RECEIVED
EPA/REGION IV
AUG 16 8 01 AM '99
WASTE
COMPLIANCE SECTION

ENVIRONMENTAL ASSISTANCE CENTER
TENNESSEE DEPARTMENT OF ENVIRONMENT AND CONSERVATION
2305 SILVERDALE ROAD
JOHNSON CITY, TENNESSEE 37601-2162
(423) 854-5400 STATEWIDE 1-888-891-8332 FAX (423) 854-5401

August 10, 1999

Glenn Asher, Supervisor
Chemtec Chemical Technologies, LLC
Bemberg Industrial Center
Tony Fuller Road, Unit 5
Elizabethton, Tennessee 37643

RE: Hazardous Waste Inspection
TNR 00-000-8482

Dear Mr. Asher:

This letter confirms the observations and recommendations which were made during the Hazardous Waste Non-Notifier Inspection conducted at Chemtec Chemical Technologies, LLC on July 2, 1999. The attached inspection report verifies that no violations were identified during the inspection.

If you have any questions or comments concerning this letter or any part of the inspection report, do not hesitate to contact me at 854-5435.

Sincerely,

Fred Willingham

Fred Willingham
Division of Solid Waste Management

FW/14069222 CONFIRM

Attachment

cc: Ms. Loriann Brown, EPA, Region IV, Atlanta
DSWM, Nashville
DSWM, JCEAC File #10-0 NN

HAZARDOUS WASTE INSPECTION REPORT

SITE/PHYSICAL LOCATION:

Chemtec Chemical Technologies, LLC
TNR 00-000-8482
Bemberg Industrial Center
Tony Fuller Road, Unit 5
Elizabethton, Tennessee

PRIMARY CONTACT(S):

Glenn Asher, Supervisor
Chemtec Chemical Technologies, LLC
Bemberg Industrial Center
Tony Fuller Road, Unit 5
Elizabethton, Tennessee 37643
423/547-0993

DATE/TIME OF INSPECTION:

July 2, 1999 starting at 9:10

INSPECTION PARTICIPANTS:

Glenn Asher, Supervisor, Chemtec Chemical Technologies, LLC
Bethanie Glynn, DSWM
Fred Willingham, DSWM

REPORT PREPARED BY:

Fred Willingham
Division of Solid Waste Management
2305 Silverdale Road
Johnson City, Tennessee 37601
423/854-5435

PURPOSE OF INSPECTION:

This inspection was conducted in response to an oral complaint and to evaluate Chemtec Chemical Technologies' compliance with the applicable requirements of the Rules and Regulations promulgate pursuant to the Hazardous Waste Management Act, T.C.A. 68-212 part 1.

FACILITY DESCRIPTION:

Chemtec Chemical Technologies, LLC is a job shop chemical manufacturer. Presently, the company is manufacturing rare earth chlorides. Standard Industrial Classification Code:2819

INSPECTION FINDINGS:

Based on the information provided to the Division, Chemtec Chemical Technologies, LLC is a non-generator of hazardous waste. A detailed description of the processes and wastes generated is as follows:

Rare earth sulfates, purchased from Government stockpiles, are stored on-site in 55-gallon drums. The sulfates are reacted with 50% NaOH in the presence of heat to form rare earth hydroxides and sodium sulfate. The rare earth hydroxides are removed from the liquid and dewatered in a filter press. The sodium sulfate solution is pumped to an evaporator and the resulting sodium sulfate solids are managed as a special waste at Iris Glen Environmental Center. Chemtec has Division approval to dispose of this waste. The rare earth hydroxides are dissolved in a 32% HCl solution to form rare earth chlorides. This liquid is collected and shipped via tankers to W. R. Grace of Chattanooga for further processing. The rare earth chlorides are used as cracking catalyst in the petroleum refining industry.

A 3000-gallon tank receives all wastewaters generated in a quality control laboratory. All wastes generated at the air scrubber located at the hydroxide/HCl process are pumped to the 3000-gallon tank. This tank also receives all blow-down from an on-site boiler. The contents of the tank is constantly monitored for pH and automatically adjusted to a pH of 6 to 9 before discharge into the Elizabethton Sanitary Sewer. On July 2, 1999, Water Pollution Control personnel conducted a dye trace and determined the waste stream entered a storm drain and discharged to the Watauga River. The Division of Water Pollution Control will address this discharge. Chemtec has analytical results from this discharge which indicate the waste is not hazardous.

VIOLATIONS:

No violations of Tennessee's Hazardous Waste Management Regulations were identified during this compliance evaluation.

SIGNED: Fred Willingham DATE: 8-10-99

REVIEWED: John White DATE: 8-10-99

FW/14079222 HWIR 10-0 NN

NORTH AMERICAN RAYON CORPORATION
WEST ELK AVENUE
ELIZABETHTON, TENNESSEE 37643

Telephone.
615/542-2141

August 18, 1980

Mr. Ray Cozart
Region IV RCRA Activities
Atlanta, Georgia 30308

Dear Mr. Cozart:

This is to inform you that North American Rayon Corporation is sending notification of hazardous waste activity (Form 8700-12). We are sending the notification with this letter because testing has not yet been performed and we are not absolutely sure we should notify. This letter is enclosed to insure North American Rayon Corporation does not violate the 3010 notification requirement in the event testing reveals that we, in fact, do generate hazardous waste. Please do not construe this notification to mean this facility generates, treats, stores, or transports hazardous waste.

If I can be of further assistance in this matter, please do not hesitate to call.

Sincerely,

Bobby Beam

Bobby Beam

BGB:bb

DOCKET NO. 1 000013
COR
0000001
T095051207

ecology and environment, inc.

195 SUGG ROAD, P.O. BOX D, BUFFALO, NEW YORK 14225, TEL. 716-632-4491, TELEX 91-9183

International Specialists in the Environmental Sciences

November 17, 1980

Bobby Beam
North American Rayon Corp.
Elizabeth, Tennessee 37643

Dear Mr. Beam:

Attached is a laboratory report of the analysis of one waste sample received at our laboratory on Nov. 10, 1980.

The sludge was subjected to the "EP Toxicity Test" and the extract analyzed according to methods published in the May 19, 1980, Federal Register, part 261, appendix II, containing EPA hazardous waste regulations.

The high levels of Barium in the extract indicate that the waste must be classified as a hazardous waste.

We will hold the sample for 30 days, if you should wish further testing. Thank you for the opportunity to work with you on this project.

Very truly yours,

Gary Hahn

Gary Hahn
Manager,
Analytical Services Center

GH/oio

Enclosure

COR

DOCKET NO. 000015 000001

T095051207

ecology and environment, inc.
International Specialists in the Environmental Sciences

LABORATORY REPORT

NORTH AMERICAN RAYON CORP.
SOLID WASTE CLASSIFICATION TEST
November 14, 1980

Sample ID: Sludge

Sample Date: Nov. 4, 1980

E & E Lab Number: 1502

	Maximum Allowable Concentration	Analysis of Extract Sludge
Sample pH	2-12.5	9.3
Arsenic, mg/l	5.0	0.075
Barium, "	100	265
Cadmium, "	1.0	<0.010
Chromium, "	5.0	0.015
Lead, "	5.0	0.060
Mercury, "	0.2	0.0005
Selenium, "	1.0	<0.002
Silver, "	5.0	<0.2
Endrin, "	0.02	<0.0005
Lindane,	0.4	<0.0005
Methoxychlor. "	10.0	<0.005
Toxaphene, "	0.5	<0.01
2, 4 D, "	10.0	<0.005
245 TP, "	1.0	<0.005

COR

DOCKET NO. 000015-S 000002

T095051207

recycled paper

ecology and environment, inc.

Tri-State Analytical Laboratory
P. O. BOX 1186
1582 EAST CENTER ST.
KINGSPORT, TENNESSEE 37662
(615) 245-7961

November 19, 1980

Mr. Jack Connely
North American Rayon Corp.
Elizabethton, Tennessee 37643

ANALYSIS REPORT

Sample Date: 11-17-80
Sample : Water and Sludge Samples for Barium

1. Sludge	39.0 mg/l	Barium
2. Scrubber Discharge	6.6 mg/l	"
3. Spring Water	<0.1 mg/l	"
4. River Water	<0.1 mg/l	"
5. Well Water	<0.1 mg/l	"

Kendred A. Young
Kendred A. Young

RECEIVED
NOV 24 1980
JMCOR

DOCKET NO. 00 000017 000001
T095051207

I-10-00 FEB 0

NORTH AMERICAN RAYON CORPORATION
WEST ELK AVENUE
ELIZABETHTON, TENNESSEE 37643

Telephone
615/542-2141

January 30, 1981

Division of Solid Waste Management
326 Capitol Hill Building
301 Seventh Avenue, North
Nashville, TN 37219

Dear Sir:

Enclosed please find completed forms PH-2019 and PH-2021 with supporting laboratory results attached. This notification concerns the waste sludge generated through our physical-chemical waste treatment facilities.

At this time, we are in the process of testing three manufacturing by-products to determine if they will fall into the hazardous waste category. It is my feeling that these three will not be classified as hazardous. As soon as results are obtained, I shall forward them to you and if necessary the completed form PH-2021.

Should you desire further information, please contact me at 615-542-2141 - Extension 475.

Sincerely,

Bobby Beam

Bobby Beam

BGB:bb

Enclosure

200-01

DOCKET NO. 000018 COR
U 000001
T095051207

NORTH AMERICAN RAYON CORPORATION
WEST ELK AVENUE
ELIZABETHTON, TENNESSEE 37643

Telephone.
615/542-2141

February 25, 1981

Ms. Rita Ford
EPA Region IV
RCRA Activities
345 Courtland Street, N.E.
Atlanta, Ga. 30365

Dear Rita:

Re: Application for Hazardous Waste Permit
TND 095 051 207

Enclosed please find Part A of RCRA permit application. The items marked have been corrected as per your letter of January 21, 1981. Unfortunately, the U.S. Geological Service did not send a map sufficient to cover the requirements delineated in the instruction pamphlet. I have, however, completed all the information requested. Another map will be needed to fully show our legal property boundaries and this will be enclosed to you, under separate cover, as soon as possible.

Please note the addition made in Part IV of Form 3. If you have any questions, please do not hesitate to call me at 615-542-2141.

Sincerely,

Bobby Beam

Bobby Beam

BGB:bb

Enclosure

DOCKET NO. 000020
COR

000001
T095051207

Tri-State Analytical Laboratory
P. O. BOX 1186
1582 EAST CENTER ST.
KINGSPORT, TENNESSEE 37662
(615) 245-7961

November 19, 1980

Mr. Jack Connely
North American Rayon Corp.
Elizabethton, Tennessee 37643

ANALYSIS REPORT

Sample Date: 11-17-80
Sample : Water and Sludge Samples for Barium

1. Sludge	39.0 mg/l	Barium
2. Scrubber Discharge	6.6 mg/l	"
3. Spring Water	<0.1 mg/l	"
4. River Water	<0.1 mg/l	"
5. Well Water	<0.1 mg/l	"

Kendred A. Young
Kendred A. Young

RECEIVED
NOV 24 1980
JMC COR

DOCKET NO. 80 000017 000001
T095051207

NORTH AMERICAN RAYON CORPORATION
WEST ELK AVENUE
ELIZABETHTON, TENNESSEE 37643
Telephone.
615/542-2141

CONSOLIDATED
PERMITS BRANCH
RECEIVED
JUN 23 1981
EPA-REGION IV
ATLANTA, GA.

June 18, 1981

Ms. Pauline Anderson
U. S. Environmental Protection Agency
Consolidated Permits Branch
345 Courtland Street, N. E.
Atlanta, Georgia 30365

Dear Ms. Anderson:

Please find enclosed Section 3007 RCRA Questionnaire that you requested.

Sincerely,

Bobby Beam/pr

Bobby Beam

BB/pr

Enclosure

DOCKET NO. 1 000021

000001

5051207

I-10-00 FEB 03

NORTH AMERICAN RAYON CORPORATION

WEST ELK AVENUE
ELIZABETHTON, TENNESSEE 37643

Telephone
615/542-2141

January 30, 1981

Division of Solid Waste Management
326 Capitol Hill Building
301 Seventh Avenue, North
Nashville, TN 37219

Dear Sir:

Enclosed please find completed forms PH-2019 and PH-2021 with supporting laboratory results attached. This notification concerns the waste sludge generated through our physical-chemical waste treatment facilities.

