL or ROCK CLASSIFICATION	UNIFIED SOIL CLASSIF.	DENSITY (PCF)	WATER CONTENT (Percent)	PERMEABILITY (cm/sec)	MONITOR/PIEZOMETER CONSTRUCTION DETAILS	WATER PROBE READINGS Temp. (°C)	Cond. (µmho/cm)	Eh (mV)	pH	NOTES
	51.9																
			11			-	47.0'									7.0	
							Gray fine-coarse SAND and SILT Some fine-coarse Gravel									7.0	
50			12			100/0'	(Wet)										
							Boring Terminated @ 50.0'										

NOTE: See reverse side for key and explanation to log

RUN NO. | RECOVERY (Percent) | ROD

Surface Elevation 585.19
Date Started 6-8-84
Date Completed 6-11-84
Number of Installations in Boring 1
Method of Installation Hollow Stem Auger

Project No. BD-84-53
Project Title Buffalo Color
Location Buffalo, N.Y.

Classified By AK Checked MR-L

HYDROGEOLOGIC LOG

THOMSEN ASSOCIATES

MONITOR NO. MW-6

Sheet 2 of 2

DEPTH	ELEVATION	SAMPLES	SAMPLE NO.	CHEM. SMPL	RECOVERY (inches)	N	SOIL or ROCK CLASSIFICATION	UNIFIED SOIL CLASSIF.	DENSITY (PCF)	WATER CONTENT (Percent)	PERMEABILITY (cm/sec)	MONITOR/PIEZOMETER CONSTRUCTION DETAILS	WATER PROBE READINGS				NOTES
												Water Level 6-11 / Water Level 6-13 / 6-19	Temp. (°C)	Cond. (µmho/cm)	Eh (mV)	pH	
0	97.3						TOPSOIL 0.4'										pH of soil samples measured in field
							Gray fine SAND and SILT, trace roots										
5			1			4										6.0	
10			2			13	Some decayed wood pieces										Well Construction Details
							13.2'										Riser Pipe: 3" I.D. Galvanized steel
15			3			3	Gray Brown Silty CLAY (Moist-Soft)									6.5	Well Screen: 3" I.D. Stainless steel, slot size = 0.01', 48.0 to 43.0'
																	Bentonite Seal: 42.2 to 40.7'
20			4			2	occasional Gray silt partings										Bentonite & cement seal from 46.7 to ground surface
																	Locking 6" I.D. Iron Pipe Cemented over Riser Pipe
25			5			3											Stick up: 3" Galvanized steel = 3.0'
30			6			-											Top of Galvanized Steel Riser Pipe = 588.74
35			7			-	grades varved										
40			8			-											
			9			-											
							44.0'										
			10			-											

NOTE: See reverse side for key and explanation to log.

RUN NO. | RECOVERY (Percent) | ROD

Surface Elevation 585.74
Date Started 6-7-84
Date Completed 6-8-84
Number of Installations in Boring 1
Method of Installation Hollow Stem Auger

Project No. BD-84-53
Project Title Buffalo Color
Location Buffalo, N.Y.
Classified By AK Checked MR-L

HYDROGEOLOGIC LOG

THOMSEN ASSOCIATES

MONITOR NO. MW-7

Sheet 1 of 2

DEPTH	ELEVATION	SAMPLES	SAMPLE NO.	CHEM. SMPL	RECOVERY (inches)	N	SOIL or ROCK CLASSIFICATION	UNIFIED SOIL CLASSIF.	DENSITY (PCF)	WATER CONTENT (Percent)	PERMEABILITY (cm/sec)	MONITOR/PIEZOMETER CONSTRUCTION DETAILS	WATER PROBE READINGS: Temp. (°C)	Cond. (μmho/cm)	Eh (mV)	pH	NOTES
	52.3						Gray Fine-coarse SAND and SILT, Some fractured Rock Fragments, trace clay (Wet-Firm)										
			11			29										7.0	Sampler Refusal at 49.5'
50					100/0		Boring Terminated @ 49.5'										

NOTE: See reverse side for key and explanation to log.

RUN NO. | RECOVERY (Percent) | ROD

Surface Elevation 585.74
Date Started 6-7-84
Date Completed 6-8-84
Number of Installations in Boring 1
Method of Installation Hollow Stem Auger

Project No. BD-84-53
Project Title Buffalo Color
Location Buffalo, N.Y.

Classified By AK Checked MR-L

HYDROGEOLOGIC LOG

THOMSEN ASSOCIATES

MONITOR NO. MW-7

Sheet 2 of 2

DEPTH	SAMPLE NO.	N	SOIL or ROCK CLASSIFICATION
0	1	67	Gray crushed STONE (FILL) (Damp-Very Compact)
	2	57	3.5'
5	3	10	Brown fine-coarse SAND, little silt (FILL) (Moist-Firm) 6.0'
	4	19	Gray SILT, occasional clay lenses, little fine sand (Moist-Firm to Loose)
	5	6	
10	6	5	contains decayed wood pieces
	7	15	
15	8	5	
	9	13	
	10	-	19.0'
20	11	6	Gray-Brown silty CLAY, occasional silt partings (Wet-Medium)
	12	6	contains occasional silt seams
25			Boring Terminated @ 24.0'

MONITOR/PIEZOMETER CONSTRUCTION DETAILS

Water Level 10-10 | 10-11 | 10-14 | 10-18

WATER PROBE READINGS: Temp. (°C) | Cond. (µmho/cm) | Eh (mV) | pH

NOTES

Well Construction Details

Screen

Stainless Steel, 3-inch ø, 19.9' to 14.9'

Riser Pipe

Black Steel, 3-inch ø, 14.9' to surface

Backfill

24.0'-13.9' Sand Filter
13.9'-11.9' Bentonite Pellet Seal
11.9'-Surface Grout

Protector Pipe

4-inch ø, 2.92' stick up

NOTE: See key and explanation to log.

RUN NO. | RECOVERY (Percent) | ROD

Surface Elevation 586.66
Date Started 10-7-85
Date Completed 10-8-85
Number of Installations in Boring 1
Method of Installation Hollow Stem Auger

Project No. GTA-85-33
Project Title Buffalo Color
Location Buffalo, New York
Classified By AK Checked mrc

HYDROGEOLOGIC LOG

THOMSEN ASSOCIATES

MONITOR NO. MW-8

Sheet 1 of 1

DEPTH	ELEVATION	SAMPLES	SAMPLE NO.	CHEM. SMPL	RECOVERY (inches)	N	SOIL or ROCK CLASSIFICATION	UNIFIED SOIL CLASSIF.	DENSITY (PCF)	WATER CONTENT (Percent)	PERMEABILITY (cm/sec)
0			1			31	Gray CRUSHED STONE (FILL) (Moist-Compact) 3.0'				
			2			22					
5			3			16	Gray-Brown silty CLAY, trace sand (FILL) (Moist-Firm) 4.0'				
			4			10	Black CINDERS & fine-coarse SAND, trace brick (FILL) (Moist-Firm) 7.0'				
			5			10	Gray SILT, little fine-coarse sand, trace gravel, trace brick contains ashes (FILL)				
10			6			5	(Moist-Loose) 10.0'				
			7			12	Gray SILT, little fine-medium sand, trace decayed wood, trace clay (Moist-Loose)				
15			8			5	Some fine Sand Seams				
			9			10	Wet				
							Boring Terminated @ 18.0'				
20											
25											
30											

MONITOR/PIEZOMETER CONSTRUCTION DETAILS

Water Level 10-10 | Water Level 10-11 | Water Level 10-14 | 10-18

WATER PROBE READINGS

Temp. (°C)	Cond. (µmho/cm)	Eh (mV)	pH

NOTES

Well Construction Details

Screen

Stainless Steel, 3-inch ø, 15.0' to 10.0'

Riser Pipe

Black Steel, 3-inch ø, 10.0' to surface

Backfill

18.0'-9.0' Sand Filter
9.0'-7.0' Bentonite Pellet Seal
7.0'-Surface Grout

Protector Pipe

4-inch ø, 3.2' stick up

NOTE: See key and explanation to log.

RUN NO.	RECOVERY (Percent)	ROD

Surface Elevation 586.39
Date Started 10-8-85
Date Completed 10-8-85
Number of Installations in Boring 1
Method of Installation Hollow Stem Auger

Project No. GTA-85-33
Project Title Buffalo Color
Location Buffalo, New York

Classified By AK Checked mc-l

HYDROGEOLOGIC LOG

THOMSEN ASSOCIATES

MONITOR NO. MW-9

Sheet 1 of 1

DEPTH	ELEVATION	SAMPLES	SAMPLE NO.	CHEM. SMPL	RECOVERY (inches)	N	SOIL or ROCK CLASSIFICATION	UNIFIED SOIL CLASSIF.	DENSITY (PCF)	WATER CONTENT (Percent)	PERMEABILITY (cm/sec)	MONITOR/PIEZOMETER CONSTRUCTION DETAILS	WATER PROBE READINGS				NOTES
												Water Level 10-12 / 10-14 / 10-18	Temp. (°C)	Cond. (µmho/cm)	Eh (mV)	pH	
0			1			56	Black CINDERS, Some fine-coarse Sand, trace silt (FILL) (Moist-Very Compact) 2.0'										Well Construction Details Screen Stainless Steel, 3-inch ø, 15.0' to 10.0' Riser Pipe Black Steel, 3-inch ø, 10.0' to surface Backfill 18.0'-9.0' Sand Filter 9.0'-7.0' Bentonite Pellet Seal 7.0'-0.0' Grout Protector Pipe 4-inch ø, 2.9'stick up
			2			17											
5			3			2	Black & Tan SILT & fine SAND, trace brick, trace cinders (FILL) (Moist-Firm) 4.0'										
			4			21	Brown-Gray SILT & fine SAND, (Moist-Loose) 6.0'										
			5			23	Gray-Brown silty CLAY, occasional silt partings (Moist-Stiff)										
10			6			9											
			7			14	occasional tan fine sand partings										
			8			4	occasional silt seams, trace gravel (Wet)										
15			9			7											
							Boring Terminated @ 18.0'										
20																	
25																	

NOTE: See key and explanation to log.

RUN NO. | RECOVERY (Percent) | ROD

Surface Elevation 586.55
Date Started 10-9-85
Date Completed 10-9-85
Number of Installations in Boring 1
Method of Installation Hollow Stem Auger

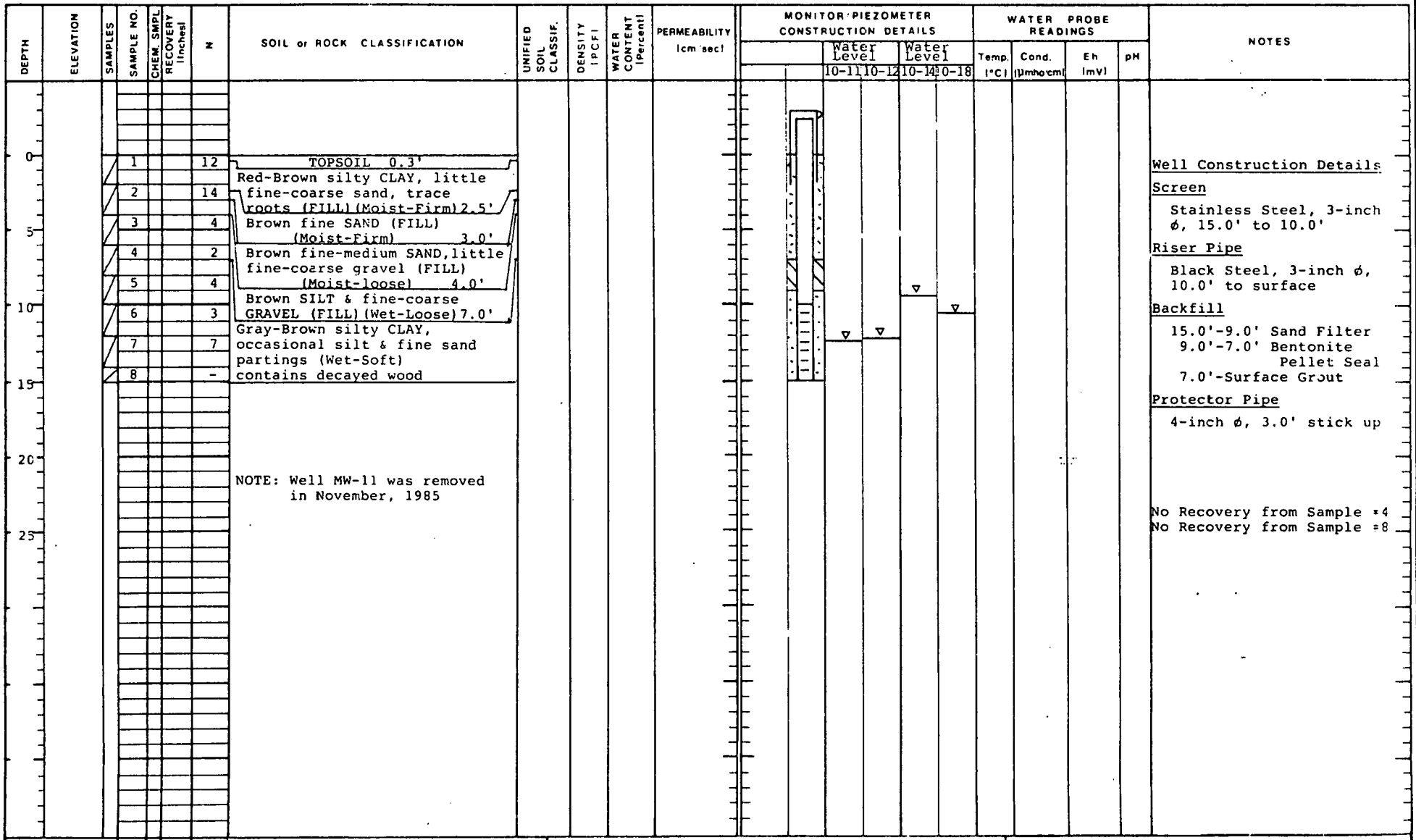
Project No. GTA-85-33
Project Title Buffalo Color
Location Buffalo, New York
Classified By AK Checked [illegible]

HYDROGEOLOGIC LOG

THOMSEN ASSOCIATES

MONITOR NO. MW-10

Sheet 1 of 1



NOTE: See key and explanation to log

RUN NO. | RECOVERY (Percent) | ROD

Surface Elevation 585.46
Date Started 10-9-85
Date Completed 10-9-85
Number of Installations in Boring 1
Method of Installation Hollow Stem Auger

Project No. GTA-85-33
Project Title Buffalo Color
Location Buffalo, New York
Classified By AK Checked MC-\

HYDROGEOLOGIC LOG

THOMSEN ASSOCIATES

MONITOR NO. MW-11

Sheet 1 of 1

DEPTH	ELEVATION	SAMPLES	SAMPLE NO.	CHEM. SMPL	RECOVERY (inches)	N	SOIL or ROCK CLASSIFICATION	UNIFIED SOIL CLASSIF.	DENSITY (PCF)	WATER CONTENT (Percent)	PERMEABILITY (cm/sec)	MONITOR/PIEZOMETER CONSTRUCTION DETAILS	WATER PROBE READINGS: Temp. (°C)	Cond. (µmho/cm)	Eh (mV)	pH	NOTES
0							No Samples Taken 0.0'-14.0' See MW-11 for Soil Description					Water Level 10-14 10-18					Well Construction Details Screen Stainless Steel, 3-inch ø, 49.0' to 44.0' Riser Pipe Black Steel, 3-inch ø, 44.0' to surface Backfill 50.0'-43.0' Sand Filter 43.0'-41.5' Bentonite Pellet Seal 41.5'-Surface Grout Protector Pipe 4-inch ø, 2.0' stick up
5																	
10																	
15			1			5	Gray silty CLAY, occasional silt partings (Wet-Soft)										
20			2			2											
25			3			-											Sewer Line hit at 15.0', boring location moved north to that shown on Drawings No. 2 and 3
30			4			-											
35			5			-											
40			6			2	43.0'±										
			7			9											

NOTE: See key and explanation to log.

RUN NO. | RECOVERY (Percent) | ROD

Surface Elevation 585.11
Date Started 10-11-85
Date Completed 10-12-85
Number of Installations in Boring 1
Method of Installation Hollow Stem Auger

Project No. GTA-85-33
Project Title Buffalo Color
Location Buffalo, New York
Classified By AK Checked

HYDROGEOLOGIC LOG

THOMSEN ASSOCIATES

MONITOR NO. MW-12

Sheet 1 of 2

DEPTH	ELEVATION	SAMPLES	SAMPLE NO.	CHEM. SMPL.	RECOVERY (inches)	N	SOIL or ROCK CLASSIFICATION	UNIFIED SOIL CLASSIF.	DENSITY (PCF)	WATER CONTENT (Percent)	PERMEABILITY (cm/sec)	MONITOR/PIEZOMETER CONSTRUCTION DETAILS	WATER PROBE READINGS: Temp. (°C)	Cond (μmho/cm)	Eh (mV)	pH	NOTES
							Gray fine-coarse SAND & fine-coarse GRAVEL, Some Silt, trace clay (Wet-Loose)										
			8			100/0											Auger Refusal at 50.0'
50							Boring Terminated @ 50.0'										
55																	

NOTE: See key and explanation to log.

RUN NO. | RECOVERY (Percent) | ROD

Surface Elevation 585.11
Date Started 10-11-85
Date Completed 10-12-85
Number of Installations in Boring 1
Method of Installation Hollow Stem Auger

Project No. GTA-85-33
Project Title Buffalo Color
Location Buffalo, New York
Classified By AK Checked

HYDROGEOLOGIC LOG

THOMSEN ASSOCIATES

MONITOR NO. MW-12

Sheet 2 of 2

APPENDIX B

LETTER FROM BUFFALO COLOR

buffalo
COLOR CORPORATION
p.o. box 7027 / buffalo, new york 14240
716-827-4500

December 16, 1985

Marjory Renaldo-Lee
Thomsen Associates
105 Corona Avenue
Groton, New York 13073

Dear Ms. Renaldo-Lee

Please forgive me for being so late with this well elevation data from the new shallow wells.

We have made a discovery which is very relevant to your project.

During the course of installing well number 12 (11 D) we struck a Buffalo Sewer Authority sewer line which they required us to repair. In digging the hole for the repair job, 1) we lost well 11S, 2) we discovered that the BSA has two sets of parallel sheet piling running 5 feet apart alongside our property. (See attached drawing). This appears to explain the anomalous nature of the gradients in the two aquifers. We would also expect there to be a marked difference between our side and PVS side of the piling. If water is backing up behind these barriers, then we could expect that the gradient would adjust with the ground water flow going toward Mobil (East).

For the purpose of your outline you should assume the following: 1) the piling goes down to bedrock, 2) the piling is as shown on the drawing, 3) the fill between the piling faces is sand to a depth of 18-20 feet below the surface of the ground.

Yours truly,

David E. Sauer
Manager, Environmental Affairs

DES:dt

Note: Well 11S is MW-11

executive and sales offices
one garret mountain plaza
west paterson, new jersey 07424
201-881-1700
toll free 800-631-0171

BUFFALO COLOR CORPORATION

SHALLOW AQUIFER WELL ELEVATIONS

DATE	R08	R09	R10	R11
11-06-85	574.91	578.54	581.87	580.09
11-07-85	574.99	578.55	582.01	574.16 *
11-11-85	574.89	578.47	581.95	581.26
11-14-85	575.39	578.64	582.33	580.53
11-18-85	575.30	578.61	578.36 *	578.02
11-25-85	574.68	578.17	581.99	579.09
Average	575.02	578.50	582.03	579.80
Standard Dev.	0.269	0.171	0.176	1.267
Standard Err.	0.109	0.070	0.076	0.567
Number of Reading	6	6	5	5
Gradient Vs R10	-6.40	-2.92	0.00	-2.56
Gradient Vs R10	-7.01	-3.53	0.00	-2.23 *

* Outlier Removed

M.3

GROUNDWATER MONITORING RESULTS

Data not included here appears as Appendices B and C of the Groundwater Quality Assessment Report in Appendix M.6 Below.

M.4

BUFFALO COLOR CORPORATION

SPECIAL REPORTS

M.4.1	Geological Investigation Reports	July 24, 1985
M.4.2	Consent Order Progress Report	October 11, 1985
M.4.3	Consent Order Completion Report	October 30, 1986

M.4

buffalo
COLOR CORPORATION
p.o. box 7027 / buffalo, new york 14240
716-827-4500

July 24, 1985

Richard Walka
Chief, Solid Waste Branch
United States Environmental
Protection Agency
Region II
26 Federal Plaza
New York, New York 10007

Dear Mr. Walka:

We have received the report (attached) from our geologist concerning the nature of the strata beneath our surface impoundments with particular respect to the possible existence of a perched aquifer on top of the (25-30 feet) thick silty clay layer which underlies the entire area.

As we understand the problem, there is a concern that in the event of a leak from the lagoons, pollutants would travel undetected through the permeable upper strata. In order to respond to this concern, it would seem necessary to place at least one well in the shallow aquifer where it could detect leaks which may appear in the clay liners of the lagoons.

A necessary precondition for the installation of such a well is a knowledge of the gradient of the shallow aquifer. The geologist's report says that the existing leak detection system wells are screened within the shallow aquifer. They can therefore be used to determine the existence or non-existence of a producing upper aquifer and the water table gradient. If a stable gradient is determined to exist, then a decision can be made as to where this additional well and then subsequent wells are to be placed. We would like your concurrence on this proposal before we proceed.

We are very concerned about the cost of this exercise, to date, both in funds and in reputation. In 1981 we commenced sampling in the leak detection wells according to the schedule in the Federal Regulations. The preliminary evaluation by the EPA inspector was that this was correct procedure. Later, a consultant to EPA found the leak detection system to be inadequate to the EPA groundwater monitoring requirements and an

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west paterson, new jersey 07424
201-881-1700
toll free 800-631-0171

enforcement action was initiated. In response to that enforcement action seven new wells were dug into the deep aquifer and a great deal of expense was incurred in monitoring and analysis. Now it appears that we are on the threshold of a third round of monitoring, the enforcement action based on the inadequacy of the first round of monitoring is not resolved, and the ongoing expense of the second round appears to have been focused on an aquifer which is extremely unlikely ever to be affected by any leak from the impoundments.

Buffalo Color, as a good corporate citizen, will continue to meet both the letter and the spirit of the law. We have attempted in good faith to do what is right with respect to these complicated regulations and we will continue to do what is proper with respect to the upper aquifer. We, nevertheless, feel that the fines imposed under the enforcement action are excessive and inasmuch as they compound funds already spent inefficiently, they are counterproductive. We feel that the imposed fines should be credited to the funds either already spent on the second round of sampling, or on the cost of resolving the issues of the upper aquifer.

Yours truly,

T.J. Wlodarczak
Director of Operations

TJW/ck

CC: L. Franckowiak, BCC
D. Sauer, BCC
P. Counterman NYDEC Albany
R. Mitrey NYDEC - Region 9
F. Langone USEPA - Region II
P. Ingrisano USEPA - Region II
N. Schnabel NYDEC - Region 9
M. McIntosh NYDEC - Region 9
R. Woods USEPA - Region II
D. Griffin Battle, Fowler, Jaffin, Pierce & Kheel

THOMSEN ASSOCIATES

July 10, 1985

Mr. David Sauer
Buffalo Color Corporation
322 Lee Street
Buffalo, NY 14210

Reference: Groundwater Near Lagoons

Dear Mr. Sauer:

The purpose of this letter is to address the questions concerning groundwater in the vicinity of your lagoons included in your Purchase Order Number 26 50430 of June 20, 1985.

We have constructed two cross sections through the area of your lagoons to depict subsurface deposits and the deep groundwater flow regime. Drawing No. 1 shows the location of the cross-sections. Cross Section A-A' (Drawing No. 2) extends from well MW-7 southeast toward the Buffalo River through PVS Chemicals. Cross Section B-B' (Drawing No. 3) extends from well MW-2 through the corner of Lagoon 3 to well MW-7 then east through Lagoons 1 and 2 to well MW-6.

The cross sections were constructed using information from four sources: 1) the groundwater monitoring system report for your facility (Thomsen Associates, 1984), 2) the groundwater monitoring system report for PVS Chemicals (Empire Soils Investigations, Inc., 1985), 3) the soils and foundation investigation for the waste treatment plant (Joseph S. Ward and Associates, 1969) and 4) plans supplied by Buffalo Color concerning the lagoons and leak detection system.

The existing monitoring wells around the lagoons and on PVS property (MW-1 through MW-7 and B-1 and B-2) are monitoring the deep aquifer. As shown on Drawings 2 and 3, the well screens for these wells are located 45 to 60 feet below ground surface in a layer of silt, sand and gravel immediately above bedrock or in the underlying bedrock. The lower aquifer monitored by the wells is separated from the water table groundwater flow regime by a thick layer of silty clay. The silty clay is 26 to 39 feet thick beneath the area of the lagoons. This layer will restrict any downward migration of contaminants from the upper water table groundwater flow system to the lower aquifer

THOMSEN ASSOCIATES

monitored by the wells surrounding the lagoons. Although the thickness of the silty clay layer decreases beneath the PVS property, toward the Buffalo River, it is still at least 20 feet thick in this area, which will restrict downward migration of any contaminants from the water table groundwater flow system to the deeper aquifer.

The potentiometric surface shown on Drawings 2 and 3 is interpolated from water level measurements in the monitoring wells. The potentiometric surface probably does not coincide with the water table surface which could either be higher or lower than the potentiometric surface. During the drilling of monitoring wells MW-5 and MW-6, free standing water was encountered above the potentiometric surface of these wells, indicating the water table is probably higher than the potentiometric surface shown on Drawings 2 and 3.

The trench drains shown on Drawings 2 and 3 are part of the leak detector system. The "well screens" depicted on the drawings represent the diameter of slotted pipe installed in the trenches. As shown on Drawing No. 3, the trench drains around Lagoons 1 and 2 are below the potentiometric surface, so are probably also below the water table. At the time of measurement (January, 1985), the trench drains at Lagoon 3 were above the potentiometric surface. However, the water table is probably above the potentiometric surface so that these trench drains may also intercept the water table.

Since the trench drains for the leak detection system probably intercept the water table, water levels could be measured in the stand pipes (leak detection wells) to evaluate the direction of groundwater flow in the upper water table groundwater flow system.

The trench drains are above the top of the silt and clay layer. Although pumping water from the trench drains would probably depress the water table in the vicinity of the lagoons, the trench drains could not be used to depress the water table to the top of the clay layer. Water samples from the trench drains may also not be representative of water quality at the bottom of the water table aquifer due to the possibility of denser contamination at the top of the silt and clay stratum.

THOMSEN ASSOCIATES

If you have any questions about this letter, please do not hesitate to call me at 607-898-5881. We were pleased to be able to assist Buffalo Color Corporation on this matter and trust we can continue to assist you in the future.

Very truly yours,

EMPIRE-THOMSEN

Marjory B. Rinaldo-Lee

Marjory B. Rinaldo-Lee, C.P.G.S.

MRL:sdw
Enc.
cc: ESI-Buffalo
File

m5

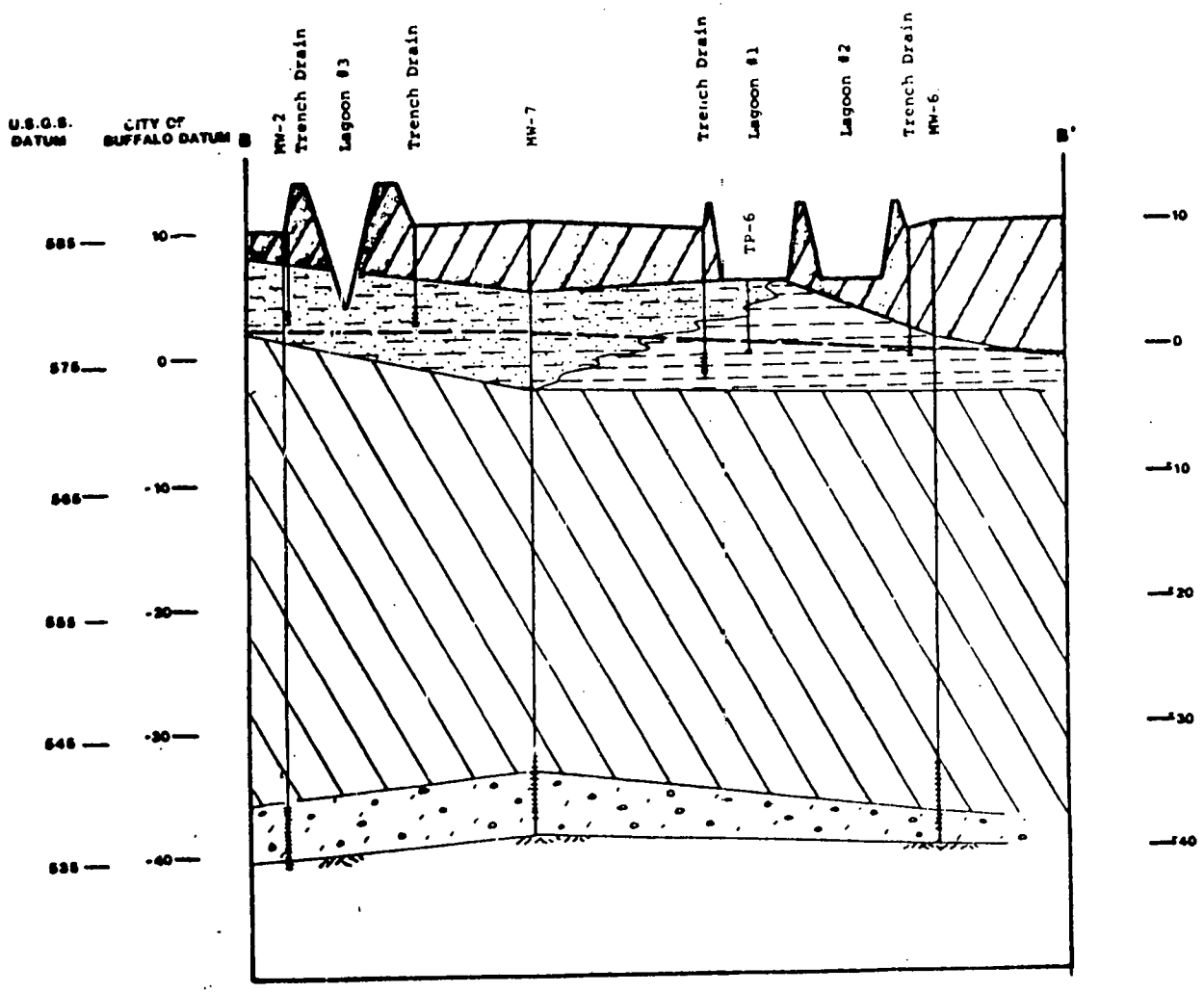
THOMSEN ASSOCIATES

References:

1. Empire Soils Investigations, Inc., 1985, "PVS Chemicals Groundwater Monitoring System".

2. Joseph S.Ward and Associates, 1969, "Report on Soils and Foundation Investigation, Waste Treatment Plant, Allied Chemical Corporation, Buffalo, New York", Prepared for Nebolsine, Toth and McPhee Associates.

3. Thomsen Assoicates, 1984, "Buffalo Color Corporation Groundwater Monitoring System and Groundwater Quality Assessment Outline".



SCALE: 1" = 100' Horizontal
10X - Vertical Exaggeration

ELEVATIONS REFERENCED TO CITY OF BUFFALO DATUM
0.0 CITY OF BUFFALO DATUM = 575.45 USGS DATUM

POTENTIOMETRIC SURFACE OF BEDROCK AQUIFER BASED ON WATER LEVEL MEASUREMENTS TAKEN ON 1-4-85

FILL

SAND & SILT

Clayey SILT

Silty CLAY

SILT, SAND & GRAVEL

Onondaga LIMESTONE

POTENTIOMETRIC SURFACE OF BEDROCK AQUIFER

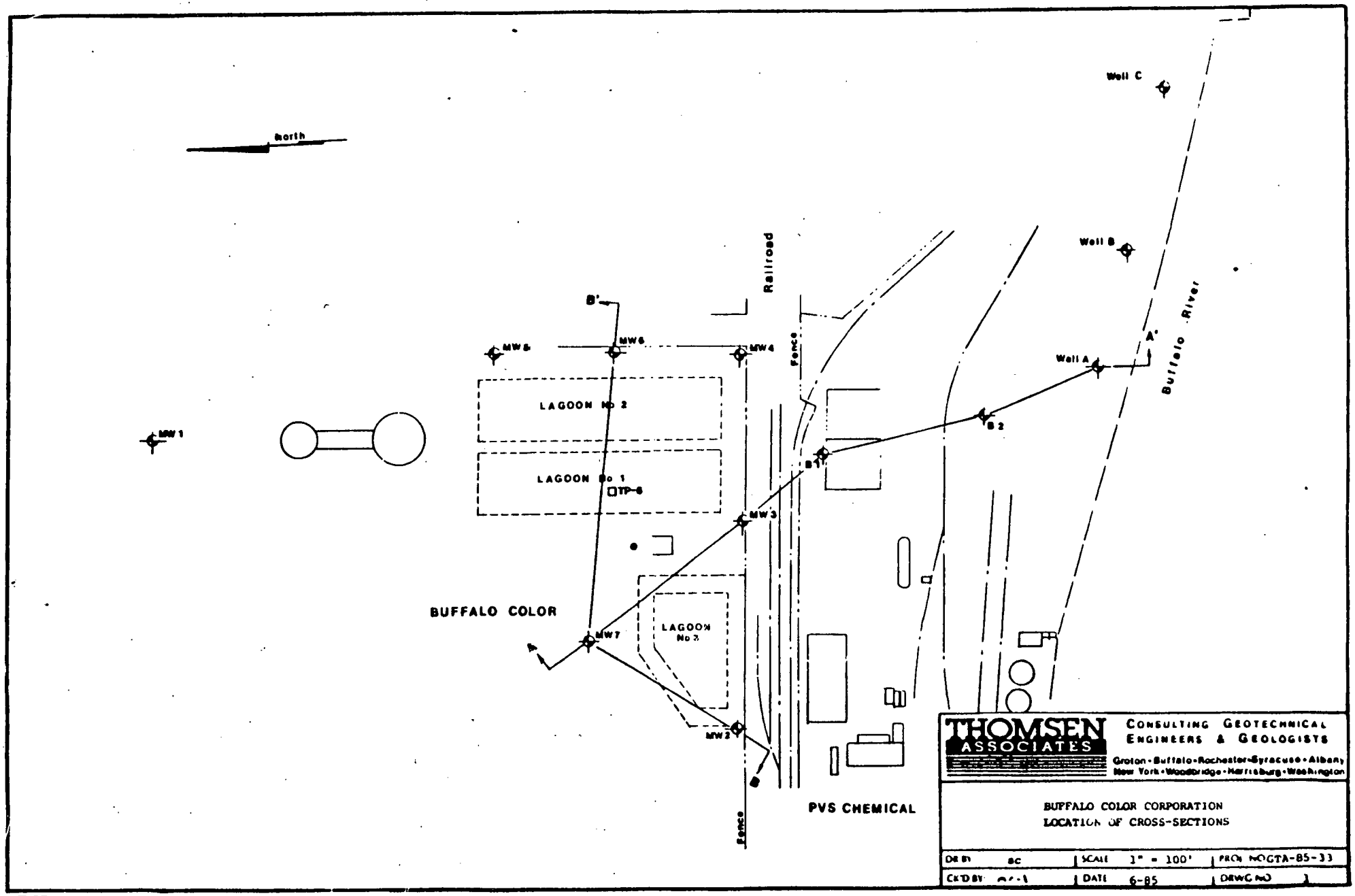
WELL SCREEN

THOMSEN ASSOCIATES

CONSULTING GEOTECHNICAL ENGINEERS & GEOLOGISTS
Groton • Buffalo • Rochester • Syracuse • Albany
New York • Edison, New Jersey

BUFFALO [illegible]LOR CORPORATION
CROSS-SECTION B - B'

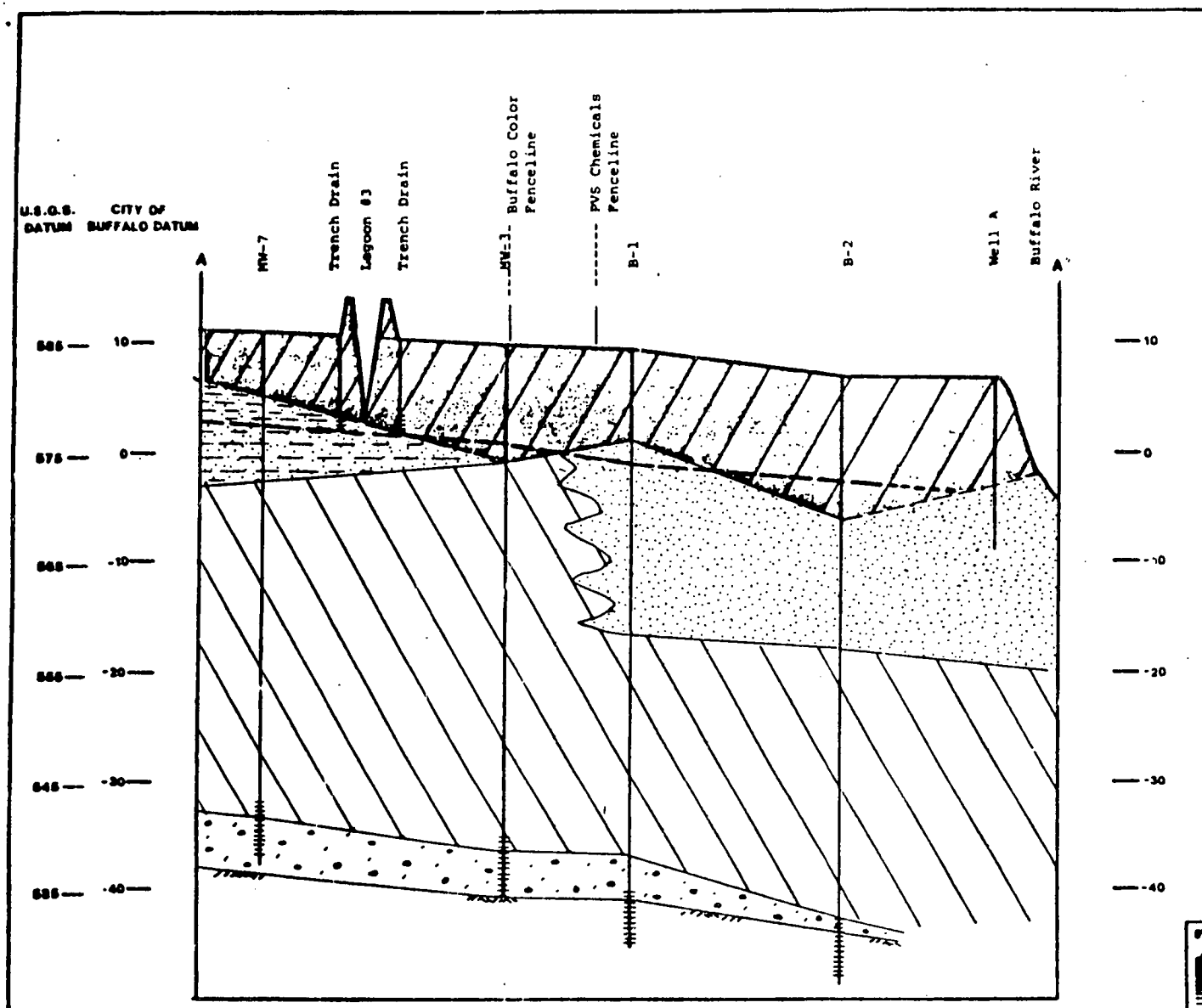
DR. BY: BC	SCALE: As Stated	PROJ NO. GTA-85-33	
CK'D. BY: [illegible]	DATE: 6-85	DRWG NO.: 3	



THOMSEN ASSOCIATES
CONSULTING GEOTECHNICAL ENGINEERS & GEOLOGISTS
Groton • Buffalo • Rochester • Syracuse • Albany
New York • Woodbridge • Harrisburg • Washington

BUFFALO COLOR CORPORATION
LOCATION OF CROSS-SECTIONS

DR BY	BC	SCALE 1" = 100'	PROJ NO GTA-85-33
CK'D BY		DATE 6-85	DRWG NO



SCALE: 1" = 100' Horizontal
10X - Vertical Exaggeration

ELEVATIONS REFERENCED TO CITY OF BUFFALO DATUM
0.0 CITY OF BUFFALO DATUM 575.45 USGS DATUM

POTENTIOMETRIC SURFACE OF BEDROCK AQUIFER BASED ON WATER LEVEL MEASUREMENTS TAKEN ON 1-4-85

- FILL
- SAND
- SAND & SILT
- Silty CLAY
- SILT, SAND & GRAVEL
- Onondaga LIMESTONE
- POTENTIOMETRIC SURFACE OF BEDROCK AQUIFER
- WELL SCREEN

THOMSEN ASSOCIATES

CONSULTING GEOTECHNICAL ENGINEERS & GEOLOGISTS
Groton • Buffalo • Rochester • Syracuse • Albany
New York • Edison, New Jersey

BUFFALO COLOR CORPORATION
CROSS-SECTION A - A'

DR. BY: BC	SCALE: As Stated	PROJ NO.	GTA-85-1
CK'D. BY: [illegible]	DATE: 6-85	DRWG. NO.	2

buffalo
COLOR CORPORATION

p.o. box 7027 / buffalo, new york 14240
716-827-4500

October 11, 1985

Christopher J. Daggett
Regional Administrator
United States Environmental Protection Agency
Region II
26 Federal Plaza
New York, New York 10007

Reference: Consent Order: BCC/USEPA Docket No. II RCRA-84-0222

Dear Mr. Daggett:

This constitutes the status report due under item two of the subject order of consent.