At this time, we are in the process of testing three manufacturing by-products to determine if they will fall into the hazardous waste category. It is my feeling that these three will not be classified as hazardous. As soon as results are obtained, I shall forward them to you and if necessary the completed form PH-2021.

Should you desire further information, please contact me at 615-542-2141 - Extension 475.

Sincerely,

Bobby Beam

Bobby Beam

BGB:bb

Enclosure

200-01

DOCKET NO. 000018 COR
0 000001

T095051207

NORTH AMERICAN RAYON CORPORATION
WEST ELK AVENUE
ELIZABETHTON, TENNESSEE 37643

Telephone.
615/542-2141

February 25, 1981

Ms. Rita Ford
EPA Region IV
RCRA Activities
345 Courtland Street, N.E.
Atlanta, Ga. 30365

Dear Rita:

Re: Application for Hazardous Waste Permit
TND 095 051 207

Enclosed please find Part A of RCRA permit application. The items marked have been corrected as per your letter of January 21, 1981. Unfortunately, the U.S. Geological Service did not send a map sufficient to cover the requirements delineated in the instruction pamphlet. I have, however, completed all the information requested. Another map will be needed to fully show our legal property boundaries and this will be enclosed to you, under separate cover, as soon as possible.

Please note the addition made in Part IV of Form 3. If you have any questions, please do not hesitate to call me at 615-542-2141.

Sincerely,

Bobby Beam

Bobby Beam

BGB:bb

Enclosure

DOCKET NO. 000020
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RETURN TO:

PAULINE ANDERSON
U. S. Environmental Protection Agency
Consolidated Permits Branch
345 Courtland Street, N.E.
Atlanta, Georgia 30365

RECEIVED
EPA/REGION IV

JUL 2 12 49 PM '81

ENFORCEMENT
DIVISION

SECTION 3007 RCRA QUESTIONNAIRE

1. I have reexamined the definitions for treating, storing or disposing of Hazardous Waste and I wish to withdraw Part A of the permit application.

Yes _____ No _____

2. I have reexamined the definitions for treating, storing, or disposing of Hazardous Waste and I wish to add the TSD activity to my original Notification.

Yes X No _____

TND095051207
North American Rayon Corp.
W Elk Ave
Elizabethton, TN 37643

Bobby G. Beam
(SIGNATURE)

Supervisor
(TITLE) PLEASE PRINT OR TYPE

6/18/81 (615) 542-2141
(DATE) (PHONE NUMBER)

ADD
VI C

DOCKET NO. 1 000021

00 000002

T095051207

September 14, 1981

North American Rayon Corp.
West Elk Avenue
Elizabethton, TN 37631

Attention: Robert L. McClure

Dear Mr. McClure,

I have examined the sample of waste (liquid and solid) for Barium, following the filtration and extraction procedure you provided. The procedure is outlined below:

1) 100.0 g sample was filtered (0.45u) which gave 74.0 g liquid (Filtrate I) and 26 g wet solid residue (9.0 g dry).

   note. Since the procedure was unclear whether wet or dry residue weight should be used, I used an intermediate value, 16g.

2) Residue was extracted for 24 hours at pH = 5 with 16x16 = 256 ml of water. This was then filtered, yielding Filtrate II which was diluted to 20x16 = 320

3) Barium Analysis by Flame emission at 553.6 nm.

   Filtrate I 1.1 ppm Barium

   Filtrate II 0.02 ppm Barium

Calculate concentration if Filtrate I & II are combined to get final solution for given procedure:

$$1.1 \times 74/394 + 0.02 \times 320/394 = 0.2 \text{ ppm Barium}$$

Sincerely,

Lou R. Raasch

Dr. Lou R. Raasch

DOCKET NO. 1 000022

COR

0 000001

T095051207

I-10-001

January 6, 1982

Mr. H. E. Britt
Vice President Manufacturing
North American Rayon Corporation
West Elk Avenue
Elizabethton, Tennessee 37643

Dear Mr. Britt:

The hazardous waste notification forms filed for North American Rayon Corporation, located in Elizabethton, have been processed by our Nashville Office. Recently those notification forms were routed to the Johnson City Office for the appropriate follow-up.

On January 5, 1982, you were contacted by telephone by a staff member of the Johnson City Office. The purpose of that contact was to set a specific date to conduct a full treatment, storage and disposal facilities interim status hazardous waste inspection of North American Rayon Corporation.

Staff members will be at North American Rayon Corporation, on February 9, 1982 at 9:00 A. M. Please find enclosed a copy of the inspection checklist. This checklist should help you prepare for the inspection.

If I can be of any further assistance on this matter, please do not hesitate to contact me.

Sincerely,

D. Larry Gilliam
Regional Manager
Division of Solid Waste Management

DLG/df

Enclosure: TSDF Checklist

cc: Carter County Health Department
Nashville, Division of Solid Waste Management

DOCKET NO. 00 000023

COR

200-02

000001

T095051207

Stewart Laboratories, Inc.

5815 MIDDLEBROOK PIKE KNOXVILLE, TENNESSEE 37921

CERTIFICATE OF ANALYSIS

TO: North American Rayon Corporation
ATTN: Mr. Harry Farthing
West Elk Avenue
Elizabethton, TN 37643

DATE REPORTED: February 25, 1982
CODE: NAR 14285
ORDER No.: 78812-E62

Sample Description: One (1) sludge and one (1) fly ash sample received February 17, 1982

Concentration units are mg/liter (ppm) in the extract

	#1, Sludge Composite (2/16/82)	#2, Fly Ash (2/16/82)
Arsenic	0.038	0.021
Barium	0.74	0.24
Cadmium	<0.001	0.001
Chromium	0.07	<0.01
Lead	0.06	<0.01
Mercury	<0.001	<0.001
Selenium	<0.008*	0.006
Silver	<0.002	<0.002
Liquid to Solid Ratio (vol.)	0.28	0
Original Weight (solids)	50. grams	50. grams
Final Volume (extract)	840. ml	1000. ml

* Higher detection limit due to matrix interferences

Sample extracted in accordance with "EP Toxicity Test - Extraction Procedure," Federal Register, Vol. 45, No. 98, p. 33127-33128.

Sworn to and subscribed before me this 25th day of February, 1982

NOTARY PUBLIC

My commission expires December 14, 1983

STEWART LABORATORIES, INC.

By

DOCKET NO. 000024

COR 000001

T095051207

TENNESSEE DEPARTMENT OF PUBLIC HEALTH
Environmental Management and Quality Assurance Administration
T.E.R.R.A. BUILDING
150 NINTH AVENUE, NORTH
NASHVILLE, TENNESSEE 37203

June 3, 1982

Harry Farthing
North American Rayon Corporation
West Elk Ave.
Elizabethton, TN 37643

Re: Withdrawal of the hazardous waste permit application for North American Rayon Corporation TND095051207

Dear Mr. Farthing:

This letter is to acknowledge receipt of your request for withdrawal of your application for a permit under the Tennessee Hazardous Waste Management Act, as amended, TCA 53-6301, et. seq. Your letter indicated you have had your waste retested and determined that it does not meet the characteristics for hazardous waste and you no longer need a permit.

It has been our general experience that the hazardous waste regulations and subsequent amendments which have been adopted since the effective date of the regulations, have cause confusion, and have been subjected to misinterpretations. This confusion on the part of the regulated community has been compounded, due to the State's and EPA's overlapping responsibilities for implementation of the hazardous waste regulatory program during the period of interim authorization.

Withdrawal of your permit application constitutes revocation of interim status, as discussed in Rule 1200-1-11-.07(3)(e) of the "Rules Governing Hazardous Waste Management in Tennessee".

In light of the foregoing, our plans are to proceed as follows. We will place your permit application in our "suspense" file. This action, in essence, revokes your interim status. However, your request will be reviewed by our field office. If they agree that you do not need a permit, we will notify you of this determination, your application will be formally withdrawn, and inactivated.

DOCKET NO. 000027

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T095051207

Finally, your request to withdraw interim status means that you may not treat, store, or dispose of hazardous waste without a permit.

If for any reasons you wish to reconsider this withdrawal request, please advise this office within the next 10 days. If you need further clarification, please contact Wayne Gregory of my staff at (615) 741-3424.

Sincerely,

Tom Tiesler RM

Tom Tiesler, Director
Division of Solid Waste Management

TT/ns/6-2 SW-30

DOCKET NO. 000027
COR
000002
T095051207

ecology and environment, inc.

195 SUGG ROAD, P.O. BOX D, BUFFALO, NEW YORK 14225, TEL. 716-632-4491, TELEX 91-9183

International Specialists in the Environmental Sciences

November 17, 1980

Bobby Beam
North American Rayon Corp.
Elizabeth, Tennessee 37643

Dear Mr. Beam:

Attached is a laboratory report of the analysis of one waste sample received at our laboratory on Nov. 10, 1980.

The sludge was subjected to the "EP Toxicity Test" and the extract analyzed according to methods published in the May 19, 1980, Federal Register, part 261, appendix II, containing EPA hazardous waste regulations.

The high levels of Barium in the extract indicate that the waste must be classified as a hazardous waste.

We will hold the sample for 30 days, if you should wish further testing. Thank you for the opportunity to work with you on this project.

Very truly yours,

Gary Hahn

Gary Hahn
Manager,
Analytical Services Center

GH/oio

Enclosure

COR

DOCKET NO. 000015 000001

T095051207

L-10-001

ecology and environment, inc.
International Specialists in the Environmental Sciences

LABORATORY REPORT

NORTH AMERICAN RAYON CORP.
SOLID WASTE CLASSIFICATION TEST
November 14, 1980

Sample ID: Sludge

Sample Date: Nov. 4, 1980

E & E Lab Number: 1502

	Maximum Allowable Concentration	Analysis of Extract Sludge
Sample pH	2-12.5	9.3
Arsenic, mg/l	5.0	0.075
Barium, "	100	265
Cadmium, "	1.0	<0.010
Chromium, "	5.0	0.015
Lead, "	5.0	0.060
Mercury, "	0.2	0.0005
Selenium, "	1.0	<0.002
Silver, "	5.0	<0.2
Endrin, "	0.02	<0.0005
Lindane,	0.4	<0.0005
Methoxychlor, "	10.0	<0.005
Toxaphene, "	0.5	<0.01
2, 4 D, "	10.0	<0.005
245 TP, "	1.0	<0.005

COR

DOCKET NO. 000015-8 000002

T095051207

TENNESSEE DEPARTMENT OF PUBLIC HEALTH
FIRST TENNESSEE REGIONAL HEALTH OFFICE
1233 SOUTHWEST AVE. EXT.
JOHNSON CITY, TENNESSEE 37601

April 5, 1982

Mr. Ed Britt
North American Rayon Corporation
West Elk Avenue
Elizabethton, Tennessee 37643

Dear Mr. Britt:

Enclosed please find copies of the EP toxicity test results for the sludge sample and the flyash sample taken at your plant on February 16, 1982.

As you can see from the results, all values are below the maximum allowable concentrations for a waste to exhibit the characteristic of EP toxicity.

If you have any questions concerning this letter please feel free to call us at 928-8301.