Buffalo Color Corporation has contracted Empire Soils (Thomsen Associates) to execute items 1 (a-e) of the appendix. Drilling of the wells has already commenced and we expect installation to be completed today or early next week. A copy of the contract is attached.

With regard to appendix item 1 (f) we have requested and received a summary of Mobil Oil's flows to the Buffalo Sewer Authority since 1981. These are attached and constitute the only known extractions of groundwater from the vacinity of the surface impoundments.

The regularly scheduled sampling of the lower aquifer wells (item 1 (g)) was conducted on September 19, 1985 in accord with 40 CFR 265.92 (b). The results and statistical comparisons will be submitted when available.

Yours truly,

David E. Sauer
Manager, Environmental Affairs

DES:dt

cc: T. J. Wlodarczak
L. J. Franckowiak
R. J. Kovalski
M. McIntosh - NYDEC - Region 9

4.3.1.13
D30

executive and sales offices
one garret mountain plaza
west paterson, new jersey 07424
201-881-1700
toll free 800-631-0171

buffalo COLOR CORPORATION

BUFFALO COLOR CORPORATION

PURCHASE ORDER

SHIPPING SCHEDULE	DATE PROMISED	DATE REQUIRED	DATE OF ORDER	TERMS	NUMBER
	10/3/85		10/1/85	N-30	26 | 51415

F.O.B. & WHT: Destination Freight Prepaid — 10/01/85

CHANGE NUMBER:

SELLER:
Empire Soils/Thomsen Associates
105 Corona Avenue
Groton, N.Y. 13073

SHIP TO US AT:
BUFFALO COLOR CORP.
322 LEE STREET
BUFFALO, NY 14210

INVOICING INSTRUCTIONS
SEND INVOICE IN TRIPLICATE TO:
BUFFALO COLOR CORP.
P.O. BOX 7027
BUFFALO, N.Y. 14240

SUBJECT TO SALES TAX: [X] YES [ ] NO

SHIP VIA & ROUTING:

CONF: Marjory Rinaldo Lee

REQUISITION NUMBER: BM #1

ITEM	QUANTITY ORDERED	DESCRIPTION	PRICE
1.	lot	Vendor to supply all labor, tools, equipment, material, facilities, supervision and professional service necessary to install a ground water monitoring system as outlined in Buffalo Color Corporation Engineering Specification #1, G.O. #990-305. All calculations and reports required by the specification shall be performed. Drill augers to be steam cleaned between wells. The final report is due to Buffalo Color Corporation, Project Engineering, attn: D. Kautz, no later than October 25, 1985. Work to begin on October 2, 1985. Any questions are to be directed to Dave Kautz at 827-4575. (Continued on page 2) Plus Sales Tax	8600.00/lot

Kautz/Beakman

BY W C Beakman — PAGE ____ OF ____
AUTHORIZED SIGNATURE OF BUYER

BUFFALO COLOR CORP.
P.O. BOX 7027
BUFFALO, N.Y. 14240
SEND ACKNOWLEDGMENT AND CORRESPONDENCE TO BUYER

VENDOR CODE NUMBER	SUB	CK	VOUCHER MO.	VOUCHER NUMBER	DUE DATE	RECEIVING REPORT NO.	PART.	FINAL	GROSS / TARE / NET
013114									

ITEM	CO.	LOC.	COST CENTER	GENERAL LEDGER ACCOUNT	PROJECT CODE: JOB NO. / DASH / PRODUCT CODE: GROUP / CODE / CONT.	V	C	WEIGHT OR QUANTITY	NET DISTRIBUTION AMOUNT	CASH DIS COUNT	*INVOICE NO.
1.	1	26	0990	82452	305						

SUB[illegible]G DIV. NO.	ORIGINATING LOC. NO.	DATE UNLOADED	DATE REPORTED	F/B NO.	FREIGHT CHARGES	RECEIVED BY
REQUIRED ONLY IF DIFFERENT FROM ABOVE						

WHERE PLACED	EXTENSIONS CHECKED	PLANT ACCOUNTING SIGNATURE · DATE	VOUCHER APPROVED FOR PAYMENT · DATE

* LAST 8 CHARACTERS OF VENDORS INVOICE NO. IF NONE USE INVOICE DATE.

C-3077

buffalo COLOR CORPORATION

CONTINUATION SHEET
PURCHASE ORDER

AT

NUMBER	CHANGE NO.
26-51415	

ITEM	QUANTY ORDERED	DESCRIPTION	PRICE

Total material $1,775.00
Total labor 6,325.00

Total cost $8,600.00

Contractor shall observe and abide by applicable laws, regulations, ordinances and other rules of the Federal Government, the State of New York, and the City of Buffalo. Of particular importance is that the contractor fully understands and enforces the OSHA regulations as they apply to this project.

Buffalo Color Corporation is not responsible for damage to, or theft of, any construction equipment and/or tools owned or rented by the contractor or any of his subcontractors.

Note:
1. Contractor to comply with Buffalo Color Corporation's insurance and safety requirements per attached. Special emphasis is placed on mandatory wearing of hard hats and safety glasses with approved side shields when on plant property. Also, shirts or jackets with long sleeves must be worn at all times.
2. Contractor's personnel to use the construction gate for entering or leaving plant property.
3. Contractor to contact Jack O'Sullivan at 827-4567 before entering the plant, or for change in schedule.
4. No additions or deletions to this contract or project scope will be accepted without a written change order instituted through and processed by owner's (BCC) Purchasing Department prior to the commencement thereof.

CONFIRMING ORDER - DO NOT DUPLICATE

PAGE___OF___

C-3059 (4/74)

THOMSEN ASSOCIATES

September 26, 1985

Mr. William Beakman
Purchasing Department
Buffalo Color Corporation
340 Elk Street
Buffalo, NY 14240

Dear Mr. Kautz:

Empire Soils Investigations, Inc. and our affiliate Thomsen Associates, is pleased to present this proposal for installing a groundwater monitoring system around the waste treatment lagoons for your Buffalo, New York Facility as outlined in Engineering Specification #1, C.O.#990-305. Our proposal for installing the monitoring wells is divided into two sections; 1) Scope of Services, in which our technical approach and methodology are described and 2) Cost Estimate, in which the cost associated with the proposed services are itemized.

1. Scope of Services

Empire Soils Investigations, Inc. will install five (5) groundwater monitoring wells in the vicinity of Buffalo Color Corporation Wastewater Treatment Lagoons; four (4) shallow wells and one (1) deep well.

Three shallow wells will be installed to characterize the shallow ground water flow regime. Two wells will be installed south of Lagoons 1 and 2 and one well will be installed near MW-7 to serve as an upgradient shallow monitoring well. One cluster well pair consisting of one shallow well and one deep well will be installed south of Lagoon #3 to 1) investigate vertical gradients between the shallow aquifer and deep aquifer systems and 2) provide a monitoring point downgradient of Lagoon #3.

The monitoring wells will be installed inside hollow stem augers. The hollow stem augers will permit soil sampling during drilling in order to determine the depth at which the wells will be placed and stabilize the borehole to facilitate well installation at the desired depth. Continuous soil samples will be taken with a split barrel sampler for the shallow wells. Soil samples will be taken very 5 feet for the deeper well.

The shallow wells will be drilled to a minimum depth of 5 feet below the water table. The deep well will be drilled to bedrock. The bottom of the well screen will be placed at a depth of at least 5 feet below the water table for the shallow wells and at the bedrock surface for the deep well.

A clean, medium grained, silica sand will be placed around the well screen and extend to the base of the silt and clay layer. Above the sand pack, a one foot (1') layer of bentonite pellets will be used to seal the annular space between the borehole and the monitoring well. The remaining annular space above the bentonite pellet seal will be filled with a cement-bentonite grout, thus limiting surface water infiltration into the borehole. A locking metal protector pipe will be cemented over the riser pipe to deter vandalism.

The wells will be constructed using three inch diameter pipe with a stainless steel well screen and galvanized steel riser pipe. The well screen will be 5 feet long.

Precautions will be taken during drilling to minimize the possibility of cross contamination. The assumed upgradient well (near MW-7) will be installed first and the augers steam cleaned after drilling each hole. In addition, the sampling spoons used to obtain soil samples will be rinsed in clean water between each sample.

After installing the wells, the locations and elevation of the wells will be surveyed by Empire Soils Investigations, Inc. based on a benchmark and site plans provided by Buffalo Color Corporation. The wells will also be developed by a combination of bailing and surging.

THOMSEN ASSOCIATES

A geologist from Thomsen associates will supervise all drilling and well installation together with measuring the groundwater at the required intervals. In addition, the geologist will perform "slug" tests following the methodology of Bouwer and Rice (1974) at the four shallow wells.

Following completion of the field work and data analysis, a report will be prepared by a Professional Hydrogeologist (Certified Professional Geological Scientist) which will include:

- o Description of Investigative Methodology
- o Boring Logs and Well Construction Details
- o Potentiometric and Water Level Contour Maps
- o Analysis of ground water flow direction in both the shallow and deep aquifer systems including impacts of any local water supply wells on ground water flow direction.

The cost of our services for completing Engineering Specification #1, C.O.#990-305 are as follows:

Field Investigation	
-Mobilization and Demobilization	$ 300.00
-Drilling in Overburden w/6 1/4" I.D. hollow stem augers, 110 lf @$19/lf	$2,090.00
-Installation of 3" I.D. Galvanized Well with Stainless Steel Screens 110 lf @ $20/lf	$2,200.00
-Locking Metal Protector Pipes 5 @ $125/ea.	$ 625.00
-Geologist, 38 hrs @ $35/hr.	$1,330.00
-Surveying Crew, 4 hrs @ $60/hr.	$ 240.00
-Mileage, 100 miles @ $0.25/mi.	$ 25.00
	$6,810.00
Report	
-Geotechnical Engineer, P.E., 1 hr @ $55/hr.	$ 55.00
-Hydrogeologist, CPGS, 20 hrs @ $50/hr.	$1,000.00
-Draftsperson, 3 hrs @ $20/hr.	$ 60.00
	$1,115.00
TOTAL	$7,925.00

THOMSEN ASSOCIATES

Additional Recommended Costs

Field Investigation	
Steam Cleaner Mobilization	$ 200.00
Steam Cleaning, 5 hrs @ $95/hr.	$ 475.00
TOTAL	$ 675.00
TOTAL RECOMMENDED BUDGET	$8,600.00

We are in a position to begin work during the week of September 30, 1985 and complete the work by October 25, 1985.

If this proposal meets with your approval, please sign the acceptance copy of this letter and return it to our office as formal authorization to proceed with this project.

Very truly yours,

EMPIRE-THOMSEN

Marjory B. Rinaldo-Lee

Marjory Rinaldo-Lee, C.P.G.S.

MRL:er
cc: Buffalo Office
File

TERMS: Net 30 days from invoice date; 1½%/mo. thereafter

ACCEPTED FOR:_____DATE:_____

E6

ENGINEERING SPECIFICATION #1

GROUND WATER WELLS

G.O. #990 - 305

1. a) A program of test borings capable of adequately describing the hydrogeologic characteristics of the upper-aquifer system (especially the zone within the upper-aquifer system that lies above the silty clay layer as described in the Thomsen report). A minimum of 3 test borings will be installed. This program shall provide for the presence of a qualified geologist to log and describe the materials encountered during the boring. The program shall also describe the methods proposed to stabilize selected holes until monitoring wells are installed.

b) A minimum of 3 monitoring wells shall be installed in order to characterize the ground-water flow regime and gradient within the upper-aquifer system. The wells must be capable of monitoring seasonal variations in the water table and be consistently screened in a zone representative of the upper aquifer system. Well completion data should be submitted including well materials and construction, along with screen intervals including slot-sizes. If the ground-water flow regime connot be adequately identified, additional test boring/wells will be required.

c) Cluster wells (both shallow and deep) shall be installed in the vicinity to the south of Lagoon #3 in order to identify/monitor a southerly ground-water flow direction.

d) The vendor shall use slug/pump tests where appropriate in order to determine the hydraulic conductivities within the upper-aquifer system, as well as, any interconnections with the lower aquifer system.

e) Potentiometric/water-level contour maps shall be included for all aquifer systems.

f) Any local water supply and production wells (on-site and off-site) should be investigated in order to ascertain the effects of such a system on the ground-water flow directions at the site. An approximate amount of ground-water pumpage shall also be included.

buffalo COLOR CORPORATION

P.O. NO.

JOB/G.O. NO. 990-305

FOR LOCATION: Buffalo

QUOTATION REQUEST NO.: B-090-5

DATE 9/30/85

DESCRIPTION: Ground Water Monitoring Wells Area E

BID COMPARISON

ITEM NO.	QUANTITY	Empire Soils	Earth Dimensions							
	5 wells	7925	18,200							
	Steam Clean	675	–							
TOTAL		8600	18,200							
FOB POINT/FRT.										
FRT. COST (EST)										
PAYMENT TERMS										
PRICES: FIRM OR SUBJ. TO ESCAL.										
DELIVERY										

AWARD BASED ON:

1. LOWEST PRICE
2. BEST DELIVERY
3. BETTER QUALITY
4. FEATURE OF MERIT
5. REQUIRED DESIGN
6. NEGOTIATED
7. PROPRIETARY ITEM
8. PRICE STABILITY
9. OTHER _____

(Circle appropriate nos. above)

REMARKS:

RECOMMENDED SUPPLIER: Empire Soils - Thomsen Assoc.

PREPARED BY: _____

PURCHASING AGENT

C-3020 (4-76)

BUFFALO SEWER AUTHORITY
SEWAGE TREATMENT WORKS
FT. W. FERRY STREET
BUFFALO, N.Y., 14213
716-883-1820

October 3, 1985

Mr. David E. Sauer
Manager, Environmental Affairs
Buffalo Color Corporation
P.O. Box 7027
Buffalo, New York 14240

Dear Mr. Sauer;

I have enclosed a copy of Mobil Oil's reported discharge to the Buffalo Sewer Authority from January 1, 1981 - August 31, 1985. These flows are reported in gallons on a monthly basis. If further information is needed please call.

Very truly yours,

Donald L. Menno
Industrial Waste Administrator

James Caruso
Associate Chemist
Industrial Waste Section

JC:gb

MOBIL OIL - FLOWS IN GALLONS

MONTH	1981	1982	1983	1984	1985
January	54,520,400	3,686,400	3,515,472	4,806,200	4,833,300
February	51,725,800	4,231,500	4,917,037	9,480,900	8,216,400
March	32,660,500	13,902,100	5,341,509	8,858,000	11,364,500
April	32,481,300	6,448,120	6,976,130	7,041,700	6,315,500
May	38,529,700	8,994,000	7,480,327	9,511,400	4,877,300
June	41,698,000	7,194,000	5,903,182	9,819,700	6,351,200
July	48,992,000	6,124,000	4,730,984	6,067,600	4,891,600
August	46,008,200	10,499,000	5,123,587	7,374,100	5,939,450
September	20,688,964	5,829,000	5,018,500	8,555,800	
October	18,511,476	4,601,300	9,577,600	3,632,800	
November	16,285,900	3,006,400	9,486,100	6,093,600	
December	6,846,100	12,465,119	12,854,700	6,307,600	

buffalo
COLOR CORPORATION

p.o. box 7027 / buffalo, new york 14240
716-827-4500

October 30, 1985

Christopher J. Daggett
Regional Administrator
United States Environmental
Protection Agency
Region II
26 Federal Plaza
New York, New York 10007

Reference: Consent Order BCC/USEPA Docket No. II RCRA-84-0222

Dear Mr. Daggett:

This constitutes the completion of the required actions under the subject order of consent.

Five new wells have been installed around the lagoons, including four (one upgradient, three downgradient) in the upper aquifer.

The various tests, drawings, logs, and determinations required by the terms of the order are either contained in the attached report by Thomsen Associates, or were included in the status report which was sent to you on October 11, 1985.

We expect sampling of the upper aquifer to commence during the first two weeks of November and then to proceed quarterly according to the regulations.

We understand that meeting the terms of the consent order here brings us into complaince with the groundwater monitoring requirements of the law and we will so indicate in our certification letter due before November 8, 1985.

Yours truly,

David E. Sauer
Manager, Environmental Affairs

DES:dt

cc: T. J. Wlodarczak
L. J. Franckowiak
R. J. Kovalski
F. Langone USEPA - Region II
M. McIntosh NYDEC - Region 9

4.3.1.13
D30.

executive and sales offices
one garret mountain plaza
west paterson, new jersey 07424
201-881-1700
toll free 800-631-0171

EMPIRE
SOILS INVESTIGATIONS INC.

BUFFALO COLOR CORPORATION
GROUNDWATER MONITORING SYSTEM

4.3.1.13

FOR
Buffalo Color Corporation
Buffalo, New York

Job No. GTA-85-33
October 1985

M6

105 CORONA AVENUE, GROTON, NY 13073, 607-898-5881

TABLE OF CONTENTS

THOMSEN ASSOCIATES

BUFFALO COLOR CORPORATION
GROUNDWATER MONITORING SYSTEM

1.0 INTRODUCTION

1.1 Project Initiation

Thomsen Associates and Empire Soils Investigations, Inc. were retained by Buffalo Color Corporation on September 30, 1985 under Purchase Order #26-51415C to install a shallow groundwater monitoring system around three waste water treatment lagoons at their facility in Buffalo, New York, and provide Buffalo Color Corporation with a report describing the methodology and findings of the investigation. This report presents the results of this investigation. The ground water monitoring system installed during this investigation is a second phase ground water monitoring system. Previously, Thomsen Associates installed a ground water monitoring system at the Buffalo Color Corporation facility to monitor groundwater quality at the bedrock/unconsolidated deposits interface. The results from the previous investigation are contained in our report entitled "Buffalo Color Corporation Groundwater Monitoring System and Groundwater Quality Assessment Outline, June 1984".