Sincerely,

Taisa E. Essary

Taisa E. Essary
Chemist
Division of Solid Waste Management

TEE/jb

Enclosure

cc: Mr. Larry Gilliam, SWM, Johnson City
Suzy Riddle, SWM, Johnson City
Solid Waste Management, Nashville
Carter County Health Department

DOCKET NO. 000025
COR
000001
T095051207

Division of Water Quality Co[illegible] [illegible] Department of Public H[illegible]

SOURCE North American Rayon Mil:

IDENTIFICATION lagoon (sludge sample)

Field Number 1 Collected By TEE Primary Station Number Date Collected 8202

Time Collected 10 10 Sample Depth (ft) Laboratory No. SWM 2

10-Temperature °C		2	340-C.O.D. mg/L (High Level)		
300-D.O. mg/L		3	335 C.O.D. mg/L (Low Level)		
310-5-day B.O.D. 20 °C mg/L		4	70508 Acidity Total - Hot mg/L		
403-pH, Lab.		5	412 Alkalinity (Net) mg/L		
400-pH, Field		6	38260-MBAS mg/L		
81-App. Color Pt - Co units		7	95-Conductivity Micromho 25 °C		
80-True Color Pt - Co units		8	1105-Aluminum as Al ug/L		
70-Turbidity NTU		9	1007-Barium as Ba ug/L	✓	600
410-Total Alk. as $CaCO_3$ mg/L		10	1032-Chromium-Hex. as Cr. ug/L		
415-Phth. Alk. As $CaCO_3$ mg/L		11	1033-Chromium-Tri. as Cr. ug/L		
437-Acidity as $CaCO_3$ mg/L		12	1034-Chromium-total as Cr. ug/L	✓	84
900-Total Hardness as $CaCO_3$ mg/L		13	1037-Cobalt as Co ug/L		
910-Calcium as $CaCO_3$ mg/L		14	1147-Selenium-total as Se ug/L	✓	<1
927-Magnesium as Mg mg/L		15	1145-Selenium (Diss.) as Se ug/L		
929-Sodium as Na mg/L		16	1077-Silver as Ag ug/L	✓	8
937-Potassium as K mg/L		17	32730-Phenols ug/L		
500-Total Residue mg/L		18	1022-Boron-Total as B ug/L		
530-Sus. Residue mg/L		19	615-Nitrite Nitrogen as N mg/L		
515-Diss. Residue mg/L		20	620-Nitrate Nitrogen as N mg/L		
31501-Coliform No./100 ml		21	405-Free CO_2 mg/L		
31616-Fecal Coliform No./100 ml.		22	505-Total Vol. Residue mg/L		
31679-Fecal Strep. No./100ml.		23	535-Vol. Sus. Residue mg/L		
635-Total Kjl. Nitrogen as N mg/L		24	545-Settleable Residue ml/L		
630-NO_3 & NO_2 as N mg/L		25	666-Diss. Phosphate as P mg/L		
1097-Antimony as Sb ug/L		26	745-Sulfide, total as S mg/L		
1045-Iron as Fe ug/L		27	746-Sulfide, Dissolved as S mg/L		
1055-Manganese as Mn ug/L		28	369-Cl_2 Demand, 30 min. mg/L		
940-Chloride as Cl mg/L		29	50064-Cl_2, Free Res. mg/L		
950-Fluoride as F mg/L		30	50060-Cl_2, Combined Res. mg/L		
665-Total Phosphate as P mg/L		1	690-Total Carbon mg/L		
945-Sulfate as SO_4 mg/L		2	550-Oil and Grease mg/L		
680-Total Organic Carbon mg/L		3	720-Cyanide as CN mg/L		
1067-Nickel as Ni ug/L		4	32240-Tannin and Lignin mg/L		
71900-Mercury-Total as Hg ug/L	✓ <0.2	5	610-Ammonia Nitrogen as N mg/L		
1051-Lead as Pb ug/L	✓ 230	6	605-Organic Nitrogen as N mg/L		
1042-Copper as Cu ug/L		7	58-Flow Rate CFM		
1002-Arsenic as As ug/L	✓ 32	8	61-Flow Rate CFS, Instantaneous		
1027-Cadmium as Cd ug/L	✓ 10	9	60-Flow Rate CFS, Mean Daily		
1092-Zinc as Zn ug/L		10	Ef Toxicity (Metals only)		
955-Silica as SiO_2 mg/L		11			

Remarks: Send Results to NHT (SWM)

COR 0 000002 PH-05 CC-6/

DOCKET NO. 000025

Division of Water Quality Control — Tennessee Department of Publi

SOURCE: North American Rayon Mill:

IDENTIFICATION: Fly Ash Dump Site

Field Number 2 Collected By LG Primary Station Number _____ Date Collected 82

Time Collected 10:15 Sample Depth (ft) _____ Laboratory No. SWM

10-Temperature °C		2	340-C.O.D. mg/L (High Level)		
300-D.O. mg/L		3	335 C.O.D. mg/L (Low Level)		
310-5-day B.O.D. 20 °C mg/L		4	70508 Acidity Total - Hot mg/L		
403-pH, Lab.		5	412 Alkalinity (Net) mg/L		
400-pH, Field		6	38260-MBAS mg/L		
81-App. Color Pt - Co units		7	95-Conductivity Micromho 25 °C		
80-True Color Pt - Co units		8	1105-Aluminum as Al ug/L		
70-Turbidity NTU		9	1007-Barium as Ba ug/L	✓	330
410-Total Alk. as $CaCO_3$ mg/L		10	1032-Chromium-Hex. as Cr. ug/L		
415-Phth. Alk. As $CaCO_3$ mg/L		11	1033-Chromium-Tri. as Cr. ug/L		
437-Acidity as $CaCO_3$ mg/L		12	1034-Chromium-total as Cr. ug/L	✓	21
900-Total Hardness as $CaCO_3$ mg/L		13	1037-Cobalt as Co ug/L		
910-Calcium as $CaCO_3$ mg/L		14	1147-Selenium-total as Se ug/L	✓	3
927-Magnesium as Mg mg/L		15	1145-Selenium (Diss.) as Se ug/L		
929-Sodium as Na mg/L		16	1077-Silver as Ag ug/L	✓	2
937-Potassium as K mg/L		17	32730-Phenols ug/L		
500-Total Residue mg/L		18	1022-Boron-Total as B ug/L		
530-Sus. Residue mg/L		19	615-Nitrite Nitrogen as N mg/L		
515-Diss. Residue mg/L		20	620-Nitrate Nitrogen as N mg/L		
31501-Coliform No./100 ml		21	405-Free CO_2 mg/L		
31616-Fecal Coliform No./100 ml.		22	505-Total Vol. Residue mg/L		
31679-Fecal Strep. No./100ml.		23	535-Vol. Sus. Residue mg/L		
635-Total Kjl. Nitrogen as N mg/L		24	545-Settleable Residue ml/L		
630-NO_3 & NO_2 as N mg/L		25	666-Diss. Phosphate as P mg/L		
1097-Antimony as Sb ug/L		26	745-Sulfide, total as S mg/L		
1045-Iron as Fe ug/L		27	746-Sulfide, Dissolved as S mg/L		
1055-Manganese as Mn ug/L		28	369-Cl_2 Demand. 30 min. mg/L		
940-Chloride as Cl mg/L		29	50064-Cl_2, Free Res. mg/L		
950-Fluoride as F mg/L		30	50060-Cl_2, Combined Res. mg/L		
665-Total Phosphate as P mg/L		1	690-Total Carbon mg/L		
945-Sulfate as SO_4 mg/L		2	550-Oil and Grease mg/L		
680-Total Organic Carbon mg/L		3	720-Cyanide as CN mg/L		
1067-Nickel as Ni ug/L		4	32240-Tannin and Lignin mg/L		
71900-Mercury-Total as Hg ug/L	✓ .95	5	610-Ammonia Nitrogen as N mg/L		
1051-Lead as Pb ug/L	✓ 20	6	605-Organic Nitrogen as N mg/L		
1042-Copper as Cu ug/L		7	58-Flow Rate CFM		
1002-Arsenic as As ug/L	✓ 46	8	61-Flow Rate CFS, Instantaneous		
1027-Cadmium as Cd ug/L	✓ 5	9	60-Flow Rate CFS, Mean Daily		
1092-Zinc as Zn ug/L		10	EP Toxicity (METALS)		
955-Silica as SiO_2 mg/L		11	ONLY		

Remarks: Send Results to NHT (SWM)

000003 PH-0 WQC-6

COR

DOCKET NO. 000025 T095051207

I-16-001

NORTH AMERICAN RAYON CORPORATION

WEST ELK AVENUE
ELIZABETHTON, TENNESSEE 37643

Telephone.
615/542-2141

May 19, 1982

Mr. Wayne Gregory
Solid Waste Management
105 Ninth Avenue, North
Terra Building
Nashville, TN 37203

Dear Mr. Gregory:

This letter is for the purpose of requesting that the Hazardous Waste Notification forms submitted by North American Rayon Corporation 1/30/81 be withdrawn and returned. An expanded analysis program of our waste treatment sludge has been conducted, since the 1/30/81 notification filing, which demonstrates that the waste is not an EP toxicity hazardous waste. Copies of the analytical report forms are enclosed.

The following list contains identification of the laboratories providing analytical data for the waste sludge from NARC's treatment process.

Original Data Showing 265 ppm Barium	Date of Results
Ecology & Environment, Inc. 195 Sugg Road Buffalo, N. Y. 14225	11/14/80
New Data, Negative for EP Toxicity	
Tri State Analytical Laboratory P.O. Box 1186 Kingsport, TN 37662	11/17/80
Dr. Lou R. Raasch ACTUAL ENVIRONMENTAL MANAGER JUL/88. East Tennessee State University Johnson City, TN 37601	9/14/81

RECEIVED
Division of Solid Waste Management
Date 5-24-82 File No._____
Received by_____

200-03

COR 000001

DOCKET NO 000026 T095051207

*Stewart Laboratories, Inc. 2/25/82
5815 Middlebrook Pike
Knoxville, TN 37921

*Tennessee Department of Public Health 4/5/82
Water Quality Division
Laboratory #SWM204

*Samples for these testings were jointly taken by NARC and Solids Waste Management personnel 2/16/82.

Please contact me, if further information is required.

Sincerely,

Harry Farthing

Harry Farthing
Environmental Engineer

HF:bb

Attachments

cc Mr. Larry Gilliam
Solids Waste Management
Johnson City, TN

DOCKET NO. 000026
COR 000002
T095051207

I-10-001

FROM	TO	DATE

TENNESSEE DEPARTMENT OF PUBLIC HEALTH

OFFICE CORRESPONDENCE

DATE: August 27, 1982

TO: Shirley Fuller

FROM: Taisa Essary

SUBJECT: Withdrawal of the Hazardous Waste Permit Application for North American Rayon Corporation (TND095051207) in Elizabethton, Tennessee

The Johnson City Office of Solid Waste Management has reviewed North American Rayon's permit application. It is our consensus that North American Rayon be granted their request for withdrawal of their application for a permit under the Tennessee Hazardous Waste Management Act. This decision is based on the fact that North American Rayon retested their waste and determined that it does not meet the characteristics for a hazardous waste.

T. E. E. TEE

TEE/jf

cc: Mr. D. Larry Gilliam 8-31-82

closure is not required

FROM	DATE

TO

200-05

DOCKET No. 000028

COR

000001

PH-0001
SR 3/77

T095051207

I-10-001

TENNESSEE DEPARTMENT OF HEALTH AND ENVIRONMENT
FIRST TENNESSEE REGIONAL HEALTH OFFICE
1233 SOUTHWEST AVE. EXT.
JOHNSON CITY, TENNESSEE 37601

June 20, 1983

DAH 6/27/83

Mr. Lou Holt
North American Rayon Corporation
West Elk Avenue
Elizabethton, Tennessee 37643

Dear Mr. Holt:

Enclosed please find a copy of the Rules Governing Hazardous Waste Management in Tennessee, per your request.

If I may be of further assistance, please do not hesitate to contact me at 928-8301.

Sincerely,

S. P. Riddle

Suzanne P. Riddle
Environmental Engineer
Division of Solid Waste Management

SPR/jf

Enclosure

cc: Mr. Larry Gilliam
Solid Waste Management, Nashville
Carter County Health Department

DOCKET # 100-01

DOCKET NO. 000029

COR

000001

T095051207

TENNESSEE DEPARTMENT OF HEALTH AND ENVIRONMENT

OFFICE CORRESPONDENCE

FROM	TO	DATE

I-10-001

DATE: June 28, 1983

TO: Mr. Larry Ledford

FROM: Suzanne Riddle

SUBJECT: Withdrawal of N.A.R.C. Hazardous Waste Permit Application TND095051207

The Johnson City Field Office of Solid Waste Management is in agreement that North American Rayon Corporation does not store, treat, or dispose of hazardous waste. Therefore, North American Rayon Corporation is not required to submit a closure plan.

S.P.R.

S.P.R./wb

cc: Mr. D. Larry Gilliam
Solid Waste Management, Nashville
Carter County Health Department

FROM	DATE

TO

DOCKET NO. 1 - 000030

#100-02

COR

000001

T095051207

PH-0001
SR 3/77

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

REGION IV

345 COURTLAND STREET
ATLANTA, GEORGIA 30365

AUG 15 1983

4AW-RM

Mr. Harry Farthing
North American Rayon Corporation
West Elk Avenue
Elizabethton, Tennessee 37643

Re: Request for Withdrawal of EPA Hazardous Waste Application
EPA I.D. No. TND 095 051 207

Dear Mr. Farthing:

This agency has been notified by the Hazardous Waste Agency of the State in which your facility is located, that your request for withdrawal of your Part A application has been granted.

Based on that information, EPA is closing our Part A file on your facility. Your EPA identification number will be retained in our data management system so that in the future, should the need arise, an EPA identification number will be available to you.

The RCRA Hazardous Waste Regulations (40 CFR §265.112) require that an owner or operator of a hazardous waste facility submit his closure plan to the Director of the State Hazardous Waste Agency within 15 days after the termination of interim status. This is the first step in the initiation of closure procedures required under 40 CFR §§265.110 to 265.120. Each of the states in Region IV of EPA has substantially equivalent state regulations. By copy of this letter, we are notifying the State Hazardous Waste Agency that all regulatory requirements for closure of your hazardous waste facility should be met and documented in their files.

If your facility is a generator which will continue to accumulate hazardous waste for short periods of time (less than 90 days) prior to shipment off site, you should be aware of the hazardous waste regulations which apply to generators who accumulate hazardous waste. In the Federal program these regulations are found in 40 CFR §262.34.

DOCKET NO. 000033

COR

000001

T095051207

If there are any questions concerning this, please contact Nell Keever of my staff at the above address or by phone at (404) 881-3446.

Sincerely yours,

James H. Scarbrough, Chief
Residuals Management Branch
Air & Waste Management Division

cc: Tennessee Department of Health and Environment

DOCKET NO. 000033

COR

000002

T09505120

N.A.R.C.

INTER-OFFICE MEMORANDUM

TO: L. Holt LOCATION: COPIES:

FROM: L. Raasch LLR

DATE: May 6, 1985

SUBJECT: Material Recovered From Drum 5-2-85

Physical appearance:

Thick viscous mixture inhomogenous, with light and dark areas
Odor: acetic acid

Chemical Analysis:

pH = 3.85
22% acetic acid
Remainder solid material including flyash

Justification:

1) pKa observed during titration 4.65 - 4.70, known pKa of acetic acid is 4.74

2) Characteristic odor of acetic acid

NOTE: The material examined did not include any of the cloth rags which were most of the observed material.

LRR/dbc

DOCKET NO. ~~000035~~

COR

0 000001

T095051207

NORTH AMERICAN RAYON CORPORATION
WEST ELK AVENUE
ELIZABETHTON, TENNESSEE 37643
Telephone. 615/542-2141

RECEIVED
Division of Solid Waste Management
Date 5/13/85 File No.
Received by

May 7, 1985

Mr. Darrell S. Hale
Division of Solid Waste Management
First Tennessee Regional Health Office
1223 Southwest Avenue Extension
Johnson City, Tennessee 37601

Mr. Hale:

This letter is to provide additional information about the contents of a drum which was unearthed at the North American Rayon Corporation's landfill site on May 2, 1985. Dr. Lou Raasch sampled the viscous mixture which was found along with rags and sweeping compound inside the drum. His observations and analyses of the material are recorded on the accompanying memo. It appears that the primary liquid component of this material is acetic acid, which confirms the observations made by NARC and Division of Solid Waste Management personnel at the site that the odor was characteristic of acetic acid.

Acetic acid was commonly used for cleaning of machinery in the nylon plant which operated in Beaunit Corporation's Third Unit until the mid 1970's. This plant was located where MKS Industries now operates. The acetic acid cleaning was done annually and the waste acid was generally absorbed in sweeping compound and old rags and placed in barrels. Apparently, some of these barrels were placed in the landfill at some time. It is not unlikely that several more of these drums will be unearthed while excavating the flyash from this area. As you requested, we will contact you should we turn up more drums in this area.

Since the material found is not hazardous and presents no danger to the environment, we would appreciate your recommendations as to proper methods of disposal. We have segregated the drum and its contents and are awaiting your determination before disposal.

We appreciate the quick response of you and Mr. Willingham in investigating this occurrence, and also your cooperation in assuring that the work delay was held to a minimum. We will continue to monitor this operation closely and to keep you informed of any unearthings of drums.

Yours truly,

Lewis A. Holt

Lewis A. Holt, Manager
Environmental Services

DOCKET NO. 000036

COR

LAH/dbc

CERTIFIED
RETURN RECEIPT REQUESTED

#100-03

000001

T095051207

I-10-001

May 21, 1985

North American Rayon Corporation
Lewis A. Holt
West Elk Avenue
Elizabethton, Tennessee 37643

RE: Disposal of Unearthed Barrel

Dear Mr. Holt:

The open drum containing rags, sweeping compound, and acetic acid residue is non-hazardous and may be included with your daily trash for ultimate disposal purposes. Because this material has a pungent odor, the landfill operator may question the disposal of the waste. To avoid this problem I am sending Carter County-Elizabethton Solid Waste Disposal System a copy of this letter.

Your interest concerning the proper disposal of this material is appreciated.

Sincerely,

Fred Willingham
Division of Solid Waste Management

FW/DLG/jj

cc: Mr. Robert Denny, Carter County-Elizabethton
Solid Waste Disposal System, Route 9, Box 317
Elizabethton, Tennessee 37643
Mr. D. Larry Gilliam
Carter County Health Department

100-04

DOCKET NO. 000037
COR
000001
T095051207

1-10-001

CERTIFIED MAIL P 115 648 676
RETURN RECEIPT REQUESTED

Tennessee Department of Health and Environment
Bureau of Environment
1733 Sunset Drive
Johnson City, Tennessee 37601-3621

June 30, 1986

Dr. Lou Raasch, Manager
Environmental Services
North American Rayon Corporation
West Elk Avenue
Elizabethton, Tennessee 37643

RE: Waste Drums Adjacent to Maintenance Building
North American Rayon Corporation

Dear Dr. Raasch:

During a visit to your facility with Dr. Michael Bruner on June 26, 1986, I observed approximately thirty-seven (37) drums containing liquid waste material adjacent to a maintenance building on North American Rayon Corporation property. The drums appeared to contain waste oil and possibly waste solvent. Rule 1200-1-11-.03(1)(b) of the Hazardous Waste Management Regulations requires persons who generate a waste to determine if that waste is a hazardous waste. Rule 1200-1-11-.03(2)(d) requires generators to be responsible for maintaining an up to date notification file by notifying the Department within thirty (30) days of such changes.

Prior to July 15, 1986, an approved laboratory must be used to make hazardous waste determinations on the waste presently in the drums on site. This office must be given sufficient notification of sampling dates so a representative of the Division of Solid Waste Management can be present during sampling.

If this waste is hazardous then the material must be properly disposed of in an approved TSD facility. Any spillage around the stored drums resulting in contamination of the soil must also be removed and properly disposed of in an approved TSD facility. Also, a clean-up closure plan must be submitted prior to any clean-up and closure of this site. This plan must be written by an approved consultant firm with knowledge of this type of activity.

#100-06

DOCKET NO. 000038
COR
000001
T095051207

If you have any questions concerning this matter, feel free to contact me at 928-6487.

Sincerely,

Darrell S. Hale, R.P.E.
Environmental Specialist
Division of Solid Waste Management

DSH/jl SWM-4

cc: Mr. Doye Rowland, DSWM, Nashville
Mr. D. Larry Gilliam, DSWM. Johnson City ✓
Chief Environmentalist, Carter County Health Department

DOCKET NO. 000038
COR
000002
T095051207

I-10-00 Larry ts.

TENNESSEE DEPARTMENT OF HEALTH AND ENVIRONMENT

OFFICE CORRESPONDENCE

FROM	TO	DATE

DATE: July 10, 1986

TO: File

FROM: Darrell S. Hale

SUBJECT: North American Rayon Corporation - Hazardous Waste Drums

On July 9, 1986, I met with Dr. Lou Raasch of North American Rayon Corporation to sample thirty-seven (37) drums observed during a previous visit to the plant site. The drums were not segregated according to the type waste in the drums. We proceeded to try to determine how many composite samples would be required to determine the type waste in the drums. North American Rayon Corporation intended to take their own samples and send these samples to Tri-State Laboratories in Kingsport.

It was determined on this date that the sampling equipment available for proper sampling of these drums was not adequate; therefore, Dr. Raasch was requested to further segregate the drums into the following three (3) categories: waste oils, solvents and water contaminated wastes. I advised Dr. Raasch to request an extension to his July 15, 1986 compliance schedule for making hazardous waste determinations on these drums.

During this investigation, an additional 80 to 100 drums were observed lying behind the wastewater treatment plant and along the fence separating the plant from the flyash disposal site. These drums appeared to have been on this site for several years. These drums will be handled separately from the previous 37 drums that were being investigated. Dr. Raasch was also advised to make hazardous waste determinations on the waste in these drums.

FROM	DATE

TO

D. S. H.

DSH/jj SWM-4

DSH

DOCKET NO. ~~000040~~

COR

000001

#100-07

PH-0001
SR 3/77

T095051207

I-10-001

RECEIVED
Division of Solid Waste Management
Date 7/14/86 File No.
Received by

NORTH AMERICAN RAYON CORPORATION
AN EMPLOYEE OWNED COMPANY

July 10, 1986

Mr. Darrell S. Hale, R.P.E.
Division of Solid Waste Management
TN Department of Health and Environment
1733 Sunset Drive
Johnson City, TN 37601-3621

Dear Mr. Hale:

During your visit today, we made a preliminary survey of the drums (38) noted in your letter of June 30, 1986. Five (5) drums were empty. Of the remaining thirty-three (33) drums, there appear to be three general types of substances: 1) aqueous, 2) oils and 3) possible chlorinated solvent(s). You have requested that we segregate these drums into groups before sampling. We also would like to segregate the drums (50 to 100) in the area west of the maintenance building so that area can be cleaned up. In order to accomplish this, we request an extension of the July 15, 1986 date for sampling to August 1, 1986. This will also allow us to coordinate the sampling with your office so that a representative of the Division of Solid Waste Management can be present during sampling.

Sincerely,

NAR

Lou R. Raasch

Lou R. Raasch, Manager
Environmental Services

LRR/lbs

CERTIFIED
RETURN RECEIPT REQUESTED

DOCKET NO. 000041
COR

#100-08

0 000001
T095051207

WEST ELK AVENUE • ELIZABETHTON, TENNESSEE 37643
EXECUTIVE OFFICES & PLANT (615) 542-2141 • SOUTHERN SALES OFFICE (615) 543-8686
NORTHERN SALES OFFICE • 500 FIFTH AVENUE • NEW YORK, NEW YORK 10110 • (212) 840-2592

Z-10-001

CERTIFIED MAIL P 115 648 694
RETURN RECEIPT REQUESTED

Tennessee Department of Health and Environment
Bureau of Environment
1733 Sunset Drive
Johnson City, Tennessee 37601-3621

July 14, 1986

Dr. Lou Raasch
Manager, Environmental Services
North American Rayon Corporation
West Elk Avenue
Elizabethton, Tennessee 37643

RE: Hazardous Waste Drums
North American Rayon Corporation

Dear Dr. Raasch:

This letter is written to address your July 10, 1986, Letter of Request for an extension to the sampling requirements in Mr. Darrell Hale's June 30, 1986 letter. Please be advised that your extension request is granted. The Compliance Schedule is now August 1, 1986, for completion of sampling and hazardous waste determinations on the drums at the above referenced site.

If you have any additional questions or if I can be of any further assistance, feel free to contact me at 928-6487.