1.2 Purpose and Scope

The purpose of our investigation was to install groundwater monitoring wells in the shallow aquifer system to characterize the shallow ground water flow regime. The scope of the investigation included obtaining soil samples from the borings in order to determine the hydrogeologic characteristics of the

upper aquifer system, performing slug tests on the shallow wells to determine the hydraulic conductivity of the upper aquifer system, evaluating the degree of connection between the upper and lower aquifer system, determining the direction of ground water flow in both the upper and lower aquifer systems, and evaluating any impacts of local water supply and production wells on ground water flow directions.

1.3 Project Location

Buffalo Color Corporation is located in Buffalo, New York, north of the Buffalo River. The facility contains three wastewater treatment lagoons south of Elk Street which were the focus of the investigation (see Drawing No. 1). Topography in the vicinity of the lagoons is relatively flat with less than 5 feet of difference in elevation between borings. A railroad track south of the lagoons separates the Buffalo Color Corporation property from the adjacent PVS Chemical Property. The location of the monitoring wells installed in June 1984 (MW-1 through MW-7) and the monitoring wells installed for this investigation (MW-8 through MW-11) is shown on Drawing No. 2.

1.4 Methodology

1.4.1 Borings and Soil Sampling

A rotary drill rig was used to advance 5 borings and install 5 monitoring wells in the vicinity of the wastewater treatment lagoons (see Drawing No. 2). Continuous flight 6-1/4 inch ID hollow stem augers were used to facilitate soil sampling and stabilize the bore hole enabling the wells to be placed at the desired depth. The shallow borings (MW-8, MW-9, MW-10 and MW-11S) were advanced 15 feet to 24 feet below the ground surface. Boring MW-11D was drilled to a depth of 50 feet. (See Appendix A for boring logs.)

Soil samples were taken every two feet in the shallow borings (MW-8, MW-9, MW-10 and MW-11S). No soil samples were taken in MW-11D for the first 14 feet, then soil samples were taken every 5 feet until bedrock was encountered. All soil samples were taken using a split barrel sampler in general accordance with ASTM Method D-1586.

A visual description of the soils encountered in each boring is found on the boring logs (Appendix A). The soil classification was performed by a geologist.

1.4.2 Monitoring Wells

Monitoring wells were installed in each of the borings. The use of hollow stem augers facilitated well installation and placement of a sand pack around the well screen and a bentonite seal above the well screen. The wells were constructed using 3-inch ID stainless steel well screen and 3-inch ID black iron riser pipe with welded joints. The well screens are 5 feet long and have 0.01 inch slots.

A clean medium grained silica sand was placed around the well screens from the bottom of the bore hole to a height of 1 foot above the top of the well screen. A bentonite pellet seal was placed in the annular space above the sand pack. The remaining annular space was filled with a cement-bentonite grout to limit surface water infiltration. A locking metal protector pipe was cemented over the riser pipe to deter vandalism. Well construction details are shown on Drawing No. 1 in Appendix A.

To minimize the possibility of cross contamination, the augers were steam cleaned between each boring. In addition, the sampling spoons used to obtain the soil samples were rinsed in clean water between each sample.

1.4.3 Field Tests for Hydraulic Conductivity

Field tests to evaluate the hydraulic conductivity of they upper aquifer were performed following the methodology of Bouwer and Rice (1974) for "slug" tests. Slug tests were performed on wells MW-8, MW-9, MW-10 and MW-11S. (See Appendix B).

1.4.4 Surveying

The locations and elevations of the 5 wells were surveyed by personnel from Empire Soils Investigations, Inc. Horizontal locations of the borings and wells were determined in the field by taping distances from existing features. The elevation of the wells was determined by differential levelling. The benchmark used to determine the elevations of the wells was MW-7. All elevations are referenced to the City of Buffalo Datum. (0.00 City of Buffalo Datum = 575.45 USGS)

2.0 FINDINGS

2.1 Geology

The borings for the shallow wells encountered 4 to 10 feet of fill. Below the fill at borings MW-8, MW-9 and MW-10 was a layer of silt. Beneath the silt, or directly beneath the fill at MW-11 was a silty clay deposit which was 36 feet thick at MW-11D. Previous borings encountered 26 to 40 feet of silty clay beneath the site.

The top of the silty clay deposit was 6-13 feet below ground surface in the vicinity of Lagoon #3. However, the top of the silty clay deposit appears to dip to the southeast and was 19 feet below the ground surface at MW-8. Beneath the silty clay is a thin

sand and gravel deposit overlying limestone bedrock. (See Thomsen Associates 1984, for a more complete discussion of site geology.)

The shallow borings were terminated at a depth of 15 to 24 feet. The bottom of all borings except boring MW-9 was terminated in the silty clay deposit. The deep boring (MW-11D) was advanced through the silty clay deposit and underlying thin sand deposit to the top of bedrock. Limestone was found at a depth of 50 feet below ground surface at this boring.

2.2 Water Table Aquifer

The four shallow wells (MW-8, MW-9, MW-1D and MW-11S) were installed to investigate the shallow groundwater flow regime. Water level measurements from these wells are summarized in Table 1.

Water level measurements indicate the direction of groundwater flow in the shallow aquifer system is generally southward. (See Drawing No. 2). The water level measurements also indicate a trough in the water table around MW-8. The water level measured at MW-8 was 4 feet below that measured at MW-9. Water level measurements indicate that well MW-8 may not yet have stabilized on October 18, 1985, which would result in the "trough" shown on Drawing No.2

The only known shallow wells in the area which could influence ground water flow direction in the shallow aquifer are a system of well points on the Mobil Oil Corporation facility, southeast of Buffalo Color Corporation. Mobil Oil Corporation has a system of 160 well points along the Buffalo River, approximately 700 feet southeast of Lagoon No. 2. These well points pump approximately 150/gpm.

and discharge the water into the Buffalo Sewer Authority. The well point system probably accounts for the lower water elevation measured at well "C" compared to water levels at wells "B" and "A".

The results of the "slug" tests indicate the hydraulic conductivity of the silt layer beneath the fill is about $5x10^{-4}$cm/sec.(see Table 2). The horizontal hydraulic conductivity of the silty clay layer measured by the "slug" tests was about $7x10^{-5}$cm/sec. The horizontal gradient beneath the site is about 0.03 ft/ft.

Applying Darcy's law to estimate the average linear velocity of flow ($\bar{v} = Ki/n$ where $\bar{v}$ is average linear velocity of flow, k is hydraulic conductivity, i is hydraulic gradient and n is effective porosity) results in an average rate of flow of 0.4 ft/day (assuming $k = 5x10^{-4}$cm/sec, i = 0.03 ft/ft, and n = 0.1).

Previous borings in the vicinity of the lagoons (MW-1 through MW-7) and MW-11D indicate the silty clay layer separating the water table aquifer from the deep aquifer is 24 to 40 feet thick. The vertical gradient measured between MW-11S and MW-11D is 0.006 ft/ft downward. Assuming a vertical hydraulic conductivity of $1x10^{-7}$cm/sec for the silty clay, a vertical hydraulic gradient of 0.006 and a porosity of 0.1, the average vertical linear velocity of groundwater flow is about $1.7x10^{-5}$ ft/day. Based on the measured vertical gradients between MW-11S and MW-11D there is some connection between the upper water table aquifer and the deep aquifer beneath the silty clay. However, the slow rate of ground water flow through the silty

clay and the thickness of the silty clay unit minimizes the connection between the two aquifers.

2.3 Deep Aquifer

The deep aquifer referred to in this report consists of the sand unit above bedrock and the top of the bedrock. Water level measurements were taken in the wells previously installed at Buffalo Color (MW-1, MW-2, MW-3, MW-4, MW-5, MW-6, MW-7), in two wells on PVS Chemicals property (B-1 and B-2) and in the newly installed deep well (MW-11D) to evaluate the direction of ground water flow in the deeper aquifer (see Table 1).

The water level elevations indicate the direction of groundwater flow in the deep aquifer system is toward the east-southeast (see Drawing No. 3).

There are no known water supply wells which pump water from the bedrock/soil interface within one quarter mile of Buffalo Color Corporation.

3.0 CONCLUSIONS

The direction of groundwater flow in the shallow aquifer system appears to be southward. However, additional water level measurements are needed in the shallow wells to confirm the direction of groundwater flow because well MW-8 may not be stabilized. The direction of groundwater flow in the deep aquifer is toward the east-southeast.

The results of the field hydraulic conductivity tests indicate the horizontal hydraulic conductivity of the silt layer beneath the fill is about 5×10^{-4} cm/sec and the horizontal hydraulic conductivity of the silty clay layer beneath the silt is about 7×10^{-5} cm/sec. Based on measured values for hydraulic conductivity and hydraulic gradient, the average linear velocity of groundwater flow is estimated to be 0.4 ft/day.

A downward vertical gradient was measured between wells MW-11S and MW-11D. However, given the thickness of the silty clay unit and estimated low vertical hydraulic conductivity of this unit, there is very little connection between the upper water table aquifer and the deep aquifer. The estimated rate of groundwater flow downward through the silty clay unit is about 2×10^{-5} ft/day.

4.0 REFERENCES

1. Bouwer, H. and R. C. Rice, 1976, "A Slug Test for Determining Hydraulic Conductivity of Unconfined Aquifers with Completely or Partially Penetrating Wells", Water Resources Research, V. 12, No. 3, pp. 423-428.

2. Thomsen Associates, 1984, "Buffalo Color Corporation Groundwater Monitoring System and Groundwater Quality Assessment Outline".

Respectfully submitted,

EMPIRE-THOMSEN

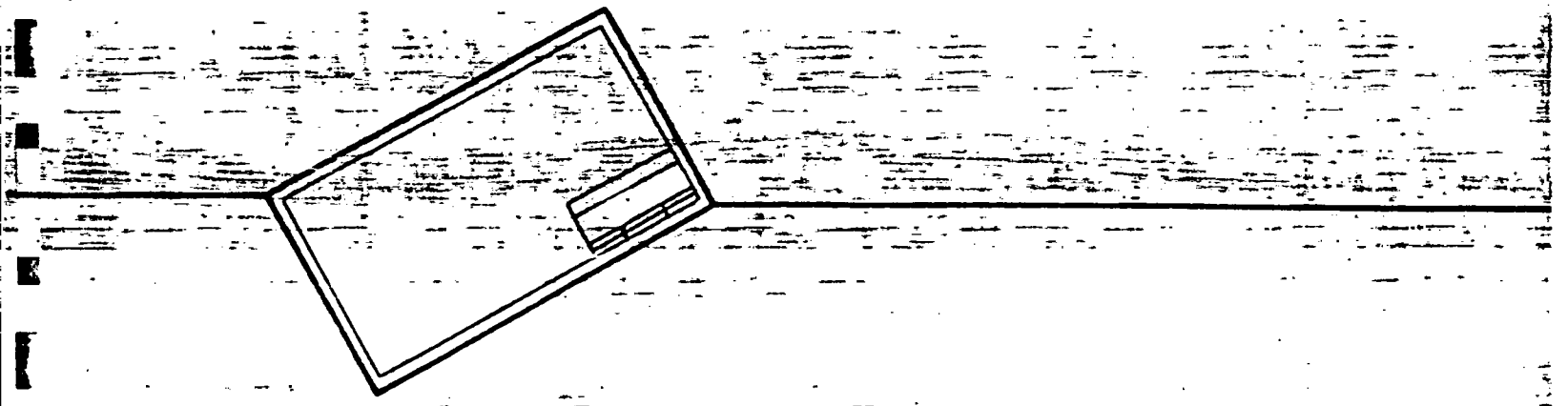
Marjory Rinaldo-Lee

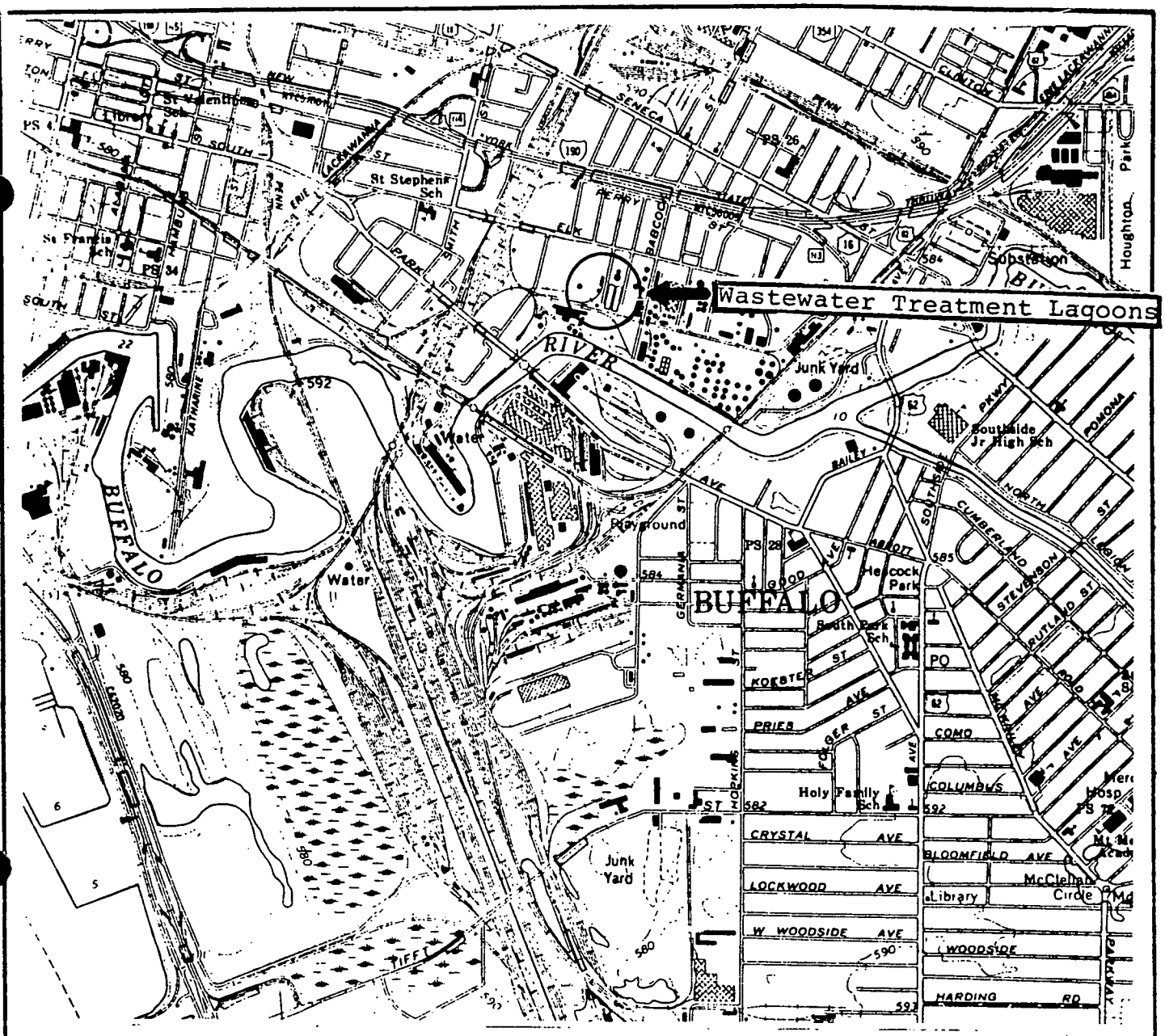
Marjory Rinaldo-Lee, C.P.G.S.

Charles T. Gaynor, II

Charles T. Gaynor, II, P. E.