Sincerely,

D. Larry Gilliam
Divisional Director
Division of Solid Waste Management

DLG/DSH/jl SWM-3

cc: Mr. Darrell Hale, DSWM, Johnson City
Mr. Doye Rowland, DSWM, Nashville
Chief Environmentalist, Carter County Health Department

#100-09

DOCKET NO. ~~000042~~
COR
000001
T095051207

I-10-001

NORTH AMERICAN RAYON CORPORATION

West Elk Avenue
ELIZABETHTON, TENNESSEE 37643

Telephone:
615/542-2141

July 31, 1986

RECEIVED
Division of Solid Waste Management
Date 8/4/86 File No.
Received by

Mr. Darrell Hale
Division of Solid Waste Management
TN Department of Health & Environment
1733 Sunset Drive
Johnson City, TN 37601-3621

RE: Drums

Dear Mr. Hale:

This letter will summarize the results of your visit on Tuesday, July 29, 1986.

1. The partial drum of unused (virgin) oil will be utilized.
2. The seven (7) drums which were empty will be disposed of.
3. The remaining 32 drums were grouped into four groups and sampled.

   a. One drum of water and a possibly chlorinated solvent.
   Requested analyses: Volatile Organics and Flash Point.

   b. 25 drums, mostly water, with some oil.
   Requested analyses: EP-Tox-Metals

   c. 2 drums, mostly water (ammonia odor)
   Requested analyses: EP-Tox-Metals

   d. 4 drums, mostly oil (heavy oil) and some water.
   Requested analyses: EP-Tox-Metals, Volatile Organics, Flash Point.

The samples were sent to IT Analytical Services in Knoxville, TN that afternoon. Upon receipt of the analytical results, we will contact you concerning final disposition of this matter.

Sincerely,

Lou R. Raasch

Lou R. Raasch, Manager
Environmental Services

COR

LRR:bb

cc E. Britt
J. Conley

100 DOCKET NO. 000043-0-000001

T095051207

I-10-001

DCG-FILE

TENNESSEE DEPARTMENT OF HEALTH AND ENVIRONMENT

OFFICE CORRESPONDENCE

FROM	TO	DATE

DATE: August 6, 1986

TO: File

FROM: Darrell S. Hale

SUBJECT: Sampling - North American Corporation

On July 29, 1986, Rick Whitson and I met with Dr. Lou Raasch, North American Corporation, to sample approximately 40 drums previously observed on NARC property. The purpose of this meeting was two folds: to segregate the drums into physically similar categories and composite sample to determine if the contents of the drums were hazardous waste. The drums were categorized into six (6) categories as follows:

(1) Empties - 7 drums

(2) Blue/Oil Mixture - 1 drum

(3) Drums Having a Chlorinated Odor - 1 drum

(4) Oil and Water - 25 drums

(5) Drums Having an Ammonia Odor - 2 drums

(6) Heavy Oil Drums - 4 drums

Requested analysis included: flashpoint, volatile organics and heavy metals.

FROM	DATE

TO

According to Dr. Raasch, the waste in the drums were generated as follows:

Blue Oil Drum - A mobile gear lubricating oil.

Chlorinated Odor Drum - Methylene Chloride refrigeration unit. No longer in use.

Oil/Water Drums - Believed to be empty drums which collected water.

Ammonia Odor Drums - Lubricated oil from ammonia refrigeration units. No longer in use.

Oil/Solvent/Water Drums - Appears to be some type of degreasing formula. Dr. Raasch has no idea how it was generated.

#100-11 COR 000001

PH-0001
SR 3/77

DOCKET NO. 000044 T095051207

Heavy Oil Drums - Generated from the changing of oil in crank shafts from tow motors, etc.

The approximately 80 drums that were observed along the fence separating the flyash disposal site and wastewater treatment plant were generated when the drums were uncovered during the removal of flyash from this flyash disposal site. Of the 80 drums on-site, 12 drums were generated from the wastewater treatment plant. These included one calgon drum which was full, one anti-foam agent drum, and ten empty drums. The remaining drums generated from the flyash site were either empty or contained flyash. The drums had holes in the sides of the drums which appeared to have been made by striking the drum with an instrument such as an axe or a pick. My concern is that when the drums were disposed of in the flyash site, that they contained chemicals and were improperly disposed of in the flyash site.

The samples that were taken this date were sent to I. T. Corporation for analysis. The Division did not split samples on this date.

D. S. H.

DSH/jj SWM-1

cc: Mr. D. Larry Gilliam
Mr. Dan Hyder, DSWM, Nashville

COR
DOCKET NO. 000044 000002
T095051207

C 1-10-061

NORTH AMERICAN RAYON CORPORATION
AN EMPLOYEE OWNED COMPANY

RECEIVED
Division of Solid Waste Management
Date 9/29/86 File No.
Received by

September 24, 1986

Mr. Darrell Hale
TN Department of Health & Environment
Division of Solid Waste Management
1733 Sunset Drive
Johnson City, TN 37601

Dear Mr. Hale:

This letter is to confirm our conversation of September 22, 1986; that we should complete disposal of the waste drums by October 22, 1986. After that date, please contact me to arrange your completion inspection of the site.

Sincerely,

Lou R. Raasch
Environmental Services

LRR/lbs

CERTIFIED
RETURN RECEIPT REQUESTED

#100-12

COR

DOCKET NO. ~~000045~~ 000001

T095051207

WEST ELK AVENUE • ELIZABETHTON, TENNESSEE 37643
EXECUTIVE OFFICES & PLANT (615) 542-2141 • SOUTHERN SALES OFFICE (615) 543-8686
NORTHERN SALES OFFICE • 500 FIFTH AVENUE • NEW YORK, NEW YORK 10110 • (212) 840-2592

I-10-001

#453 554

CERTIFIED
RETURN RECEIPT
REQUESTED

RECEIVED
Division of Solid Waste Management
Date 10/27/86 File No.
Received by

NORTH AMERICAN RAYON CORPORATION
AN EMPLOYEE OWNED COMPANY

October 23, 1986

Mr. Darrell Hale
Division of Solid Waste Management
TN Department of Health & Environment
1733 Sunset Drive
Johnson City, TN 37601

Dear Mr. Hale:

This letter will provide you with more detailed information than the message I left for you on October 21, 1986. We have removed all the drums from the area near the garage. The drum of methylene chloride has been redrummed and is at our Receiving Department awaiting pickup by McKesson. I have been informed by Roger Wexler of McKesson that they have just completed their acceptance analysis and will pick up the drum. They won't be able to get it this week because they have been bought by UNIVAR and must complete inventory this week. Roger Wexler can be contacted if you need further information.

Under current regulations, waste oil is exempt. Enterprise Oil only picks up oil in this area about once a quarter. They will pick it up when they are in the area, but won't make a special trip just for us.

Next week, I will contact you to arrange your inspection of the area near the garage where the drums were sitting, if you need to do this to close your file.

Sincerely,

Lou R. Raasch

Lou R. Raasch
Environmental Services

LRR/lbs

COR

DOCKET NO. 1 000046 000001

T095051207

WEST ELK AVENUE • ELIZABETHTON, TENNESSEE 37643
EXECUTIVE OFFICES & PLANT (615) 542-2141 • SOUTHERN SALES OFFICE (615) 543-8686
NORTHERN SALES OFFICE • 500 FIFTH AVENUE • NEW YORK, NEW YORK 10110 • (212) 840-2592

I-10-001

CERTIFIED MAIL P 148 488 13
RETURN RECEIPT REQUESTED

Tennessee Department of Health and Environment
Bureau of Environment
1733 Sunset Drive
Johnson City, Tennessee 37601-3621

November 3, 1986

Dr. Lou Raasch, Manager
Environmental Services
North American Rayon Corporation
West Elk Avenue
Elizabethton, Tennessee 37643

RE: Waste Drums Adjacent to Maintenance Building

Dear Dr. Raasch:

As a result of my inspection of the waste drum storage area on October 28, 1986, this letter is written to confirm compliance with my June 30, 1986, letter requiring notification, hazardous waste determinations, and subsequent clean-up of the above referenced area. Your cooperation during this inspection, sampling and clean-up activity is certainly appreciated.

If you have any questions concerning this matter or if I can be of any assistance, please feel free to contact me at 928-6487.

Sincerely,

Darrell S. Hale, R.P.E.
Environmental Specialist IV
Division of Solid Waste Management

DSH/jj SWM-4

cc: Mr. D. Larry Gilliam, DSWM, Johnson City
Mr. Doye Rowland, DSWM, Nashville
Chief Environmentalist, Carter County Health Dept.

#100-14

DOCKET NO. 000047

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1045021207

PS Form 3811, July 1983 447-845

I-10-001

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1. ☐ Show to whom, date and address of delivery.
2. ☐ Restricted Delivery.

3. Article Addressed to:
Dr. Lou Roesch, Mgr.
Environmental Services
NARC
West Elk Ave
Elizabethton TN 37643

4. Type of Service:
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☒ Certified ☐ COD
☐ Express Mail

Article Number
P-148-488-137

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5. Signature – Addressee
X

6. Signature – Agent
X [signature]

7. Date of Delivery
11-5-86

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Hoskins

TENNESSEE DEPARTMENT OF HEALTH AND ENVIRONMENT
CUSTOMS HOUSE
701 BROADWAY
NASHVILLE, TENNESSEE 37219-5403

RECEIVED
Division of Solid Waste Management
4/13/89 File No.
Received by JL

April 6, 1987

Mr. Lou R. Raasch, Environmental Service Manager
North American Rayon Corporation
West Elk Avenue
Elizabethton, TN 37643

Dear Mr. Raasch:

Enclosed is your Annual Report packet for 1989. This report is normally due by March 1, but due to the fact that we failed to put North American Rayon Corp. on our generator list when you notified last year we are extending your deadline until May 15, 1989. This should give you sufficient time to complete the Annual Report.

We are also waiving any late payment penalties on any fees due until May 15, 1989.

If you have any question regarding the Annual Report, please contact me at (615)741-3424.

Sincerely,

Barbara Blanton

Barbara Blanton
Environmental Specialist
Waste Activity Audit
Division of Solid Waste Management

bjb

Enclosures

Copy: Darrell Hale, Johnson City Field Office

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CERTIFIED MAIL #29,052
RETURN RECEIPT REQUESTED

Nash 12-8-87 mb

JMA 12-8

RECEIVED
DEC 7 1987
DIV. OF SWM

Tennessee Department of Health and Environment
Bureau of Environment
1733 Sunset Drive
Johnson City, Tennessee 37601-3621

December 2, 1987

TN-101

Dr. Lou Raasch
North American Rayon Corporation
W. Elk Avenue
Elizabethton, Tennessee 37643

RE: Hazardous Waste Generator Inspection Report
TND 095-05-1207

Notice of Violation

Dear Sir:

This letter confirms the observations and/or recommendations which were made during the Hazardous Waste Generator Inspection conducted at North American Rayon Corporation, on November 18, 1987. The attached inspection report details the violations which were noted during this inspection.

The aforementioned violations should be corrected no later than February 1, 1988. A follow-up inspection will be scheduled between February 1, 1988 and February 5, 1988, to verify the corrective actions taken.

If the corrective action cannot be accomplished by the above date, please provide this office with a projected completion date and sufficient justification for the delay in order that the follow-up inspection schedule can be changed.

Your cooperation and the cooperation of your staff during my inspection is certainly appreciated.

COR

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T095051207

#4

If you have any questions concerning the contents of this letter or the attached inspection report, please do not hesitate to contact me at 928-6487.

Sincerely,

Darrell S. Hale

Darrell S. Hale, R.P.E.
Environmental Specialist
Division of Solid Waste Management

DSH/jl

Attachment

SWM-B: NOV 1

cc: Mr. D. Larry Gilliam
Mr. Doye Rowland, Enforcement Section
DSWM, Nashville
Carter County Environmental Office

DOCKET NO. 000050

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T095051207

Inspection Report

Site/Operation Inspected:

North American Rayon Corporation
West Elk Avenue
Elizabethton, Tennessee 37643
ID # TND 095051207

Owner/Operator/Primary Contact:

North American Rayon Corporation
Dr. Lou Raasch
West Elk Avenue
Elizabethton, Tennessee 37643

Date and Time of Inspection:

Novemgeer 18, 1987 - Starting at 10 A. M.

Facility Status:

Fully Regulated Generator

Report Prepared By:

Darrell S. Hale, R.P.E.
Environmental Specialist
Bureau of Environment
Division of Solid Waste Management
1733 Sunset Drive
Johnson City, Tennessee 37601-3621
615-928-6487

Names and Affiliations of Other Inspection Participants:

Mr. Rick Watkins, Environmental Services Coordinator, NARC
Mr. Fred Willingham, Environmental Specialist, DSWM

Purpose of Inspection:

After receiving a call from Dr. Lou Raasch on November 12, 1987, concerning the operation of degreasers and spray booths by NARC, this inspection was conducted to determine North American Rayon Corporation's compliance with the applicable requirements of the Rules Governing Hazardous Waste Management in Tennessee.

Facility Description:

NARC conducts the viscose manufacturing of textile and industrial continuous filament type rayon fiber and vinyl

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coated fabric. As a result, the following processes and waste streams were observed:

A. Viscose Process

1. Press Room - Paper pulp is steeped in sodium hydroxide. It then goes through a hydraulic press. The spent sodium hydroxide goes to drip lye storage which is fed to dialysis. The regenerated lye goes back into the process. The remaining 30% is used as in pipe neutralization in the on-site wastewater treatment plant. The pH of this waste stream is approximately 13.

2. Shredder Room - Alkali cellulose is placed in a hopper and aged. Waste alkali cellulose is disposed of at the local sanitary landfill as a special waste.

3. Drum Room - Alkali cellulose is converted into cellulose xanthate by mixing carbon di-sulfide. Waste cellulose xanthate is disposed of as a special waste in the local sanitary landfill

4. Mixer Room - Cellulose xanthate is dissolved in dilute sodium hydroxide to make viscose. Waste generated is solidified viscose (cellulose) which is discharged to the alkaline sewer.

5. Spinning Room Unit #1 and #2 - Spent sulfuric acid is generated in this department. The spent sulfuric acid is sent to the acid recovery building. Here the waste is either regenerated and returned to the spinning room or run through a crystallizer to remove salts for making an anhydrous by-product (sodium sulfate) Na_2SO_4. Waste sources from these units are: waste process bath discharge, equipment wash-ups, and floor drains. These sources are discharged to the on-site wastewater treatment plant. The nature of the waste is: H_2SO_4, Na_2SO_4, $ZnSO_4$, sulfides, polysulfides, thiosulfate, surfactants, yarn lubricants, hemicelluloses. Unit #2 has an ion exchange zinc recovery wash water loop on the contact yarn spinning wet process.

6. Tinting Room - Dye tanks are discharged to the on-site wastewater treatment plant. The dye contains no heavy metals or solvents.

7. Unit #1 Purification - Ammonium hydroxide and ammonium sulfide is used to remove impurities.

Rinse waters are discharged to the on-site wastewater treatment plant.

8. Unit #1 Acid Recovery Building - This unit receives 100,000 gallons per hour of spent sulfuric acid from the spin bath for regeneration.

9. Unit #2 Acid Recovery Building - This unit receives 50,000 - 60,000 gallons per hour of spent sulfuric acid spin bath solution for regeneration. The nature of the waste generated from both acid recovery buildings is H_2SO_4, Na_2SO_4, and $ZnSO_4$.

10. Fabricoating Room - Plastisol (polyvinyl chloride and dioctal teraphthalate) is coated on cotton fabrics, nylon 6, and polyester. Wastes generated - 1) Excess plastisol is placed in drums and heated in baking ovens. Dried solids are placed in trash dumpsters for disposal in local sanitary landfill. 2) Waste rags soaked in mineral spirits are used to clean the belts on the process line. These rags are disposed of in the daily trash dumpster.

11. Latex Coating - Industrial yarn is dipped in latex to increase rubber adhesion. Waste generated: Latex dip misture - solidifed rubber disposed of in the trash dumpsters on site.

B. Laboratory - Wastes generated in small amounts in the laboratory are:

1. Denatured ethyl alcohol

2. Acetone

3. Ethyl alcohol

4. Isopropyl alcohol

5. Methyl alcohol

6. Chloroform - some is recycled in the lab, approximately 2 liters

7. Toluene

8. Xylol

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T095051207

For the most part these wastes are generated as the result of lab practices and are discharged into the sink to the on-site wastewater treatment plant.

C. On-Site Wastewater Treatment Unit - Receives wastewater from the boiler room, alkaline sewer from Viscose Deparrtment, acid sewer from spinning and acid recovery, and dialyzer waste from the Press Room. Waste generated in the form of sludge consist of flyash, cellulose, zinc hydroxide and calcium sulfate.

D. Boiler Room - Waste generated:

1. Wastewaters generated from the wet scrubbers are discharged to the on-site wastewater treatment plant.

2. Filtered flyash is recycled by American Limestone in highway roadbeds.

3. Cinders are recycled by Bolton Block into cinder blocks.

4. Clinkers are used for on-site road beds and parking areas.

E. Maintanance Shops - There were fourteen (14) maintenance shops identified at North American Rayon Corporation.

1. Millrite Shop

2. Machine Shop

3. Pipe and Fiberglass Shop - Rags soaked in acetone.

4. Paint and Lacquer Shop

5. Pump Shop

6. Unit #1 Mechanics Shop

7. Electric Shop

8. Lead Shop

9. Car Shop

DOCKET NO. 000050 COR
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T095051207

10. Instrument Shop - no waste generated

11. Electronic Shop - no waste generated

12. Unit #2 Mechanics Shop

13. Air Conditioning Shop - waste oils generated

14. Viscose Maintenance Shop

Waste generated from these shops include:

1. The following solvents used in degreasing: acetone, lacquer thinner, solvent S-21-5-D (87% ethanol).

2. Paint sludges and spent varsol from three (3) wet paint spray booths. Lacquer thinner is used to clean spray guns and sprayed into the spray booth. Paint sludges placed in the daily trash dumpster.

3. Spent 80% ethanol used in the rotary dip tank. Spent ethanol is used as a paint thinner.

4. Baghouse collector dust is generated from steel grit, sand blasting, and aluminum oxide tumbling of metal. Presently this is disposed of in the daily trash dumpsters once every 3 - 6 months.

5. Metal filings and turnings are disposed of in the daily trash dumpster.

6. Welding slag is stored in the "lead storage (mine) area".

7. Cyanide pot heat treatment process - slag and quench bath wastewater is generated.

8. Spent sodium hydroxide and rinse waters from caustic dip tanks.

9. Twenty (20) 55 gallon drums of unusable lacquer.

10. Slag from lead melting furnace - this waste is stored in the "lead storage (mine) area".

F. Storage Areas at North American Rayon Corporation:

1. Lead Storage (mine) Area - This area is located on the south-east side of the plant near the product storage area. This area receives welding slag, lead slag and metal parts where they are stored on the ground.

2. Waste Drum Storage Area - There were a total of eighty-one (81) 55 gallon drums observed stored during this inspection; twenty-one (21) of which were identified as being generated from the lacquer room. There were also twenty (20) 5 gallon drums which were identified in this storage area as being generated in the lacquer room. There were two (2) 55 gallon drums lying on their side leaking on the ground. The only markings were on the sides of the drums (Heresite). There was one (1) 55 gallon drum which had methylene chloride stenciled on the side.

Inspection Findings:

The following violations were observed as a result of this inspection:

0010 Rule 1200-1-11-.03(1)(b) requires persons who generate a waste, to determine if that waste is a hazardous waste.

Hazardous waste determinations must be made on all waste streams generated at this facility, including waste in drums in the storage area.

0023 Rule 1200-1-11-.03(2)(b) requires a person who is a generator of a waste on the effective date of the regulations established under Rule 1200-1-11-.02 which identify that waste as a hazardous waste subject to the requirements of Rule 1200-1-11-.03, to notify the Department within 90 days of that date. Such notification must be submitted on generator notification forms provided by the Department. The form must be completed according to the instructions accompanying it.

0030 Rule 1200-1-11-.03(4)(b)1(ii) requires generators who accumulate hazardous waste temporarily on-site without requesting a permit or interim status to inspect the area where continers are stored at least weekly, looking for leaks and for deterioration caused by corrosion or other factors.

3510 Rule 1200-1-11-.07(1)(b)1(ii) prohibits an existing hazardous waste management facility, in Tennessee, from treating, storing, or disposing of hazardous waste unless the owner or operator has a permit under the Tennessee Hazardous Waste Management Act or interim status.

Possible storage and disposal violations for holding hazardous waste on-site for more than ninety (90) days (documentation can be completed after determinations have been made). Treatment violations as a result of spraying spent solvents into spray booths when cleaning paint spray guns. In addition, failure to meet generator requirements for proper management of hazardous waste, including notification and hazardous waste determinations.

Remarks and Recommendations:

Other violations of the generator requirements may be forthcoming once hazardous waste determinations and generation amounts are determined. Previous State and Federal notifications filed in 1980 and 1981 by North American Rayon Corporation for barium laden sludge were later withdrawn in 1982. Subsequent inspections by chemists and engineers on the Solid Waste Management staff did not reveal hazardous waste generations found during this inspection although these waste streams have been generated since November 1980.

Signed Darrell S. Hale Date 12/3/87

DSH/jl SWM-2

DOCKET NO. 000050

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T095051207

ENNESSEE DEPARTMENT OF HEALTH AND ENVIRONMENT

OFFICE CORRESPONDENCE

FROM	TO	DATE
DLG	RDR	1/12/88

DATE: January 11, 1988

TO: Mr. Doye Rowland

FROM: D. Larry Gilliam

SUBJECT: Action Request (EAR) Memo
North American Rayon Corporation
TND 095 05 1207

I. Summary:

NARC made notification to the Division of Solid Waste Management in 1981 for flyash sludge which tested E.P. Toxic for barium. In 1982, NARC withdrew this notification citing lab error for mistakenly identifying the flyash as hazardous. After receiving inquiries from NARC concerning proper disposal of spent solvents generated by degreasers and paint booths, the facility was inspected on November 18, 1987. Several waste generation points were identified where no hazardous wastes determinations had been made. Two storage areas were observed. One area contained drums of spent solvents and other unknown waste streams. The other area contained spent welding slag, lead slag, and possibly cyanide pot heat treatment slag. Amounts of hazardous waste stored can be documented after determinations are made. A February 1, 1988 Compliance Schedule has been set.

FROM	DATE

TO

II. Chronology:

Documents and correspondence concerning notification and withdrawal of notification:

January 30, 1981 -

Notification of D005 (Barium) generation.

January 6, 1982 -

Division of Solid Waste Management letter to NARC scheduling 2/9/82 inspection from DLG. (No inspection report found.)

COR 000001

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2/22/88 - Date surface impoundment last received hazardous waste.

PH-0001
SR 3/77

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May 19, 1982 -

Delisting petition submitted to DSWM by NARC for notification withdrawal.

June 3, 1982 -

Tentative approval from DSWM withdrawing NARC permit application.

August 27, 1982 -

Memo to Shirley Fuller from Taisa Essary recommending approval of hazardous waste withdrawal application.

May 23, 1983 -

Unsigned notification that NARC does not generate a hazardous waste. (May have been filled out by Division staff.)

June 20, 1983 -

Copy of letter showing transmittal of regulations to NARC.

June 28, 1983 -

DSWM memo from Suzy Riddle agreeing that NARC was not a TSD Facility.

July 7, 1983 -

DSWM letter to NARC withdrawing permit application from Tom Tiesler.

August 15, 1983 -

EPA letter to NARC withdrawing Part A Application.

Documents and correspondence concerning investigation of stored and disposed drums:

May 7, 1985 -

Letter from NARC to DSWM concerning unearthening of drums in flyash disposal area and analytical results.

DOCKET NO. 000051
COR 000002
T095051207

May 21, 1985 -

DSWM letter to NARC from Fred Willingham approving drums and contents for local landfill disposal.

June 30, 1986 -

Letter to NARC from DSH requiring action to be taken concerning drums of liquid waste stored on site.

July 3 & 9, 1986 - Willie Sheets

July 10, 1986 -

Memo to the file from DSH concerning additional drums observed on site property during sampling episode.