DRAWINGS





BUFFALO SE QUADRANGLE
NEW YORK–ERIE CO.
7.5 MINUTE SERIES PLANIMETRIC

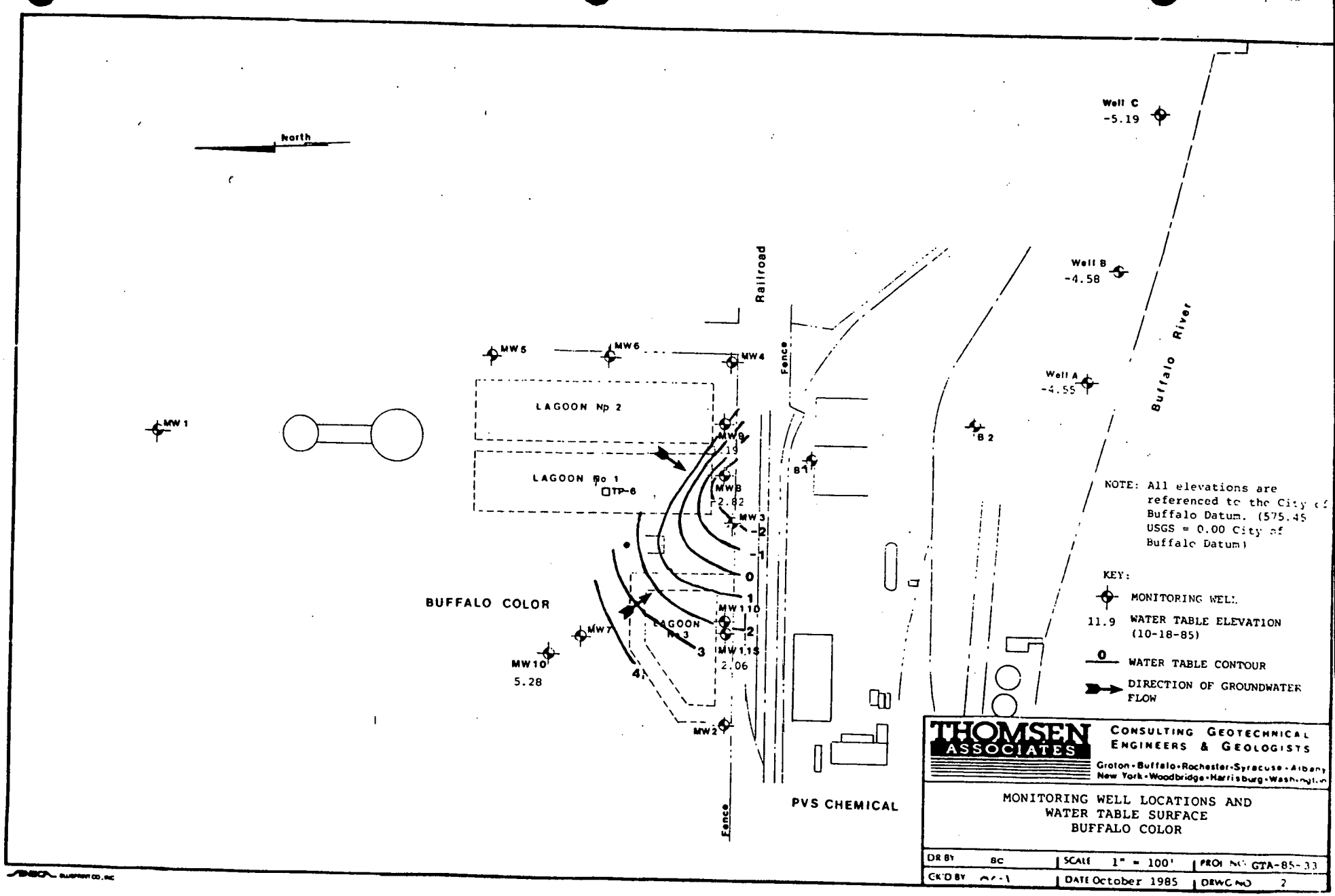
EMPIRE SOILS INVESTIGATIONS INC

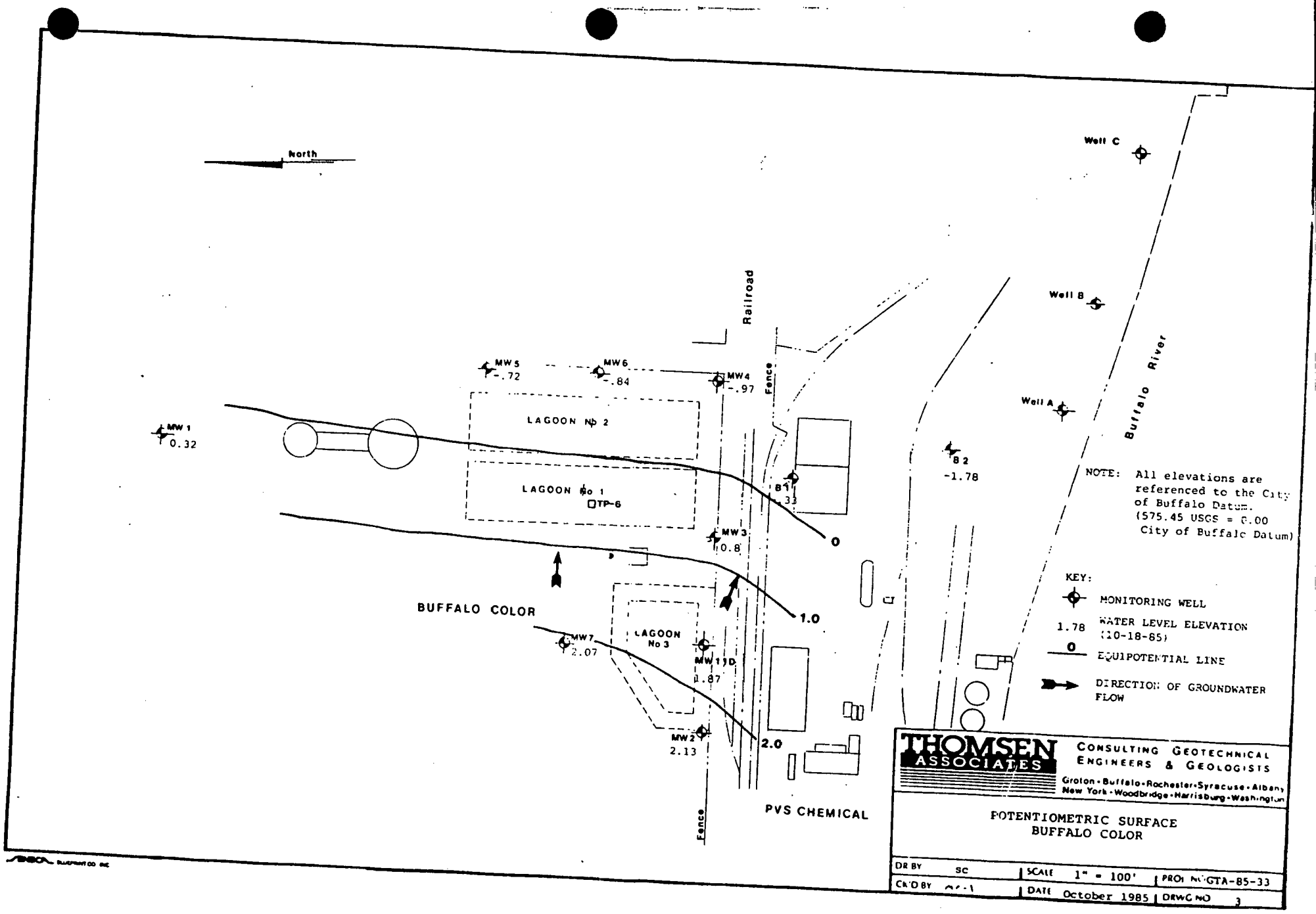
SUBSURFACE INVESTIGATION PLAN

BUFFALO COLOR CORPORATION
SITE LOCATION

DR.BY. MR-L	SCALE: 1"=2000'	PROJ. NO. BD-84-53
CK'D BY. MR-L	DATE: April 1984	DRWG.NO. 1

R/T FORM R-1


North
Well C
-5.19
Well B
-4.58
Well A
-4.55
Railroad
Fence
Buffalo River
MW5
MW6
MW4
MW1
LAGOON No 2
LAGOON No 1
TP-6
MW9
19
MW8
2.82
MW3
B1
B2
-2
-1
0
1
2
3
4
BUFFALO COLOR
MW7
MW10
5.28
LAGOON No 3
MW11D
MW11S
2.06
MW2
PVS CHEMICAL
NOTE: All elevations are referenced to the City of Buffalo Datum. (575.45 USGS = 0.00 City of Buffalo Datum)
KEY:
MONITORING WELL
11.9 WATER TABLE ELEVATION (10-18-85)
0 WATER TABLE CONTOUR
DIRECTION OF GROUNDWATER FLOW
THOMSEN ASSOCIATES
CONSULTING GEOTECHNICAL ENGINEERS & GEOLOGISTS
Groton • Buffalo • Rochester • Syracuse • Albany
New York • Woodbridge • Harrisburg • Washington
MONITORING WELL LOCATIONS AND WATER TABLE SURFACE
BUFFALO COLOR
DR BY BC
SCALE 1" = 100'
PROJ NO GTA-85-33
CK'D BY
DATE October 1985
DRWG NO 2


North
Well C
Well B
Well A
Buffalo River
Railroad
Fence
MW5
-.72
MW6
-.84
MW4
-.97
MW1
0.32
LAGOON No 2
LAGOON No 1
TP-6
B1
-.33
B2
-1.78
MW3
0.8
0
1.0
2.0
BUFFALO COLOR
MW7
2.07
LAGOON No 3
MW11D
1.87
MW2
2.13
PVS CHEMICAL
Fence
NOTE: All elevations are referenced to the City of Buffalo Datum. (575.45 USGS = 0.00 City of Buffalo Datum)
KEY:
MONITORING WELL
1.78 WATER LEVEL ELEVATION (10-18-85)
0 EQUIPOTENTIAL LINE
DIRECTION OF GROUNDWATER FLOW
THOMSEN ASSOCIATES
CONSULTING GEOTECHNICAL ENGINEERS & GEOLOGISTS
Groton • Buffalo • Rochester • Syracuse • Albany
New York • Woodbridge • Harrisburg • Washington
POTENTIOMETRIC SURFACE
BUFFALO COLOR
DR BY SC
SCALE 1" = 100'
PROJ NO GTA-85-33
CK'D BY
DATE October 1985
DRWG NO 3

TABLES

TABLE 1

Summary of Water Level Elevations

Well	Reference Elevation	Water Level 10-10-85	10-11-85	10-12-85	10-14-85	10-17-85	10-18-85
MW-1	9.93	-	-	-	-	-	0.32
MW-2	11.20	-	-	-	-	-	2.13
MW-3	12.24	-	-	-	-	-	0.80
MW-4	12.03	-	-	-	-	-	-0.97
MW-5	12.33	-	-	-	-	-	-0.72
MW-6	11.74	-	-	-	-	-	-0.84
MW-7	13.29	-	-	-	-	-	2.07
MW-8	14.13	-3.17	-3.17	-3.17	-3.08	-3.02	-2.82
MW-9	14.14	0.67	1.34	0.04	1.00	1.16	1.19
MW-10	14.00	-3.90	-	4.70	4.81	5.20	5.28
MW-11S	13.01	-	-2.29	-2.24	0.55	2.44	2.06
MW-11D	11.66	-	-	-	2.04	1.88	1.87
B-1	11.01	-	-	-	-	-	-0.33
B-2	9.12	-	-	-	-	-	-1.78
"A"	10.13	-	-	-	-	-	-4.55
"B"	9.67	-	-	-	-	-	-4.58
"C"	10.20	-	-	-	-	-	-5.19
River	-	-	-	-	-	-	-1.22

NOTES

1. All elevations are referenced to City of Buffalo Datum. (575.45 USGS = 0.00 City of Buffalo)
2. "-" indicates no water level reading.
3. River elevation measured from top of well "C"

TABLE 2

Field Hydraulic Conductivity Test Results

Well	Soil Type	Hydraulic Conductivity (cm/sec)
MW-8	Silt	8.4×10^{-4}
MW-9	Silt	2.8×10^{-4}
MW-10	Silty Clay	6.5×10^{-5}
MW-11	Silty Clay	7.1×10^{-5}

Note: See Boring Logs in Appendix A for complete description of soil type.

APPENDIX A

Boring Logs and Well Construction Details

DATE
STARTED 10/7/85
FINISHED 10/8/85
SHEET 1 OF 1

EMPIRE SOILS INVESTIGATIONS INC. **SUBSURFACE LOG**

HOLE NO. MW-8
SURF. ELEV.
G. W. DEPTH See Note

PROJECT Buffalo Color

LOCATION 340 Elk Street, Buffalo, N.Y.

DEPTH-FT	SAMPLES	SAMPLE NO	BLOWS ON SAMPLER 0/6	6/12	12/18	N	pH	SOIL OR ROCK CLASSIFICATION	NOTES
0		1	18	36			-	Gray Crushed Stone (damp, FILL)	Reference pH (distilled water) = 6.5
			31	21		67			
		2	60	30			6.0		
			27	21		57			
		3	7	7			-	Brown f-c SAND, little Silt (moist, FILL)	
5			3	4		10			
		4	8	8			6.5	Gray SILT, occasional Clay lenses, little fine Sand (moist, firm)	
			11	12		19			
		5	2	2			6.5		
			4	6		6		(loose)	
10		6	2	2			6.5	Contains decayed Wood pieces	Observation well installed at 19.9 feet:
			3	3		5			0.0' - 14.9' 3" black steel riser
		7	3	8			-	(moist-wet)	
			7	7		15			14.9' - 19.9' 3" stainless well screen
15		8	2	3			-		
			2	3		5			0.0' - 11.9' Grout seal
		9	5	6			-		
			7	8		13		(firm)	11.9' - 13.9' Bentonite seal
		10	WOH/1.0'				-		
			2	3		-			
20		11	2	3			6.5	Gray-brown Silty CLAY with occasional Silt partings (moist-wet, soft)	13.9' - 24.0' Sand filter
			3	3		6			
		12	3	3			-	Contains occasional Silt seams (medium)	4" diameter protective casing at surface
			3	3		6			
								Boring Completion at 24 feet	No free standing water encountered at Boring Completion; moist-wet samples noted at 12' to 24.0'
25									Free standing water readings (with reading to top of riser) 2.92' stick-up

Date	Water
10-10-85	17.3'
10-11-85	17.3'

No blows to drive 2 " spoon 12 " with 140 lb. pin wt. falling 30 "per blow.

C = No blows to drive ____ " casing ____ " with ____ lb. weight falling ____ "per blow.

CLASSIFICATION Visual By Geogolist

METHOD OF INVESTIGATION 6¼" ID Hollow Stem Auger

B/T Form H

DATE
STARTED 10/8/85
FINISHED 10/8/85
SHEET 1 OF 1

EMPIRE SOILS INVESTIGATIONS INC. — **SUBSURFACE LOG**

HOLE NO. MW-9
SURF. ELEV.
G. W. DEPTH See Note

PROJECT Buffalo Color

LOCATION 340 Elk Street
Buffalo, N.Y.

DEPTH-FT	SAMPLES	SAMPLE NO	BLOWS ON SAMPLER 0/6	6/12	12/18	N	BLOW ON CASING C	SOIL OR ROCK CLASSIFICATION	NOTES
0		1	19	20				Gray Crushed Stone (moist, FILL)	
			11	12		31			
		2	8	8					
			14	15		22		Gray-brown Silty CLAY, trace sand (moist, FILL)	
		3	5	6					
5			10	20		16		Black CINDERS and f-c Sand, trace brick (moist, FILL)	
		4	4	6					
			4	7		10		Gray SILT, little f-c Sand, trace gravel, trace brick (moist, FILL)	Observation well installed at 15.0 feet:
		5	3	5					
			5	6		10		Contains ashes	0.0'-10.0' 3" black riser
10		6	2	2				Gray SILT, little f-m Sand, trace decayed wood, trace clay (moist, loose)	10.0'-15.0' 3" stainless well screen
			3	3		5			0.0'-7.0' Grout
		7	4	5					7.0'-9.0' Bentonite seal
			7	7		12		(Firm)	9.0'-18.0' sand filter
		8	2	2					4" diameter protective casing at surface
15			3	3		5		Contains fine Sand seams (loose)	3.2 feet stick-up
		9	4	5					
			5	6		10		(Wet)	
								Boring Completion at 18.0 feet	No free standing water encountered at Boring Completion; wet samples noted at 16 to 18 feet
20									Free standing water readings:
									Date / Water
									10-10-85 13.5'
									10-11-85 12.8'
									With readings to top of riser

No blows to drive 2 " spoon 12 " with 140 lb. pin wt. falling 30 "per blow.

C = No blows to drive _____ " casing _____ " with _____ lb. weight falling _____ "per blow.

CLASSIFICATION Visual By Geologist

METHOD OF INVESTIGATION: 6¼" ID Hollow Stem Auger

R/T Form H

DATE
STARTED 10/9/85
FINISHED 10/9/85
SHEET 1 OF 1

EMPIRE SOILS INVESTIGATIONS INC.

SUBSURFACE LOG

HOLE NO. MW-10
SURF. ELEV.
G. W. DEPTH See Note

PROJECT Buffalo Color

LOCATION 340 Elk Street
Buffalo, N.Y.

DEPTH-FT.	SAMPLES	SAMPLE NO	BLOWS ON SAMPLER 0/6	6/12	12/18	N	BLOW ON CASING C	SOIL OR ROCK CLASSIFICATION	NOTES
0		1	8	20				Black Cinders, some f-c Sand, trace silt (moist, FILL)	
			36	40		56			
		2	18	8				Black & tan SILT and fine Sand, trace brick trace cinders (moist, FILL)	
			9	15		17			
		3	1	1				Brown-gray SILT and fine Sand (moist-wet, loose)	
5			1	2		2			
		4	6	6				Gray-brown Silty CLAY, with occsional Silt partings (moist, stiff)	Observation well installed at 15.0 feet:
			15	16		21			
		5	7	8					0.0'-10.0' 3" black riser
			15	21		23		Contains occasional tan, fine Sand partings	
10		6	3	4				Becomes gray (medium)	10.0'-15.0' 3" stainless well screen
			5	4		9			0.0'-7.0' Grout seal
		7	6	7				(moist-wet)	7.0'-9.0' Bentonite seal
			7	6		14			
		8	1	2				Contains occastional Silt seams, trace gravel (wet, soft)	9.0'-18.0' Sand filter
15			2	3		4			
		9	3	3				(medium)	
			4	5		7			
								Boring Completion at 18.0 feet	No free standing water encountered at Boring Completion
20									Moist-wet to wet samples noted at 12 to 18 feet
									Free standing water readings:
									Date / Water
									10-10-85 / 17.9'
									From top of riser (2.9 foot stick-up)

No blows to drive 2 " spoon 12 " with 140 lb pin wt falling 30 "per blow.

C = No blows to drive ____ " casing ____ " with ____ lb. weight falling ____ "per blow.

CLASSIFICATION Visual by Geologist

METHOD OF INVESTIGATION 6¼" ID Hollow Stem Auger

B/T Form H

DATE
STARTED 10/9/85
FINISHED 10/9/85
SHEET 1 OF 1

EMPIRE SOILS INVESTIGATIONS INC. **SUBSURFACE LOG**

HOLE NO. MW-11S
SURF. ELEV.
G. W. DEPTH See Note

PROJECT Buffalo Color
LOCATION 340 Elk Street, Buffalo, N.Y.

DEPTH-FT	SAMPLES	SAMPLE NO	BLOWS ON SAMPLER 0/6	6/12	12/18	N	BLOW ON CASING C	SOIL OR ROCK CLASSIFICATION	NOTES
		1	4	6				4" TOPSOIL	
			6	4		12		Red-brown Silty CLAY, little f-c Sand, trace gravel, trace roots (moist, FILL)	
		2	5	7					
			7	7		14		Brown fine SAND (moist, FILL)	
		3	2	2				Brown f-m SAND, little f-c Gravel (moist-wet FILL)	
			2	1		4			
		4	2	1				Brown SILT and f-c Gravel (wet, Possible FILL)	Sample No. 4 - no recovery due to soil nature
			1	1		2			
		5	1	2				Gray-brown Silty CLAY, occasional Silt and fine Sand partings (wet, soft)	
			2	2		4			
		6	2	1				Contains trace decayed wood	
			2	1		3			
		7	3	3				(medium)	
			4	5		7			Samples No. 8 - no recovery due to soil nature
		8	3	2		-			
								Boring Completion at 15.0 feet	Observation well installed at 15.0 feet: 0.0'-10.0' 3" black riser 10.0'-15.0' 3" stain-well screen 0.0'-7.0' Grout steel 7.0'-9.0' Bentonite seal 9.0'-15.0' Sand filter No free standing water encountered at Boring Completion; wet samples noted at 6 to 15 feet Free standing water readings: Date — Water 10-11-85 — 15.3' from top of riser (3.0' stick-up)

No blows to drive 2 " spoon 12 " with 140 lb. pin wt. falling 30 "per blow.
C = No blows to drive ____ " casing ____ " with ____ lb. weight falling ____ "per blow.

CLASSIFICATION Visual by Geologist

METHOD OF INVESTIGATION 6¼" ID Hollow Stem Auger

R/T Form H

DATE
STARTED 10/11/85
FINISHED 10/12/85
SHEET 1 OF 2

EMPIRE SOILS INVESTIGATIONS INC.

SUBSURFACE LOG

HOLE NO. MW-11D
SURF. ELEV.
G. W. DEPTH See Note

PROJECT Buffalo Color

LOCATION 340 Elk Street
Buffalo, N.Y.

DEPTH-FT.	SAMPLES	SAMPLE NO	BLOWS ON SAMPLER 0/6	6/12	12/18	N	BLOW ON CASING C	SOIL OR ROCK CLASSIFICATION	NOTES
0								Overburden Soils	Driller augered to 14.0 feet without obtaining samples
5									
10									See boring log for MW-11S for soil classification
15		1	2	2				Gray Silty CLAY, occastional Silt partings (moist-wet, soft)	
			3	3		5			
20		2	1	1				(Very soft)	
			1	2		2			
25		3	WOH/2.0'			-			WOH- Weight of Hammer WOR - Weight of Rod
30		4	WOR/1.0'						
			2	2		-			
35		5	WOR/1.0'					Contains occasional brown Clay partings	
			WOH	3		-			
40		6	1	1					

● No blows to drive 2 " spoon 12 " with 140 lb. pin wt. falling 30 "per blow.

C = No blows to drive _____ " casing _____ " with _____ lb. weight falling _____ "per blow.

CLASSIFICATION Visual By Geologist

METHOD OF INVESTIGATION 6¼" ID Hollow Stem Auger

R/T Form H

STARTED 10/11/85
FINISHED 10/12/85
SHEET 2 OF 2

EMPIRE SOILS INVESTIGATIONS INC.

SUBSURFACE LOG

HOLE NO. MW-11D
SURF. ELEV.
G. W. DEPTH See Note

PROJECT Buffalo Color

LOCATION 340 Elk Street
Buffalo, N.Y.

DEPTH-FT	SAMPLES	SAMPLE NO	BLOWS ON SAMPLER 0/6	6/12	12/18	N	BLOW ON CASING C	SOIL OR ROCK CLASSIFICATION	NOTES
40			1	2		2			
								Gray f-c SAND and f-c Gravel, some Silt, trace clay (wet, loose)	
		7	3	3					
45			6	6		9			
		8	18	18	100/0.0'			(Very compact)	
50								Boring Completion with refusal at 50.0 feet	No free standing water encountered at Boring Completion wet samples noted at 14 to 50 feet Observation well installed at 49.0 feet 0.0'-44.0' 3" black steel riser 44.0'-49.0' 3" stainless well screen 0.0'-41.5' Grout seal 41.5'-43.0' Bentonite seal 43.0'-50.0' Sand filter

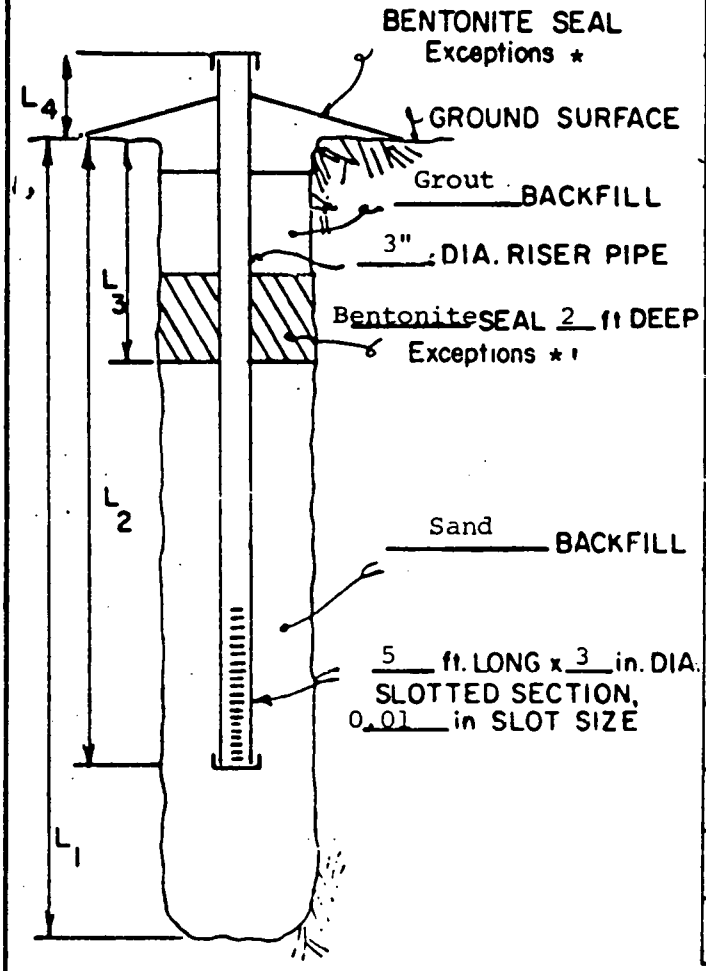
N = No blows to drive 2 " spoon 12 " with 140 lb. pin wt. falling 30 "per blow.

C = No blows to drive _____ " casing _____ " with _____ lb. weight falling _____ "per blow.

CLASSIFICATION Visual By Geogolist

METHOD OF INVESTIGATION 6¼" ID Hollow Stem Auger

R/T Form H



WELL NO.	L_1	L_2	L_3	L_4	Water Level
MW-8	24'	19.9'	13.9'	2.92'	16.95
MW-9	18'	15.0'	9.0'	3.2'	12.95
MW-10	18'	15.0'	9.0'	2.9'	8.72
MW-11S	15'	15.0'	9.0'	3.0'	10.95
MW-11D	50'	49.0'	43.0'	2.0'	9.79

Notes:
1. Bentonite seal for MW-11D was 1.5 ft deep.
2. Protector pipe placed over all wells L4 is the stickup of the protector pipe.
3. Grout backfill extends to ground surface, no surface bentonite seal installed.
4. Water level measured on 10-18-85 & referenced to top of protector pipe.

EMPIRE SOILS INVESTIGATIONS, INC.

OBSERVATION WELL DETAILS

BUFFALO COLOR

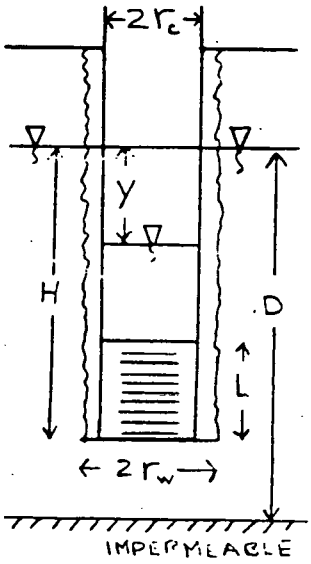
DR.BY	MR-L	SCALE	None	PROJ NO	GTA-85-33
CK'D.BY	MR-L	DATE	10-85	DRWG NO.	1

APPENDIX B

Field Hydraulic Conductivity Test Data

SUBJECT FIELD SLUG TESTS PROJECT NUMBER GTA-82-57

BY MRL DATE 12-6-82 CHECKED BY ..... DATE ..... SHEET NUMBER 1 OF 1



$$K = \frac{r_c^2 \ln(R_e/r_w)}{2L} \frac{1}{t} \ln\left(\frac{y_o}{y_t}\right)$$

$$\ln\left(\frac{R_e}{r_w}\right) = \left[\frac{1.1}{\ln(H/r_w)} + \frac{A + B\ln(D-H)/r_w}{L/r_w}\right]^{-1}$$

t = time

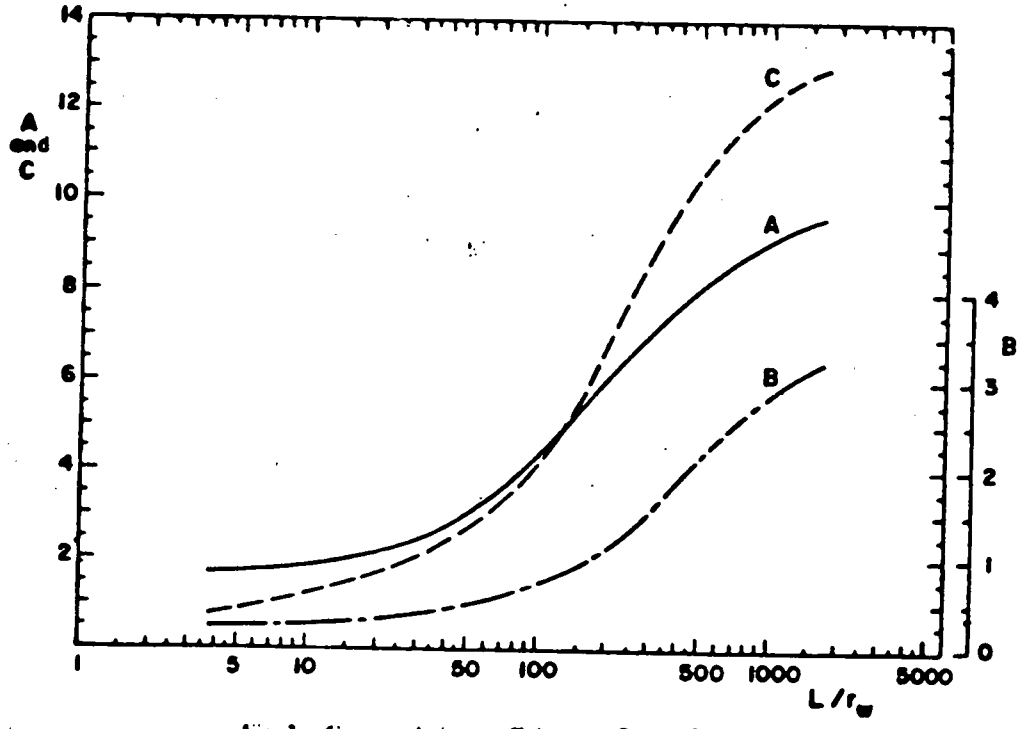


Fig. 3. Curves relating coefficients *A*, *B*, and *C* to L/r_w.

FROM: Bower and Rice (1976)

Field Slug Test Data

MW-8
H_o = 16.95'

Time (sec)	H (ft)
30	1.41
60	1.33
90	1.31
120	1.30
150	1.29
180	1.28
210	1.275
240	1.27
270	1.26
330	1.24
450	1.23
690	1.21

MW-9
H_o = 12.95'

Time (sec)	H (ft)
30	0.67
60	0.645
90	0.63
120	0.615
150	0.60
180	0.58
210	0.56
240	0.52
270	0.49
330	0.46
390	0.43

MW-10
H_o = 8.72'

Time (sec)	H (ft)
30	2.30
60	2.29
90	2.29
120	2.28
150	2.25
180	2.23
210	2.22
240	2.21
270	2.19
330	2.18
390	2.17
510	2.08
750	2.04

MW-11S
H_o = 10.95'

Time (sec)	H (ft)
30	2.07
60	2.05
90	2.04
120	2.025
150	2.01
180	2.01
210	1.995
240	1.985
270	1.98
330	1.97
450	1.95
690	1.94
1170	1.925

M.5

GROUNDWATER QUALITY ASSESSMENT PLAN

The GQA Plan is included as Appendix A in the Groundwater Quality Assesssment Report which appears as Appendix M.6 below.

M.6

GROUNDWATER QUALITY ASSESSMENT REPORT

BUFFALO COLOR CORPORATION

GROUNDWATER QUALITY ASSESSMENT

February 7, 1986

1. Background and Introduction

1.1 Buffalo Color Corporation's process waste water is highly alkaline (pH >12.5) and runs to clay lined lagoons prior to neutralization.

1.2 Groundwater monitoring wells were placed into the deep aquifer. Required quarterly sampling was performed (see Appendix B) and background characteristics were determined (see Appendix E).

1.3 The first semi-annual sampling was conducted on September 19, 1985 and the statistical comparisons were made (see Appendix F).

1.4 Due to the fact that several of the parameters showed significant increases between the downgradient and upgradient wells, a ground water quality assessment plan was prepared and submitted on January 14, 1986 (see Appendix A).

1.5 As specified in the plan, special sampling was also conducted on September 19, 1986 (see Appendix C). This report constitutes an evaluation of those at all other relevant data.

2. Reasons for Assessment

2.1 On the basis of the staistical calculations (Appendix F) the following downgradient wells were found to have significant changes relative to the upgradient wells:

2.1.1 Well R03

2.1.1.1 Decrease in pH
2.1.1.2 Increase in specific conductance

2.1.2 Well R05

2.1.2.1 Decrease in pH
2.1.2.2 Increase in specific conductance

2.1.3 Well R06

2.1.3.1 Decrease in pH
2.1.3.2 Increase in specific conductance
2.1.3.3 Increase in total organic carbon

2.2 This constitutes probable cause for invocation of the assessment procedure.

3. Evaluation of Monitoring Data

3.1 Groundwater Quality Parameters (Appendix G.1)

3.1.1 Well R03

3.1.1.1 No changes seen

3.1.2 Well R05

3.1.2.1 Increase in sulfate ion

3.1.3 Well R06

3.1.3.1 Increase in Chloride ion
3.1.3.2 Increase in Sulfate ion
3.1.3.3 Increase in Sodium ion

3.1.4 Data on the waste water which has passed through the surface impoundments indicates that all three of the identified ions are present at substantially higher concentrations in the process waste water than are observed in the groundwater (see Appendix D).

3.1.5 However, the change in pH observed at all three wells is in exactly the opposite direction from that which would be predicted from the hypothesis of a leaking lagoon. The deep aquifer groundwater is becoming very slightly more acid not more alkaline as it moves under the surface impoundments.

3.1.6 The rise in specific conductance observed between the downgradient and upgradient wells is consistant with the presence of an underground salt deposit beneath the impoundments which is slowly dissolving into the passing groundwater.

3.2 Drinking Water Parameters: Metals (Appendix G.2)

3.2.1 Well R03

3.2.1.1 Increase in Cadmium over standard
3.2.1.2 Increase in Selenium over standard

3.2.2 Well R05

3.2.2.1 Increase in Cadmium over standard
3.2.2.2 Increase in Selenium over standard

3.2.3 Well R06

3.2.3.1 Increase in Cadmium over standard
3.2.3.2 Increase in Selenium over standard

3.2.4 Data on the waste water which has passed through the surface impoundments indicates that neither of these metals are present in concentrations in excess of those observed in the waste water.

3.2.5 The rise in observed concentration is, therefore, inconsistant with the hypothesis that the lagoons are the source of the increase.

3.2.6 All of the other heavy metal concentrations are below the drinking water standards in both the upgradient and downgradient wells.

3.3 Drinking Water Parameters: Conventionals (Appendix G.3)

3.3.1 All wells, both upgradient and downgradient showed levels which exceeded the drinking water standard on each of:

3.3.1.1 Nitrate as N
3.3.1.2 Fluoride
3.3.1.3 Coliform
3.3.1.4 Turbidity

3.3.2 Thus the upgradient water should <u>not</u> be considered suitable as drinking water.

3.3.3 Each of these parameters moved further away from the drinking water standard as it passed under the surface impoundments.

3.4 Drinking Water Parameters: Pesticides (Appendix G.4)

3.4.1 No pesticides were detected in either the upgradient and downgradient wells.

3.4.2 No pesticides were detected in the process waste water going through the surface impoundments.

3.5 Drinking Water Parameters: Radiation (Appendix G.5)

3.5.1 <u>Well R03</u>

3.5.1.1 No increase over standard

3.5.2 <u>Well R05</u>

3.5.2.1 Increase in Gross Beta over standard

3.5.3 <u>Well R06</u>

3.5.3.1 No increase over standard

3.5.4 There has been no known activity on this site related to radioactivity. Some natural clays are radioactive and this may be the case here.

3.6 Surface Impoundment Parameters (Appendix G.6)

3.6.1 Per the Groundwater Quality Assessment Plan, special sampling was conducted to determine if specific constituents of the process waste water could be found in the deep aquifer.

3.6.2 None of the materials searched for were detected.

3.6.3 This leads to the following conclusions:

3.6.3.1 The elevated TOC found at Well RO6 cannot have been caused by leaking waste water from the lagoons because the characteristic aniline components of the waste water were not detected.

3.6.3.2 There is no evidence of any connection between the surface impoundments and the lower aquifer on the basis of these samples and analyses.

4. Conclusions

4.1 There are significant differences between upgradient and downgradient wells with respect to:

4.1.1 pH
4.1.2 Specific Conductance
4.1.3 Total Organic Carbon

4.2 These differences are not consistant with the contents of the surface impoundments.

4.3 The groundwater in the area is not suitable as a drinking water source.

5. Recommendations

5.1 There is no need for further special sampling at this time.

5.2 The next semi-annual sampling should be done on schedule (March 1986).

APPENDICES

APPENDIX A

GROUNDWATER QUALITY ASSESSMENT PLAN

BUFFALO COLOR CORPORATION

GROUNDWATER QUALITY ASSESSMENT PLAN

January 10, 1985

1. Introduction

1.1 The purpose of this plan is to satisfy the requirements of 40 CFR 265.93 by describing the means by which Buffalo Color Corporation will determine to what extent the contents of its surface impoundments are leaking into the groundwater.

1.2 The plan is executed when a students t- statistic calculated on the difference between the average current value for any of the downgradient wells and the average background value of the upgradient wells exceeds the critical t- value at a confidence level of 95%.

1.3 The plan consists of two phases

1.3.1 Phase I - Additional Sampling and Analyses
1.3.2 Phase II - Determination of the extent of the migration.

2. Phase I - Additional Sampling and Analysis

2.1 This phase is an enhanced monitoring program at the existing monitoring wells. It will evaluate whether hazardous constituents have entered the groundwater from the waste water treament lagoons and will determine the concentrations of these constituents.

2.2 Sampling Locations

2.2.1 Upgradient Wells (Deep Aquifer)

2.2.1.1 Sampling Well RO2
2.2.1.2 Sampling Well RO7

2.2.2 Downgradient Wells (Deep Aquifer)

2.2.2.1 Sampling Well RO3
2.2.2.2 Sampling Well RO5
2.2.2.3 Sampling Well RO6

2.3 Frequency of analysis

2.3.1 One sampling of all of the deep aquifer wells will be conducted for the key parameters.

2.3.2 If this sampling shows a positive result for any of the key parameters in any of the downgradient wells, at least two additional samples will be collected and the data evaluated.

2.3.3 If the first sampling does not show a positive result in any of the downgradient wells, an evaluation will be made on that basis.

2.4 Key Parameters to be analyzed:

2.4.1 Indicator Parameters

2.4.2 Compounds which are specific to the surface impoundments and which would be likely to be detectable if leaked into groundwater.

2.4.2.1 Aniline
2.4.2.2 N-Methylaniline
2.4.2.3 N,N-Dimethylaniline
2.4.2.4 N-Ethylaniline
2.4.2.5 N,N-Diethylaniline
2.4.2.6 Cyanide (Total)
2.4.2.7 Cyanide (Amenable)

2.5 Evaluation of results:

2.5.1 First Indication

2.5.1.1 The first sampling will act as a more precise indication of contamination. Since the key parameters selected are consistantly present in the waste water which now passes or has passed through the surface impoundments, and since the waste water concentrations are usually one or more orders of magnitude above the limits of detection of the analytical methods, a leak from the lagoons would have a high probability of being found even if diluted with groundwater.

2.5.1.2 If the first sampling fails to produce a detectable result in any of the downgradient wells, then there is no leak from the impoundments and a negative report will be prepared.

2.5.1.3 If the compounds are detected, additional sampling will be executed before making the evaluation and report.

2.5.2 Additional Sampling

2.5.2.1 If additional sampling is required at least two additional rounds of samples will be collected and analyzed for the parameters listed in 2.4.2 above.

2.5.2.2 Using the data collected in 2.5.1 and all previous data collected, the evidence of leakage to the groundwater from the impoundments will be evaluated.

2.6 Reporting of results

2.6.1 A report will be prepared either on the basis of:

2.6.1.1 A first indication sampling which failed to detect any of the key parameters, or:

2.6.1.2 All sampling of the key parameters and other parameters previously measured.

2.6.2 The report will include:

2.6.2.1 Tabulation of all previous results
2.6.2.2 Evanuation of results
2.6.2.3 Determination of whether hazardous constituents have entered groundwater
2.6.2.4 In the event that the data indicate migration of contaminants from the lagoons into the groundwater a specific plan and time schedule for the Phase II investigation will be submitted.
2.6.2.5 In the event that the data do not indicate such a migration, the report will so state and sampling of the aquifer will resume at its normal frequency.

3. Phase II - Determination of Extent of Migration

3.1 This phase will include gathering additional hydrogeological data so that the rate and extent of migration can be evaluated.

3.2 The vertical and horizontal extent of migration will be evaluated through the use of additional wells, some of which have already been installed.

3.2.1 Upgradient Well (Shallow Aquifer)
3.2.1.1 Sampling Well R10

3.2.2 Upgradient Well (Bedrock)
3.2.2.1 To be installed near well R07

3.2.3 Downgradient Wells (Shallow Aquifer)
3.2.3.1 Sampling Well R08
3.2.3.2 Sampling Well R09
3.2.3.3 Sampling Well R11 (Destroyed)
3.2.3.4 Soon to be installed near Well R03

3.2.4 Downgradient Wells (Bedrock)
3.2.4.1 To be installed near Well R05
3.2.4.2 To be installed near Well R06

3.2.5 Downgradient Wells (Deep Aquifer)

3.2.5.1 To be installed on the Mobil property east of R05 based on estimated rate of migration.

3.2.5.2 To be installed on the Mobil property east of R06 based on estimated rate of migration.

3.2.5.3 To be installed on the Mobil property further east and outside the estimated extent of the contaminant plume.

3.3 Well Specifications

3.3.1 Wells to the shallow aquifer will be screened just above the impermeable clay layer so as to capture any perched water table.

3.3.2 Wells to bedrock will be cased to the bedrock so that the wells are measuring water quality in the bedrock.

3.3.3 Wells to the deep aquifer will be screened in the sand deposit.

3.4 To provide sufficient data to statistically compare water quality in the downgradient wells to water quality in the upgradient wells in the shallow aquifer, the deep aquifer, and bedrock, a total of four samplings will be made of Wells R02, R03, R05, R06, R07, R08, R09, R10, R12, and each of the seven new wells.

3.5 Samples will be analyzed for each of the parameters listed in 2.4.2 which have been found to be contaminating groundwater in Phase I. The results of the chemical analysis will be used to estimate the extent of contaminant migration.

3.6 The Phase II investigation will include gathering additional hydrogeologic data so that the rate and extent of migration can be evaluated. To evaluate the rate of migration, data will be obtained on hydraulic conductivity and hydraulic gradient using field permeability tests. Using the results of the field permeability tests and measured hydraulic gradients from the potentiometric surface map, the average linear velocity will be calculated. The rate of migration will be estimated from the average linear.