July 10, 1986 -

Letter from NARC to DSWM requesting extension to compliance schedule.

July 14, 1986 -

DSWM letter of compliance extension.

July 31, 1986 -

NARC letter to DSWM showing analytical results requested on drum contents.

August 6, 1986 -

DSH memo to file documenting sampling episode on drums. Note last paragraph concerning drums pulled from flyash disposal site.

August 11, 1986 - Willie Sheets

September 2, 1986 -

NARC letter of transmittal of analytical results.

September 24, 1986 -

Letter from NARC confirming compliance date.

DOCKET NO. 000051
COR 000003
T095051207

October 23, 1986 -

NARC letter confirming closure of drum storage area.

November 3, 1986 -

DSH letter documenting inspection of site and clean-up approval.

November 18, 1987 -

Initial generator inspection by D. Hale.

December 2, 1987 - Notice of Violation issued.

III. Violator:

North American Rayon Corporation
West Elk Avenue
Elizabethton, Tennessee 37643
615/542-2141
EPA I.D. Number TND 095 05 1207

IV. Violations:

Rule 1200-1-11-.03(1)(b) -

Failure to make hazardous waste determinations.

Rule 1200-1-11-.03(2)(b) -

Incomplete notification.

Rule 1200-1-11-.07(1)(b)1(ii) -

Storage and possible disposal without a permit.

V. Personnel Involved:

Darrell S. Hale, Environmental Specialist IV
Fred Willingham, Environmental Specialist III
615/928-6487

VI. Witnesses:

Dr. Lou Raasch, NARC
Mr. Rick Watkins, NARC
615/542-2141

DOCKET NO. 11 000051

COR 000004
T095051207

VII. Harm to the Environment:

None Documented.

VIII. Results Requested:

A Commissioner's Order with assessment of civil penalty is requested for violations of TSDF permit requirements. A high priority (9) is requested for this case.

D. L. G.

D. L. G.

DLG/DSH/jj SWM-7

cc: Mr. Darrell Hale, DSWM, Johnson City

DOCKET NO. 000051

COR 000005

T095051207

2-3-88 mst
JMA
(Duplicate) GAB 2-5-88
2-4-88 DCH 2/16

RECEIVED
FEB 8 1988
DIV. OF SWM

NORTH AMERICAN RAYON CORPORATION
AN EMPLOYEE OWNED COMPANY

January 28, 1988

Mr. Darrell S. Hale
Environmental Specialist
Bureau of Environment
Division of Solid Waste Management
1733 Sunset Drive
Johnson City, TN 37601-3621

Dear Sir:

This letter is to follow up the notice of violation letter dated December 2, 1987 resulting from your November 18, 1987 hazardous waste generator inspection at North American Rayon Corporation in Elizabethton, TN. We regret to report that the proposed February 1, 1988 deadline set by your office to correct the cited violations will not be met and a request is made to have the correction deadline extended to March 1, 1988. Due to the fact that we are relying on outside technical assistance for laboratory analyses and hazardous waste determinations, the necessary lead time to receive the results will prevent us from meeting the February 1, 1988 date. A brief summary of where we stand with regard to the corrections of cited violations follows:

Waste Drum Storage Area

On January 18 and 19, 1988, two chemists from GSX Services, Inc. came to NAR and sampled each of the drums located in the waste drum storage area adjacent to the oil house. The samples were characterized by GSX and chemically compatible groups were established. In a telephone conversation on 1/27/88 with Bill Clark, GSX Technical Sales Representative, we were informed that 19 composite groups were identified and samples from these groups will have a complete analysis performed. The analytical results should be received within 10-15 working days according to Mr. Clark. Once they are received, a disposal plan can be formulated to comply with all federal and state regulations.

#100-18

DOCKET NO. 000052

WEST ELK AVENUE • ELIZABETHTON, TENNESSEE 37643
EXECUTIVE OFFICES & PLANT (615) 542-2141 • SOUTHERN SALES OFFICE (615) 543-8686
NORTHERN SALES OFFICE • 500 FIFTH AVENUE • NEW YORK, NEW YORK 10110 • (212) 840-2592

COR 000001
T095051207

Hazardous Waste Stream Determinations/Identification

As of this writing, we are awaiting the arrival of price quotations from GSX Services, Inc., International Technology Corp., and Solid Tek Systems, Inc. concerning hazardous waste stream determinations to be performed on the wastes generated at North American Rayon. Once received, we will immediately proceed with completing and submitting the Hazardous Waste Stream Reports to your office.

Miscellaneous

After receiving your notice of violation letter, the following actions have been taken at North American Rayon:

(1) Spent solvents used to clean spray guns in the paint and lacquer shops are being collected in identifiable drums and will be disposed of in accordance with the hazardous waste regulations.
(2) Waste varsol generated by the degreasing units throughout the shop areas is being collected in identifiable drums and will be disposed of in accordance with the hazardous waste regulations.
(3) The metal filings, shavings and turnings generated in the machine shop areas are no longer placed in the trash dumpsters. These are being collected and will be taken to a metal recycler.
(4) Slag from the lead melting pot is being collected in drums and will be disposed of in accordance with the hazardous waste regulations.
(5) The decision has been made to discontinue the use of the cyanide pot heat treatment unit. The pot and clean-up waste will be disposed of in accordance with the hazardous waste regulations.
(6) Summers-Taylor, Inc. will be enlarging and modifying our existing waste drum storage area to include a containment dike and roof.

We understand and appreciate the urgency with which the cited violations must be corrected. Our efforts are being directed towards the successful completion of the necessary actions to ensure adherence to the Tennessee Hazardous Waste Management Regulations. We feel that the March 1, 1988 date will provide the needed time to complete the ongoing efforts of hazardous waste drum identification and disposal, and the hazardous waste stream identifications. Should you need any additional information, please call me.

Sincerely,

Lou Raasch

Lou Raasch, Manager
Environmental Services
NAR

LR:bb

cc Mr. Charles Green
Mr. J. C. Boyd
Mr. Gary Shockley

DOCKET NO. 000052

COR 000002
T095051207

10-23 4

RPR 2-11
DCH 2/16

Tennessee Department of Health and Environment
Bureau of Environment
1733 Sunset Drive
Johnson City, Tennessee 37601-3621

February 1, 1988

Dr. Lou Raasch, Manager
Environmental Services
North American Rayon Corporation
West Elk Avenue
Elizabethton, Tennessee 37643

RE: January 28, 1988 Letter of Request

Dear Sir:

This letter is written to address the request by you for an extension to the February 1, 1988, compliance deadline for hazardous waste violations noted in the Division of Solid Waste Management's Notice of Violation letter dated December 2, 1987.

Please be advised that the extension to your compliance schedule is approved. Therefore, your new compliance date for corrections to the aforementioned letter of Notice of Violation is March 1, 1988.

If you have any questions or if I can be of further assistance, feel free to contact me at 928-6487.

Sincerely,

D. Larry Gilliam
Regional Director
Division of Solid Waste Management

DLG/DSH/jj SWM-7

cc: Mr. Darrell Hale, DSWM, Johnson City
Mr. Doye Rowland, DSWM, Nashville ✓
DSWM, Nashville
Environmental Section, Carter County Health Department

DOCKET NO. 000053
COR 000001
TN95051207

NORTH AMERICAN RAYON CORPORATION
AN EMPLOYEE OWNED COMPANY

March 1, 1988

Mr. Darrell Hale
Division of Solid Waste Management
1733 Sunset Drive
Johnson City, TN 37601

Dear Mr. Hale:

The status of the waste determinations on the various items cited in your notice is still unfinished. We are waiting for the results of the lab analyses.

We have been working with GSX on the disposal of the drums. The waste oil drums are cleaned up. You may contact Bill Clark of GSX (1-800-231-4302) concerning the status of the project. They have assured me that they would have a "hard copy" of the lab results on Friday. Then they could prepare the removal/disposal, and upon our approval act upon it early next week.

The waste stream classifications are also waiting for analytical results. Upon their receipt, we will complete the classifications. IT Corporation Analytical Services is performing this set of analyses.

In conclusion, it is a bit frustrating to wait for results over which you have no time control, but we appear not to have a choice. It is most probable that we can get the drums removed next week. I am unsure about the waste stream determinations and the samples from the two storage areas, especially since you had not requested the samples until February.

An extension of our completion date, perhaps to March 15, should enable completion of the project.

Sincerely,

Lou R. Raasch

Lou R. Raasch, Manager
Environmental Services

LRR/lbs

COR 000001
T095051207

WEST ELK AVENUE • ELIZABETHTON, TENNESSEE 37643
EXECUTIVE OFFICES & PLANT (615) 542-2141 • SOUTHERN SALES OFFICE (615) 543-8686
NORTHERN SALES OFFICE • 500 FIFTH AVENUE • NEW YORK, NEW YORK 10110 • (212) 840-2592

100 DOCKET NO. 000054

TENNESSEE DEPARTMENT OF HEALTH AND ENVIRONMENT
CUSTOMS HOUSE
701 BROADWAY
NASHVILLE, TENNESSEE 37219-5403

CERTIFIED MAIL # P485-414-353
RETURN RECEIPT REQUESTED

March 3, 1988

Dr. Lou Raasch, Mgr.
Environmental Services
North American Rayton Corporation
West Elk Avenue
Elizabethton, TN 37643

Dear Dr. Raasch:

Through investigation by Division of Solid Waste Management personnel, this Division must allege that North American Rayon Corporation violated the Tennessee Hazardous Waste Management Act, Section 68-46-105(4) which states: "It shall be unlawful to store, containerize, label, transport, treat or dispose of hazardous waste or fail to provide information in violation of the rules, regulations, or orders of the Commissioner or Board, or in such a manner as to create a public nuisance or a hazard to the public health". Specifically, the Division alleges that the company has stored and mismanaged various hazardous wastes on-site.

Tennessee Code Annotated Section 68-31-112 and 68-46-111(a) authorizes the Commissioner or his designee, prior to any enforcement action, to request the presence of an alleged violator to show cause why enforcement actions ought not to be taken by the Department. Among the enforcement actions available to the Department is the assessment of a ten thousand ($10,000.00) dollars per day civil penalty for violation of Tennessee Code Annotated Section 68-46-101 et seq.

Therefore, we are requesting that you meet with us in this office on Thursday, March 17, 1988 at 10:00 a.m. CST, and show cause why this Division should not take enforcement action including the assessment of an appropriate civil penalty. Our office is located in the Customs House Building, 701 Broadway, Fourth Floor, Nashville, Tennessee. You or your representatives should bring all relevant information, reports, and documents pertaining to the management of hazardous waste at your facility. You should be prepared to discuss, in detail with reasonable accuracy, this matter so that all parties might reach a mutually agreeable solution.

Sincerely,

Tom Tiesler, Director
Division of Solid Waste Management

TT/lag/SW-81

cc: Darrell Hale, SWM - Johnson City
Dan Hyder, SWM - Nashville

DOCKET NO. 000055

COR 000001

T095051207

10-95

GSX Services, Inc.
P.O. Drawer C
Old Greenbrier Pike
Greenbrier, Tennessee 37073
(615) 244-8960 (800) 251-1227

March 9, 1988

Dr. Lou R. Raasch, Ph.D
North American Rayon Corporation
West Elk Ave.
Elizebethton, Tn 37643

Dear Mr. Raasch:

Thank you for your interest in GSX Services, Inc. We, here at GSX, pride ourselves on being a full service company, striving to provide you with the highest standards of hazardous materials management.

With this goal in mind, we are pleased to submit the attached cost proposal for the complete packaging, manifesting, transportation and disposal of hazardous material located at your facility.

I trust that the information provided will prove to be adequate for your evaluation and review. Again, thank you for considering GSX for your hazardous waste disposal needs. If I can be of further assistance or should you require additional information, please contact myself or the Customer Service Department at 1-800-251-1227.

Sincerely,

Mark Harned

Mark Harned
Technical Sales Representative

#100-21

DOCKET NO. 000056.