3.7 Reporting of results

3.7.1 Data gathered during Phase II as well as all other previously gathered data on groundwater quality will be analyzed and a report prepared.

3.7.2 The report will include:

3.7.2.1 Tabulation of all Phase II results

3.7.2.2 Evaluation of results

3.7.2.3 Conclusions as to the rate and extent of contaminant migration and concentrations of contaminants.

APPENDIX B

DATABASE: ROUTINE SAMPLING

BUFFALO COLOR CORPORATION
GROUNDWATER MONITORING PROGRAM
TREATMENT PLANT LAGOONS PERIMETER
18 JUL 1984

Parameter	Well R03	Well R05	Well R06	Well R07 *
pH	10.1	10.2	9.1	9.1
	10.1	10.2	9.1	9.1
	10.1	10.3	9.1	9.1
	10.1	10.2	9.0	9.1
Specific Conductance U MHOS	270	400	380	310
	270	400	380	310
	270	405	385	290
	270	405	385	270
Total Organic Carbon, mg/L	9.62	11.45	16.46	10.77
	9.17	11.65	15.24	10.46
	9.25	11.85	15.39	10.56
	8.97	11.38	14.31	10.62
Total Organic Halide, mg/L	< 0.010	< 0.010	< 0.010	< 0.010
	0.029	< 0.010	< 0.010	< 0.010
	0.011	< 0.010	< 0.010	< 0.010
	0.011	< 0.010	< 0.010	< 0.010
Chloride, mg/L	5.0	10.0	36.0	18.0
Sulfate, mg/L	14.0	151.0	145.0	167.0
Phenol, mg/L	< 0.1	< 0.1	< 0.1	< 0.1
Iron, mg/L	18.0	22.0	5.0	226.0
Sodium, mg/L	65.0	96.0	98.0	61.0
Manganese, mg/L	0.1	0.1	< 0.05	0.4
Arsenic, mg/L	0.055	0.032	0.017	0.020
Barium, mg/L	0.044	0.061	0.021	0.040
Cadmium, mg/L	0.069	0.072	0.093	0.019
Chromium, mg/L	0.052	0.077	0.033	0.049
Lead, mg/L	0.039	0.023	0.040	0.019
Mercury, mg/L	0.0007	0.0013	0.0008	0.0005
Manganese, mg/L	0.977	0.429	0.519	0.495
Selenium, mg/L	0.094	0.081	0.033	0.051
Silver, mg/L	0.001	< 0.001	0.002	0.001
Nitrate, mg/L	22.	19.	35.	43.
Fluroide, mg/l	0.42	0.33	0.51	0.47
Total Coliform, MPN/100 ml	< 3	< 3	< 3	< 3
Lindane, ug/L	< 0.01	< 0.01	0.02	< 0.01
Endrin, ug/L	< 0.05	< 0.05	< 0.05	< 0.05
Methoxyclor, ug/L	< 0.02	< 0.02	< 0.02	< 0.02
Toxaphene, ug/L	< 0.5	< 0.5	< 0.5	< 0.5
2,4-D, ug/L	< 0.1	< 0.1	< 0.1	< 0.1
2,4,5-TP, ug/L	< 0.1	< 0.1	< 0.1	< 0.1
Turbidity, NTU	1200	870	220	1800
Water Elevations * Ft. above sea level	577.11	576.03	576.33	578.33
Gradient Ft.	- 1.22	- 2.33	- 2.00	NA

* Upgradient well. Well water levels were measured on 17 July 1984 prior to pumping out of wells preparatory to sampling.

BUFFALO COLOR CORPORATION
GROUNDWATER MONITORING PROGRAM
TREATMENT PLANT LAGOONS PERIMETER
02 AUGUST 1984

	Well RO2*	Well RO3	Well RO5	Well RO6	Well RO7*
pH	9.80	9.40	9.57	8.50	9.33
	9.88	9.32	9.51	8.46	9.29
	9.85	9.30	9.51	8.45	9.30
	9.88	9.32	9.51	8.44	9.29
Specific Conductance Umohs	268	208	270	351	228
	273	212	280	350	230
	275	213	285	365	231
	272	212	282	365	235
Total Organic Carbon mg/liter	7.19	10.71	7.80	11.06	7.52
	7.61	9.78	7.29	11.64	7.65
	7.65	9.96	8.12	11.49	7.84
	7.34	10.79	7.25	11.34	7.00
Total Organic Halide mg/liter	0.028	0.011	0.018	0.021	0.038
	0.031	0.011	0.013	0.025	0.041
	0.029	0.012	0.014	0.026	0.029
	0.028	0.010	0.017	0.020	0.036
Water Elevations Ft. above sea level	577.82	576.77	575.35	575.99	578.02
Gradient vs RO7	-0.20	-1.25	-2.67	-2.03	-
Gradient vs RO2	-	-1.05	-2.47	-1.83	0.20

* Upgradient wells. Well water levels were measured on 31 July 1984 prior to purgig of wells preperatory to sampling.

BUFFALO COLOR CORPORATION
GROUNDWATER MONITORING PROGRAM
TREATMENT PLANT LAGOONS PERIMETER
16 AUGUST 1984

	Well RO2*	Well RO3	Well RO5	Well RO6	Well RO7*
pH	9.45	9.40	9.50	8.70	9.65
	9.50	9.40	9.50	8.65	9.65
	9.50	9.40	9.50	8.65	9.60
	9.50	9.40	9.50	8.65	9.60
Specific Conductance Umohs	210	180	230	320	200
	218	190	235	328	210
	220	185	240	335	208
	228	190	240	335	210
Total Organic Carbon mg/liter	4.82	4.64	4.68	10.42	6.04
	5.22	4.29	5.32	9.62	6.60
	5.05	4.12	5.22	9.21	7.01
	5.03	4.33	4.73	10.04	6.04
Total Organic Halide mg/liter	<0.010	<0.010	<0.010	<0.010	<0.010
	<0.010	<0.010	<0.010	<0.010	<0.010
	<0.010	<0.010	<0.010	<0.010	<0.010
	<0.010	<0.010	<0.010	<0.010	<0.010
Water Elevations Ft. above sea level	577.97	576.97	575.83	576.16	578.19
Gradient vs RO7	-0.22	-1.22	-2.36	-2.03	-
Gradient vs RO2	-	-1.00	-2.14	-1.81	0.22

* Upgradient Wells. Well water levels were measured on August 14 prior to purging of wells preparatory to sampling.

D22

BUFFALO COLOR CORPORATION
GROUNDWATER MONITORING PROGRAM
TREATMENT PLANT LAGOONS PERIMETER
19 SEP 1984

Parameter		Well RO2*	Well RO3	Well RO5	Well RO6	Well RO7*
pH		9.35	9.00	9.80	8.80	9.70
		9.40	9.20	9.90	8.80	9.70
		9.40	9.20	9.90	8.85	9.70
		9.40	9.15	9.85	8.90	9.70
Specific Conductance umohs		220	210	230	570	213
		215	215	235	590	220
		220	220	230	585	215
		210	215	230	580	220
Total Organic Carbon mg/liter		7.05	8.16	6.22	10.54	10.65
		7.20	8.16	5.33	10.37	10.44
		7.16	8.26	5.80	10.84	9.57
		6.98	8.56	6.47	10.27	10.58
Total Organic Halide mg/liter		0.250	<0.010	0.014	0.038	0.059
		0.010	<0.010	0.020	0.034	0.058
		0.012	<0.010	0.018	0.035	0.058
		0.014	<0.010	0.020	0.037	0.057
Chloride	mg/l	19.0	15.0	13.0	35.0	19.0
Sulfate	mg/l	15.0	2.0	18.0	74.0	5.0
Phenol	mg/l	<0.01	<0.01	<0.01	<0.01	<0.01
Iron	mg/l	34.06	8.14	14.24	10.80	15.35
Sodium	mg/l	107.4	108.5	106.9	152.4	120.2
Manganese	mg/l	0.808	0.912	0.469	0.596	0.633
Arsenic	mg/l	0.041	0.037	0.022	0.029	0.033
Barium	mg/l	0.049	0.034	0.033	0.054	0.022
Cadmium	mg/l	0.080	0.047	0.066	0.029	0.040
Chromium	mg/l	0.035	0.077	0.084	0.017	0.023
Lead	mg/l	0.037	0.051	0.064	0.024	0.050
Mercury	mg/l	0.0011	0.0019	0.0009	0.0022	0.0012
Selenium	mg/l	0.101	0.093	0.057	0.084	0.070
Silver	mg/l	0.001	0.001	0.002	<0.001	0.001
Nitrate	mg/l	37.0	29.0	17.0	36.0	46.0
Fluroide	mg/l	0.51	0.39	0.24	0.55	0.47
Lindane	ug/l	<0.05	<0.05	<0.05	<0.05	<0.05
Endrin	ug/l	0.03	0.02	<0.01	0.02	0.01
Methoxychlor	ug/l	<0.02	<0.02	<0.02	<0.02	<0.02
Toxaphene	ug/l	<0.50	<0.50	<0.50	<0.50	<0.50
2,4-D	ug/l	<0.10	<0.10	<0.10	<0.10	<0.10
2,4,5-TP	ug/l	<0.10	<0.10	<0.10	<0.10	<0.10
Turbidity	N.T.U.	1050	240	210	660	430
Total Coliform	MPN/100W	<3	<3	<3	<3	<3
Gross Alpha	pCi/l	9.4±30	2.4±2.1	4.5 ± 2.4	<3	1.7±2.2
Gross Beta	pCi/l	<15	<15	25.3 ± 7.1	<15	<15
Total	pCi/l	<3	<3	<3	<3	<3
Water Elevations Feet above sea level		577.84	576.94	575.74	575.97	578.10
Gradient vs RO2		-	-0.90	-2.10	-1.87	0.26
Gradient vs RO7 Feet		-0.26	-1.16	-2.36	-2.13	-

* Upgradient well. Well water levels were measured on September, 1984 prior to pumping out of wells preparatory to sampling.

D22.

BUFFALO COLOR CORPORATION
GROUNDWATER MONITORING PROGRAM
TREATMENT PLANT LAGOONS PERIMETER

22 October 1984

	Well R02 *	Well R03	Well R05	Well R06	Well R07 *
pH	9.50	8.70	9.60	8.55	9.75
	9.50	8.70	9.60	8.50	9.70
	9.45	8.70	9.60	8.50	9.70
	9.50	8.70	9.60	8.50	9.70
Specific Conductance (umohs)	155	148	210	312	241
	180	150	205	318	250
	165	145	205	305	252
	170	140	200	300	250
Total Organic Carbon (mg/liter)	4.71	4.05	4.04	10.40	8.54
	4.08	2.62	3.59	8.45	7.92
	4.19	3.06	3.64	8.97	7.21
	3.85	2.95	3.46	9.53	6.63
Total Organic Halogen (mg/liter)	0.023	0.033	0.016	0.043	0.021
	0.021	0.031	0.017	0.026	0.023
	0.022	0.032	0.015	0.036	0.022
	0.019	0.031	0.016	0.032	0.022
Water Elevations (Feet Above Sea Level)	578.00	576.49	573.74	575.25	578.17
Gradient vs R02 (feet)	-	- 1.51	- 4.26	- 2.75	0.17
Gradient vs R07 (feet)	- 0.17	- 1.68	- 4.43	- 2.92	-

* Upgradient Well. Well water levels were measured on 19 October 1984 prior to pumping out of wells preparatory to sampling.

BUFFALO COLOR CORPORATION
GROUNDWATER MONITORING PROGRAM
TREATMENT PLANT LAGOONS PERIMETER

01 November 1984

	Well RO2 *	Well RO3	Well RO5	Well RO6	Well RO7 *
pH	9.40	9.20	9.70	8.70	9.50
	9.35	9.20	9.75	8.70	9.50
	9.35	9.25	9.80	8.70	9.50
	9.35	9.30	9.80	8.70	9.50
Specific Conductance (umohs)	272	249	329	459	272
	280	258	329	460	270
	285	260	329	470	280
	282	259	329	470	280
Total Organic Carbon (mg/liter)	3.88	4.26	3.18	6.84	5.16
	3.84	4.23	3.14	6.82	5.17
	3.91	4.28	3.16	6.87	5.14
	3.87	4.25	3.21	6.85	5.15
Total Organic Halogen (mg/liter)	0.019	0.036	0.030	0.029	0.033
	0.011	0.043	0.030	0.026	0.031
	0.012	0.039	0.018	0.028	0.042
	0.012	0.041	0.028	0.027	0.023
Water Elevations (Feet Above Seal Level)	577.97	576.91	575.40	575.68	578.23
Gradient vs RO2 (feet)	-	- 1.06	- 2.57	- 2.29	0.26
Gradient vs RO7 (feet)	- 0.26	- 1.32	- 2.83	- 2.55	-

* Upgradient Well. Well water levels were measured on 30 October 1984 prior to pumping out of wells preparatory to sampling.

BUFFALO COLOR CORPORATION
GROUNDWATER MONITORING PROGRAM
TREATMENT PLANT LAGOONS PERIMETER

19 November 1984

	Well R02 *	Well R03	Well R05	Well R06	Well R07 *
pH	9.85	8.85	9.71	8.62	9.25
	9.88	8.90	9.69	8.67	9.27
	9.85	8.90	9.65	8.67	9.23
	9.89	8.92	9.63	8.65	9.28
Specific Conductance (umohs)	222	189	232	310	200
	219	189	237	310	202
	231	202	241	318	207
	220	190	235	308	205
Total Organic Carbon (mg/liter)	6.45	5.04	4.37	9.10	6.34
	6.22	4.90	4.64	8.87	6.13
	7.01	5.32	4.86	9.04	7.16
	6.01	5.02	4.72	9.50	6.27
Total Organic Halogen (mg/liter)	< 0.010	< 0.010	0.018	0.018	0.046
	< 0.010	< 0.010	0.018	0.030	0.045
	< 0.010	< 0.010	0.018	0.020	0.044
	< 0.010	< 0.010	0.017	0.019	0.043
Water Elevations (Feet Above Seal Level)	578.17	576.52	575.01	575.94	578.32
Gradient vs R02 (feet)	-	- 1.65	- 3.16	- 2.23	0.15
Gradient vs R07 (feet)	- 0.15	- 1.80	- 3.31	- 2.38	-

* Upgradient Well. Well water levels were measured on 15 November 1984 prior to pumping out of wells preparatory to sampling.

BUFFALO COLOR CORPORATION
GROUNDWATER MONITORING PROGRAM
TREATMENT PLANT LAGOONS PERIMETER

29 November 1984

	Well R02 *	Well R03	Well R05	Well R06	Well R07 *
pH	9.75	9.25	9.82	8.85	9.50
	9.72	9.30	9.88	8.79	9.50
	9.70	9.30	9.85	8.75	9.45
	9.70	9.28	9.82	8.78	9.42
Specific Conductance (umohs)	190	175	202	245	160
	200	172	199	252	168
	200	170	200	248	163
	190	170	202	256	163
Total Organic Carbon (mg/liter)	6.87	5.17	3.97	10.40	5.25
	6.66	5.23	3.99	10.57	4.50
	6.80	4.79	4.08	10.15	5.04
	6.82	5.59	4.20	10.20	4.97
Total Organic Halogen (mg/liter)	0.021	0.039	0.017	0.041	0.087
	0.030	0.012	0.017	0.047	0.112
	0.025	0.021	0.016	0.041	0.109
	0.030	0.040	0.024	0.051	0.127
Water Elevations (Feet Above Sea Level)	578.11	577.03	575.48	575.83	578.31
Gradientt vs R02 (feet)	-	- 1.08	- 2.63	- 2.28	0.20
Gradient vs R07 (feet)	- 0.20	- 1.28	- 2.83	- 2.48	-

* Upgradient Well. Well water levels were measured on 27 November 1984 prior to pumping out of wells preparatory to sampling.

BUFFALO COLOR CORPORATION
GROUNDWATER MONITORING PROGRAM
TREATMENT PLANT LAGOONS PERIMETER

20 December 1984

Parameter		Well RO2 *	Well RO3	Well RO5	Well RO6	Well RO7 **
pH		9.50	9.12	9.62	8.72	9.21
		9.52	9.15	9.70	8.77	9.21
		9.52	9.15	9.68	8.75	9.19
		9.50	9.12	9.67	8.72	9.18
Specific Conductance (umohs)		171	163	171	215	161
		172	171	175	230	163
		178	170	181	250	170
		173	165	185	245	175
Total Organic Carbon (mg/liter)		6.82	7.13	8.35	10.68	5.14
		7.00	6.36	8.46	10.80	6.01
		7.01	7.06	8.41	10.18	5.35
		6.52	7.12	8.17	10.19	5.30
Total Organic Halogen (mg/liter)		0.020	0.018	0.010	0.020	0.024
		0.033	< 0.010	0.011	0.021	0.036
		0.050	< 0.010	0.019	0.022	0.045
		0.043	0.016	0.027	0.021	0.036
Chloride	mg/l	17.0	12.0	13.0	37.0	18.0
Sulfate	mg/l	2.0	1.0	1.0	15.0	1.0
Phenol	mg/l	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
Iron	mg/l	15.60	15.08	17.25	17.05	40.80
Sodium	mg/l	67.40	60.30	60.00	65.60	63.60
Manganese	mg/l	0.111	0.143	0.919	0.202	0.344
Arsenic	mg/l	0.006	0.005	0.012	0.004	0.011
Barium	mg/l	0.059	0.041	0.081	0.069	0.063
Cadmium	mg/l	0.002	0.005	0.007	0.002	0.002
Chromium	mg/l	0.004	0.017	0.005	0.007	0.019
Lead	mg/l	0.003	0.006	0.002	0.005	0.008
Mercury	mg/l	< 0.0002	0.0004	0.0008	< 0.0002	0.0005
Selenium	mg/l	< 0.001	< 0.001	0.004	0.001	0.0002
Silver	mg/l	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
Nitrate	mg/l	17.0	25.0	29.0	18.0	7.5
Fluoride	mg/l	0.69	0.75	0.59	0.66	0.97
Lindane	ug/l	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Endrin	ug/l	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Methoxychlor	ug/l	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02
Toxaphene	ug/l	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
2,4-D	ug/l	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
2,4,5 - TP	ug/l	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Turbidity	N.T.U.	20	10	15	10	70
Total Coliform	MPN/100 W	42	20	10	8	4
Gross Alpha	pCi/l	< 3	1.6±1.9	3.4±2.1	2.8±1.8	3.5±1.9
Gross Beta	pCi/l	<10	<10	18.8±6.5	<10	<10
Total Radium	pCi/l	< 3	< 3	< 3	< 3	< 3
Water Elevations (Feet Above Sea Level)		578.22	577.20	575.57	575.96	578.42
Gradient vs RO2	Feet	-	- 1.02	- 2.65	- 2.26	0.20
Gradient vs RO7	Feet	- 0.20	- 1.22	- 2.85	- 2.46	-

* Upgradient Well. Well water levels were measured on December 20, 1984 prior to pumping out of wells preparatory to sampling.

BUFFALO COLOR CORPORATION
GROUNDWATER MONITORING PROGRAM
TREATMENT PLANT LAGOONS PERIMETER

15 March 1985

Parameter		Well RO2 *	Well RO3	Well RO5	Well RO6	Well RO7 **
pH		9.45	9.41	9.62	9.28	9.81
		9.42	9.38	9.60	9.18	9.72
		9.42	9.30	9.60	9.25	9.78
		9.45	9.28	9.62	9.25	9.75
Specific Conductance (umohs)		280	250	300	420	280
		300	265	318	440	292
		300	270	320	440	282
		300	260	318	432	278
Total Organic Carbon (mg/liter)		6.81	6.92	6.82	11.45	6.69
		6.40	6.68	7.08	10.77	7.70
		6.79	6.18	7.49	11.02	6.71
		7.08	6.99	7.38	10.36	7.71
Total Organic Halogen (mg/liter)		0.020	0.056	<0.020	0.026	<0.020
		0.021	0.051	<0.020	<0.020	<0.020
		<0.020	0.043	<0.020	0.035	<0.020
		<0.020	0.041	<0.020	0.023	<0.020
Chloride	mg/l	17.00	10.00	9.00	31.00	14.00
Sulfate	mg/l	7.00	4.00	4.00	6.00	3.00
Phenol	mg/l	<0.001	<0.001	0.010	0.015	<0.001
Iron	mg/l	12.60	12.96	12.20	14.55	17.47
Sodium	mg/l	53.50	50.00	53.90	57.00	55.00
Manganese	mg/l	0.08	0.09	0.11	0.12	0.18
Arsenic	mg/l	0.008	0.002	0.009	0.006	0.004
Barium	mg/l	0.063	0.048	0.102	0.088	0.077
Cadmium	mg/l	0.001	0.009	0.005	0.001	<0.001
Chromium	mg/l	0.007	0.011	0.006	0.003	0.011
Lead	mg/l	0.001	0.004	0.004	0.006	0.003
Mercury	mg/l	<0.0002	0.0005	0.0005	<0.0002	0.0003
Selenium	mg/l	<0.001	0.002	0.003	0.003	0.001
Silver	mg/l	<0.001	<0.001	<0.001	<0.001	<0.001
Nitrate	mg/l	12.3	22.0	17.0	22.0	11.0
Fluoride	mg/l	0.55	0.67	0.63	0.53	1.05
Lindane	ug/l	<0.01	<0.01	<0.01	<0.01	<0.01
Endrin	ug/l	<0.05	<0.05	<0.05	<0.05	<0.5
Methoxychlor	ug/l	<0.02	<0.02	<0.02	<0.02	<0.02
Toxaphene	ug/l	<0.50	<0.50	<0.50	<0.50	<0.50
2,4-D	ug/l	<0.10	<0.10	<0.10	<0.10	<0.10
2,4,5 - TP	ug/l	<0.10	<0.10	<0.10	<0.10	<0.10
Turbidity	N.T.U.	35	25	20	20	80
Total Coliform	MPN/100 W	56	29	30	15	9
Gross Alpha	pCi/l	<5	<5	<5	<5	<5
Gross Beta	pCi/l	<10	<10	13.4±6.5	12.2±6.4	6.4±5.7
Total Radium	pCi/l	<5	<5	<5	<5	<5
Water Elevations (Feet Above Sea Level)		578.32	577.36	576.32	576.67	578.59
Gradient vs RO2	Feet	-	-0.96	-2.00	-1.64	0.27
Gradient vs RO7	Feet	-0.27	-1.23	-2.27	-1.92	-

* Upgradient Well. Well water levels were measured on March 11, 1985 prior to pumping out of wells preparatory to sampling.

BUFFALO COLOR CORPORATION
GROUNDWATER MONITORING PROGRAM
TREATMENT PLANT LAGOONS PARAMETER

26 JUNE 1985

Parameter	Well RO2*	Well RO5	Well RO6	Well RO7*
pH	9.25	9.40	8.60	8.30
	9.22	9.35	8.60	8.48
	9.20	9.35	8.60	8.52
	9.20	9.35	8.60	8.55
	8.90	9.20	8.70	8.40 (S)
Specific Conductance (umohs)	322	340	477	300
	316	340	477	318
	313	337	478	306
	323	347	478	316
	279	298	375	258 (S)
Total Organic Carbon (mg/liter)	5.94	8.26	6.60	6.16
	6.63	6.94	6.34	5.13
	6.29	6.38	8.19	5.07
	8.11	8.31	6.70	5.01
	15.00	8.50	24.50	8.50 (S)
Total Organic Halogen (mg/liter)	<0.010	<0.010	<0.010	<0.010
	<0.010	<0.010	<0.010	<0.010
	<0.010	<0.010	<0.010	<0.010
	<0.010	<0.010	<0.010	<0.010
	<0.010	<0.010	<0.010	<0.010(S)
Chloride (mg/liter)	18.0	11.1	35.0	16.0
Sulfate (mg/liter)	15.8	12.5	7.4	6.4
Phenol (mg/liter)	<0.001	<0.001	<0.001	<0.001
Iron (mg/liter)	1.67	1.09	0.40	0.23
Sodium (mg/liter)	63.0	61.0	59.0	60.0
Manganese (mg/liter)	0.204	0.133	0.015	0.022
Zinc (mg/liter)	4.80	2.93	1.02	1.70
	4.80	3.60	1.14	1.85 (S)
Chromium (mg/liter)	0.11	<0.01	<0.01	<0.01 (S)
1,1, Dichlorethane (mg/liter)	<0.001	<0.001	<0.001	<0.001
	<0.001	<0.001	<0.001	<0.001 (S)
Toluene (mg/liter)	0.0089	0.0099	<0.001	<0.001 (S)
Water Elevations (Feet Above Sea Level)	578.00	575.81	576.21	578.31
Gradient vs RO2 (Feet)	-	-2.19	-1.79	0.31
Gradient vs RO7 (Feet)	-0.31	-2.50	-2.10	-

* Upgradient Well. Well water levels were measured 06-24-85 prior to pumping out of wells preparatory to sampling.

(S) This set of analyses was run by NYDEC's laboratory.

BUFFALO COLOR CORPORATION
GROUNDWATER MONITORING PROGRAM
TREATMENT PLANT LAGOONS

19 SEPTEMBER 1985

	WELL R02	WELL R03	WELL R05	WELL R06	WELL R07
pH	9.60	9.07	9.25	9.20	9.40
	9.58	9.08	9.22	9.15	9.38
	9.55	9.05	9.20	9.13	9.41
	9.58	9.08	9.22	9.15	9.41
Specific Conductance (umohs)	327	310	322	469	303
	320	308	318	472	305
	328	312	320	473	303
	332	314	328	478	310
Total Organic Carbon (mg/liter)	6.25	5.35	5.98	11.85	7.83
	4.97	5.15	5.52	12.10	7.69
	6.39	5.29	5.23	11.73	6.54
	5.47	5.59	5.35	11.08	7.15
Total Organic Halogen (mg/liter)	0.019	0.015	<0.010	0.022	0.017
	0.017	0.016	<0.010	0.020	0.017
	0.017	0.019	0.012	0.022	0.014
	0.020	0.016	<0.010	0.017	0.014
Chloride (mg/liter)	18.0	11.0	9.0	34.0	16.0
Sulfate (mg/liter)	4.0	2.0	12.0	5.0	4.0
Phenol (mg/liter)	0.003	0.085	<0.001	<0.001	0.034
Iron (mg/liter)	0.47	0.37	1.00	0.46	0.20
Sodium (mg/liter)	72.0	62.0	58.0	62.0	62.0
Manganese (mg/liter)	0.010	<0.010	0.035	0.020	<0.010
Water Elevations (Feet above Sea Level)	578.02	576.93	575.74	576.01	578.25
Gradient vs R02	-	1.09	2.28	1.28	0.23
Gradient vs R07	-0.23	1.32	2.51	2.24	-

* Upgradient Well. Well water levels were measured on September 10, 1985 prior to pumping out of wells prepartory to sampling.

APPENDIX C

DATABASE: SPECIAL SAMPLING

BUFFALO COLOR CORPORATION

GROUNDWATER MONITORING PROGRAM

TREATMENT PLANT LAGOONS PERIMETER

19 September 1985

	WELL R02	WELL R03	WELL R05	WELL R06	WELL R07
Aniline	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010
N-Methyl Aniline (mg/liter)	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010
N,N-Dimethylaniline (mg/liter)	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010
N-Ethylaniline (mg/liter)	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010
N,N-Diethylaniline (mg/liter)	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010
Cyanide (total) (mg/liter)	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02
Cyanide (Amenable) (mg/liter)	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02

APPENDIX D

DATABASE: SURFACE IMPOUNDMENT SAMPLING

APPENDIX E

BACKGROUND LEVELS

BUFFALO COLOR CORPORATION
GROUNDWATER MONITORING PROGRAM
DETERMINATION OF BACKGROUND LEVELS

Parameter	Well	N	X	Sx
pH in pH Units	UG Wells R02+R07	76	9.51236	0.21534
	DG Well R03	40	9.25625	0.35546
	DG Well R05	40	9.72650	0.20717
	DG Well R06	40	8.76750	0.23084
Specific Conductance (umohs)	UG Wells R02+R07	76	228.000	44.417
	DG Well R03	40	207.750	41.535
	DG Well R05	40	261.225	66.973
	DG Well R06	40	365.425	101.052
Total Organic Carbon (mg/liter)	UG Wells R02+R07	76	6.63737	1.74086
	DG Well R03	40	6.42425	2.21772
	DG Well R05	40	6.12425	2.50414
	DG Well R06	40	10.40625	2.10434
Total Organic Halogen (mg/liter)	UG Wells R02+R07	76	0.03238	0.03445
	DG Well R03	40	0.02175	0.01451
	DG Well R05	40	0.01690	0.00552
	DG Well R06	40	0.02545	0.01116

N = Total number of replicates

X = Average of N replicates

S_x = Standard deviation

UG = Upgradient

DG = Downgradient

BUFFALO COLOR CORPORATION
GROUNDWATER MONITORING PROGRAM
TREATMENT PLANT LAGOONS PERIMETER

SOURCES OF DATA

The database for this calculation has been reported as follows:

DATE OF SAMPLING	FORM OF REPORT	PARAMETERS SAMPLED *	NUMBER OF WELLS OF WELLS **
07-18-84	First Quarterly Moitoring Report	IGD	1UG + 3DG
08-02-84	Special Report for NYDEC	I	2UG + 3DG
08-16-84	Special Report for NYDEC	I	2UG + 3DG
09-19-84	Second Quarterly Monitoring Report	IGD	2UG + 3DG
10-22-84	Facility Annual Report - 1984	I	2UG + 3DG
11-01-84	Facility Annual Report - 1984	I	2UG + 3DG
11-19-84	Facility Annual Report - 1984	I	2UG + 3DG
11-29-84	Facility Annual Report - 1984	I	2UG + 3DG
12-20-84	Third Quarterly Monitoring Report	IGD	2UG + 3DG
03-15-85	Fourth Quarterly Monitoring Report	IGD	2UG + 3DG

* I = Indicator Parameters
G = Groundwater Quality Parameter
D = Drinking Water Parameters

** UG = Upgradient
DG = Downgradient

APPENDIX F

STATISTICAL CALCULATIONS

CALCULATION OF STATISTICAL SIGNIFICANCE

		N	Average	Std. Dev	Calc. t	Crit. t	% Sig.
Background Wells R02, R07	pH	76	9.5124	0.2153	-	-	-
	Specific Conductance	76	228.0000	44.4170	-	-	-
	Total Organic Carbon	76	6.6374	1.7409	-	-	-
	Total Organic Halogen	76	0.0324	0.0345	-	-	-
Downgradient Well R03	pH	4	9.0700	0.0141	4.062	1.99	>95
	Specific Conductance	4	311.0000	2.5820	3.715	1.67	>95
	Total Organic Carbon	4	5.3540	0.1836	- 1.465	1.67	
	Total Organic Halogen	4	0.01650	0.00173	- 0.073	1.67	
Downgradient Well R05	pH	4	9.2225	0.0206	2.677	1.99	>95
	Specific Conductance	4	322.0000	4.3205	4.206	1.67	>95
	Total Organic Carbon	4	5.5200	0.3290	- 1.275	1.67	
	Total Organic Halogen	4	0.01050	0.00100	- 0.101	1.67	
Downgradient Well R06	pH	4	9.1575	0.0299	3.277	1.99	>95
	Specific Conductance	4	473.0000	3.7416	10.964	1.67	>95
	Total Organic Carbon	4	11.6900	0.4349	5.762	1.67	>95
	Total Organic Halogen	4	0.02025	0.00236	- 0.056	1.67	

Critical t value is at 95% confidence for 74 degrees of freedom.

Observations

1. Downgradient Well R03 shows significant change in pH and specific conductance.

2. Downgradient Well R05 shows significant change in pH and specific conductance.

3. Downgradient Well R06 shows significant change in pH, specific conductance, and total organic carbon.

4. All three pH changes are in the opposite direction from that which would occur if the alkaline lagoons were leaking their contents to the lower aquifer.

5. Both the upgradient wells and all three downgradient wells show increases over previous norms. The increase is a more stable number than either the previous norm or the current average.

	Previous Norm	Current Average	Difference
Upgradient Well R02, R07	228.0	316.0	88.0
Downgradient Well R03	207.7	311.0	103.3
Downgradient Well R05	261.2	322.0	60.8
Downgradeint Well R06	365.4	473.0	107.6
Standard Deviation	63.0	78.4	21.2

Thus, it appears that wet weather equally elevated the specific conductance of all of the wells during September 19 sampling.

6. Well R06 shows a definite increase in Total Organic Carbon as compared to the other wells. It should be noted that the site is built on what was once the site of an oil refinery and distribution center.

APPENDIX G

EVALUATION OF MONITORING DATA

EVALUATION OF GROUNDWATER QUALITY PARAMETERS

MEDIAN MONITORING RESULT

	UPGRADIENT R02 + R07	DOWNGRADIENT R03	R05	R06	EVALUATION
Chloride (mg/liter)	18.0	12.0	10.0	35.0	(3)
Sulfate (mg/liter)	4.0	4.0	12.2	10.7	(2) (3)
Phenol	< 0.001	< 0.010	< 0.005	< 0.005	(0)
Iron (mg/liter)	15.35	12.96	13.02	12.67	(0)
Sodium (mg/liter)	62.5	62.0	60.0	63.8	(3)
Manganese (mg/liter)	0.195	0.122	0.122	0.120	(0)

Standard is assumed to be equal to media upgradient result.

(0) Median downgradient results exceed neither the standard nor the median upgradient results.

(1) Elevated level in d.g. Well R03 carries it over the standard

(2) Elevated level in d.g. Well R05 carries it over the standard

(3) Elevated level in d.g. Well R06 carries it over the standard

(4) Elevated level in at least one d.g. well

(5) Median upgradient results exceeds the standard

(6) Median d.g. results do not exceed the standard

EVALUATION OF DRINKING WATER PARAMETERS (METALS)

	UPGRADIENT R02 + R07	DOWNGRADIENT R03	R05	R06	STANDARD	EVALUATION
Arsenic (mg/liter)	0.001	0.030	0.017	0.011	0.05	(6) (4)
Barium (mg/liter)	0.059	0.043	0.071	0.062	1.00	(6) (4)
Cadmium (mg/liter)	0.002	0.028	0.037	0.015	0.01	(1) (2) (3)
Chromium (mg/liter)	0.019	0.035	0.042	0.012	0.05	(6) (4)
Lead (mg/liter)	0.008	0.023	0.013	0.015	0.05	(6) (4)
Mercury (mg/liter)	0.0005	0.0006	0.0009	0.0005	0.002	(6) (4)
Selenium (mg/liter)	0.002	0.048	0.030	0.018	0.01	(1) (2) (3)
Silver (mg/liter)	< 0.001	0.001	0.001	0.001	0.05	(6) (4)

(0) Median downgradient results exceed neither the standard nor the median upgradient results.

(1) Elevated level in d.g. Well R03 carries it over the standard

(2) Elevated level in d.g. Well R05 carries it over the standard

(3) Elevated level in d.g. Well R06 carries it over the standard

(4) Elevated level in at least one d.g. well

(5) Median upgradient results exceeds the standard

(6) Median d.g. results do not exceed the standard

EVALUATION OF DRINKING WATER PARAMETERS (CONVENTIONAL)

	MEDIAN MONITORING RESULT					
	UPGRADIENT	DOWNGRADIENT				
	R02 + R07	R03	R05	R06	STANDARD	EVALUATION
Nitrate as N (mg/liter)	17.0	23.5	18.0	28.5	10.0	(5) (4)
Fluoride (mg/liter)	0.69	0.55	0.46	0.54	1.4-2.4	(5) (4)
Coliform (1/000 ml)	4	12	7	6	1	(5) (4)
Turbidity (NTU)	80	133	115	120	1	(5) (4)

(0) Median downgradient results exceed neither the standard nor the median upgradient results.

(1) Elevated level in d.g. Well R03 carries it over the standard

(2) Elevated level in d.g. Well R05 carries it over the standard

(3) Elevated level in d.g. Well R06 carries it over the standard

(4) Elevated level in at least one d.g. well

(5) Median upgradient results exceeds the standard

(6) Median d.g. results do not exceed the standard

EVALUATION OF DRINKING WATER PARAMETERS

(PESTICIDES)

MEDIAN MONITORING RESULT

	UPGRADIENT	DOWNGRADIENT				
	R02 + R07	R03	R05	R06	STANDARD	EVALUATION
Lindane (ug/liter)	< 0.01	< 0.01	< 0.01	< 0.01	4.0	(0)
Endrin (ug/liter)	< 0.05	< 0.05	< 0.05	< 0.05	0.2	(0)
Methoxychlor (ug/liter)	< 0.02	< 0.02	< 0.02	< 0.02	100.0	(0)
Toxaphene (ug/liter)	< 0.50	< 0.50	< 0.50	< 0.50	5.0	(0)
2,4-D (ug/liter)	< 0.10	< 0.10	< 0.10	< 0.10	100.0	(0)
2,4,5-TP (ug/liter)	< 0.10	< 0.10	< 0.10	< 0.10	10.0	(0)

(0) Median downgradient results exceed neither the standard nor the median upgradient results.

(1) Elevated level in d.g. Well R03 carries it over the standard

(2) Elevated level in d.g. Well R05 carries it over the standard

(3) Elevated level in d.g. Well R06 carries it over the standard

(4) Elevated level in at least one d.g. well

(5) Median upgradient results exceeds the standard

(6) Median d.g. results do not exceed the standard

EVALUATION OF DRINKING WATER PARAMETERS

(RADIATION)

MEDIAN MONITORING RESULTS

	UPGRADIENT	DOWNGRADIENT				
	RO2 + RO7	RO3	RO5	RO6	STANDARD	EVALUATION
Gross Alpha (pci/liter)	3.5	3.35	4.75	2.9	15.0	(6) (4)
Gross Beta (pci/liter)	< 10.0	12.35	22.05	13.50	15.0	(2)
Radium (pci/liter)	< 3.0	< 3.0	< 3.0	< 3.0	5.0	(0)

(0) Median downgradient results exceed neither the standard nor the median upgradient results.

(1) Elevated level in d.g. Well RO3 carries it over the standard

(2) Elevated level in d.g. Well RO5 carries it over the standard

(3) Elevated level in d.g. Well RO6 carries it over the standard

(4) Elevated level in at least one d.g. well

(5) Median upgradient results exceeds the standard

(6) Median d.g. results do not exceed the standard

EVALUATION OF SURFACE IMPOUNDMENT PARAMETERS

MEDIAN MONITORING RESULTS

	UPGRADIENT	DOWNGRADIENT			EVALUATION
	RO2 + RO7	RO3	RO5	RO6	
Aniline (mg/liter)	< 0.010	< 0.010	< 0.010	< 0.010	(0)
N-Methylaniline (mg/liter)	< 0.010	< 0.010	< 0.010	< 0.010	(0)
N,N-Dimethylaniline	< 0.010	< 0.010	< 0.010	< 0.010	(0)
N-Ethylaniline (mg/liter)	< 0.010	< 0.010	< 0.010	< 0.010	(0)
N,N-Diethylaniline (mg/liter)	< 0.010	< 0.010	< 0.010	< 0.010	(0)
Cyanide (Total) (mg/liter)	< 0.02	< 0.02	< 0.02	< 0.02	(0)
Cyanide (Free (mg/liter)	< 0.02	< 0.02	< 0.02	< 0.02	(0)

(0) Median downgradient results exceed neither the standard nor the median upgradient results.

(1) Elevated level in d.g. Well RO3 carries it over the standard

(2) Elevated level in d.g. Well RO5 carries it over the standard

(3) Elevated level in d.g. Well RO6 carries it over the standard

(4) Elevated level in at least one d.g. well

(5) Median upgradient results exceeds the standard

(6) Median d.g. results do not exceed the standard