COR 000001

T095051207

CERTI ED MAIL #29,270
RETURN RECEIPT REQUESTED

Tennessee Department of Health and Environment
Bureau of Environment
1733 Sunset Drive
Johnson City, Tennessee 37601-3621

March 24, 1988

Dr. Lou R. Raasch, Manager
Environmental Services
North American Rayon Corporation
West Elk Avenue
Elizabethton, Tennessee 37643

RE: Emergency Spill Surface Impoundment Waste Pile
TND # 095-05-1207

NOTICE OF VIOLATION

Dear Sir:

During a November 18, 1987, Hazardous Waste Generator Inspection conducted at your facility, it was determined that a surface impoundment located adjacent to the onsite wastewater treatment plant receives spent sulfuric acid. This acid is generated as a result of routine monthly spills from piping used to transfer this acid from the viscose process spinning room to the acid recovery buildings. In addition, a waste pile was observed in the lead storage (mine) area located on the south-east side of the plant. Subsequent hazardous waste determinations on waste received at both sites indicate that both sites received a characteristic hazardous waste. Therefore, both sites are regulated hazardous waste management units. The operation of these units without a permit or interim status is in violation of Rule 1200-1-11-.07 which prohibits an existing hazardous waste management facility, in Tennessee, from treating, storing, or disposing of hazardous waste unless the owner or operator has a permit under the Tennessee Hazardous Waste Management Act or interim status.

In addition, failure to notify on the spent sulfuric acid is a violation of Rule 1200-1-11-.03 which requires a person who is a generator of a waste on the effective date of the regulations established under rule 1200-1-11-.02 which identify that waste as a hazardous waste subject to the requirements of Rule 1200-1-11-.03, to notify the Department within 90 days of that date. Such notification must be submitted on generator notification forms provided by the Department. The form must be completed according to the instructions accompanying it.

DOCKET NO. 000058

#100-22

COR 000001

TN095051207

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MAR 30 1988
DIV. OF SWM

The following actions must be taken:

1. Prior to April 15, 1988, notification must be made on the spent sulfuric acid discharged to the on-site hazardous waste surface impoundment.

2. Prior to May 15, 1988, a proposed groundwater monitoring plan must be submitted for the surface impoundment in accordance with Rule 1200-1-11-.05(6) of the Rules Governing Hazardous Waste Management in Tennessee.

3. Prior to May 15, 1988, a Closure Plan must be submitted for both the hazardous waste surface impoundment and the waste pile in accordance with Rule 1200-1-11-.05(7).

4. Please be advised that North American Rayon Corporation may be required to submit a Post-Closure Permit Application in accordance with Rule 1200-1-11-.07 of the Rules Governing Hazardous Waste Management in Tennessee.

If you have any question concerning this matter, or the accuracy of this correspondence, feel free to contact me at 928-6487 in Johnson City.

Sincerely,

Darrell S. Hale

Darrell S. Hale, R.P.E.
Environmental Specialist
Division of Solid Waste Management

DSH/jl SWM-5

cc: Mr. Glen Birdwell, DSWM, Nashville
Mr. D. Larry Gilliam, DSWM, Johnson City
Mr. Gary Shockley, Attorney, Hamilton Bank Building, Johnson City, Tennessee
Environmental Section Carter County Health Department
DSWM, Nashville 10-23 14

DOCKET NO. 000058
COR 000002
TN9505120 7

TENNESSEE DEPARTMENT OF HEALTH AND ENVIRONMENT
CUSTOMS HOUSE
701 BROADWAY
NASHVILLE, TENNESSEE 37219-5403

CERTIFIED MAIL #P 485 414 275
RETURN RECEIPT REQUESTED

March 24, 1988

Dr. Lou Raasch, Manager
Environmental Services
North American Rayon Corporation
West Elk Avenue
Elizabethton, TN 37643

Dear Dr. Raasch:

On March 17, 1988 this Division conducted a show cause meeting relative to violations of the Tennessee Hazardous Waste Management Act by North American Rayon Corporation. Representatives of North American Rayon Corporation included yourself.

The purpose of this correspondence is to inform you that this Division will continue enforcement actions in this matter. Any questions you may have regarding this letter should be directed to this office at (615) 741-3424.

Sincerely,

Tom Tiesler

Tom Tiesler, Director
Division of Solid Waste Management

TT/F4068084

#100-21

DOCKET NO. 000059

COR 000001

T095051207

Webster

10-23

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Division of Solid Waste Mgmt.
Date 4/29/88 File No.
Received by

BAKER, WORTHINGTON, CROSSLEY, STANSBERRY & WOOLF

ATTORNEYS AT LAW

UPPER EAST TENNESSEE OFFICE
HAMILTON BANK BUILDING
POST OFFICE BOX 3038 CRS
JOHNSON CITY, TENNESSEE 37602

TELEPHONE 615 928-0181
TELECOPIER 615 928-5694

JAMES F. BAKER (1864-1924)
HOWARD H. BAKER (1902-1964)
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JAMES A. DELANIS
J. RANDOLPH BIBB, JR.
H. BRUCE GUYTON
STEVEN J. EISEN
WILLIAM R. WRIGHT

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NASHVILLE, TENNESSEE 37219
VANDERBILT PLAZA
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TELECOPIER 615 329-0791

KNOXVILLE, TENNESSEE 37902
530 GAY STREET, S.W.
TELEPHONE 615 546-2800
TELECOPIER 615 525-8569

HUNTSVILLE, TENNESSEE 37756
COURTHOUSE SQUARE
TELEPHONE 615 663-2321
TELECOPIER 615 663-2111

HENDERSONVILLE, TENNESSEE 37075
MAPLE GLEN OFFICE BUILDING
TELEPHONE 615 822-8822
TELECOPIER 615 824-4684

April 28, 1988

Mr. Rick Whitson
Tennessee Department of
Health and Environment
1733 Sunset Drive
Johnson City, Tennessee 37601

Dear Mr. Whitson:

As we discussed at our April 26 meeting, North American Rayon is requesting an additional 45 days within which to complete a closure plan for their wastewater diversion basin. Because the basin contains no listed hazardous waste, we need to characterize the waste existing in the basin, prior to arriving at a closure plan. Therefore, we need some additional time for sampling and analyzing the sludge in the basin.

Thank you for your assistance in this matter. Unless we hear otherwise from you, we will assume that the 45-day extension discussed at the April 26 meeting is approved.

Sincerely yours,

Melissa McGuire

Melissa M. McGuire

ssr
cc: Charles Green
J. C. Boyd

DOCKET NO. 000061

COR 000001
T095051207

RECORD OF COMMUNICATION	☒ PHONE CALL ☐ DISCUSSION ☐ FIELD TRIP ☐ CONFERENCE ☐ OTHER (SPECIFY) (Record of item checked above)	
TO: GARY BODENSTEIN	FROM:	DATE 5-4-88 TIME 3 PM.

SUBJECT: NORTH AMERICAN RAYON

SUMMARY OF COMMUNICATION

TN IDENTIFIED ANOTHER NON-NOTIFIER LOCATED IN ELIZABETHTON (EAST TN JOHNSON CITY OFFICE). THE NAME of the Company is North AMERICAN RAYON. They have CORROSIVE WASTE (pH <2) going into AN UNLINED SURFACE IMPOUNDMENT GROUNDWATER MONITORING WELLS are going in.

CONCLUSIONS, ACTION TAKEN OR REQUIRED

DOCKET NO. 000062.

INFORMATION COPIES TO: Wayne TN file

COR 000001

EPA Form 1300-6 (7-72) REPLACES EPA HQ FORM 5300-9 WHICH MAY BE USED UNTIL SUPPLY IS EXHAUSTED.

T095051207

10-2 23

BAKER, WORTHINGTON, CROSSLEY, STANSBERRY & WOOLF

ATTORNEYS AT LAW

UPPER EAST TENNESSEE OFFICE
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POST OFFICE BOX 3038 CRS
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TELECOPIER 615 663-2111

HENDERSONVILLE, TENNESSEE 37075
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TELECOPIER 615 824-4684

May 5, 1988

Mr. Rick Whitson
Tennessee Department of
Health & Environment
1733 Sunset Drive
Johnson City, Tennessee 37601

RE: North American Rayon Corporation/Diversion Basin and Waste Pile

Dear Mr. Whitson:

On behalf of North American Rayon, I would like to thank you for meeting with us on April 26, 1988, to discuss the closure of the diversion basin and waste pile at the North American plant. As you know, there has been no known disposal of any listed hazardous waste in the diversion basin. The basin was simply used as an overflow tank from the wastewater treatment process at the plant. Therefore, although we know that the tank may have received some wastewater with a low pH, we do not know whether any of the sediment in the tank is hazardous waste. Consequently, before we can design a closure plan, we must characterize the sludge. Bob Garrett from HazTech will be submitting, under separate cover, a sampling plan which should serve to characterize the sludge. This plan should meet the criteria that we agreed to at our April 26 meeting. If there are any minor deficiencies in the sampling plan, we hope that you will make any necessary changes and return the plan to us, rather than requiring resubmission.

DOCKET NO. NAR-003

COR 000001

DOCKET NO. 000064 095051207

Once the sludge has been sampled and characterized, we should be able to arrive at a closure plan. As you know, North American has requested a 45-day extension for the submission of this plan due to the unusual circumstances of this matter. The additional 45 days would allow us to submit a plan on or before June 29, 1988.

At the same time that HazTech is preparing a sampling plan and coducting sampling, they will also be designing a groundwater monitoring plan. This groundwater monitoring plan will be submitted on or before May 15, 1988.

There was also some discussion at this meeting regarding the closure of the waste pile. You and Larry Gilliam indicated that the closure plans on the impoundment and the waste pile could be combined, including combined financial assurances, etc. In addition, you stated that a sampling plan might not be necessary for the waste pile provided that North American can document that none of the debris at the site was ever placed directly on the soil, but rather was always placed on top of the asphalt pad. You further suggested that if nothing was ever put on the soil, high pressure cleaning of the pad might be acceptable.

Subsequent to the meeting, I spoke with Darrell Hale regarding the pumping of water from the diversion basin. He indicated that he had spoken with you regarding this question, and that you stated that pumping some of the water from the diversion basin back into the wastewater treatment system would be acceptable to the Department of Health and Environment.

I hope that this letter accurately reflects our discussion on the 26th. Please let me know if you disagree with this discussion in any way. Thank you for your assistance in this matter.

Sincerely yours,

Melissa McGuire

Melissa M. McGuire

ssr
cc: Charles Green
J. C. Boyd

DOCKET NO. 000064
COR
000002
T095051207

CERTIFIED MAIL #29,369
RETURN RECEIPT REQUESTED

DCH

Tennessee Department of Health and Environment
Bureau of Environment
1733 Sunset Drive
Johnson City, Tennessee 37601-3621

RECEIVED
MAY 12 1988
DIV. OF SWM

May 9, 1988

Ms. Melissa M. McGuire
Baker, Worthington, Crossley, Stansberry, and Woolf
Attorneys at Law
P. O. Box 3038 CRS
Johnson City, Tennessee 37602

RE: North American Rayon Corporation
Closure Plan
TND 095051207

Dear Ms. McGuire:

This letter is written in response to your correspondence dated April 28, 1988, requesting a forty-five (45) day extension to the existing May 15, 1988, compliance date for NARC to submit Closure Plans for the surface impoundment and waste pile hazardous waste management units.

The Division is granting NARC a forty-five (45) day extension to the May 15, 1988, compliance date, in order for NARC to identify the hazardous consitutents which have been managed in the units.

Therefore, NARC must submit Closure Plans for the surface impoundment and waste pile, which adequately satisfies the applicable requirements of Rule 1200-1-11-.05, by June 29, 1988.

If you have any questions or comments, do not hesitate to contact me at 615/928-6487.

Sincerely,

D. Larry Gilliam

D. Larry Gilliam
Regional Director
Division of Solid Waste Management

DLG/RW/jj SWM-1

cc: Mr. Dwight Hinch, DSWM, Nashville
Mr. Dan Hyder, DSWM, Nashville
Mr. Darrell Hale, DSWM, Johnson City
DSWM, Nashville 10-23 25

DOCKET NO. 000065

COR 000001

T095051207

CERTIFIED MAIL #29,384
RETURN RECEIPT REQUESTED

D C H

Tennessee Department of Health and Environment
Bureau of Environment
1733 Sunset Drive
Johnson City, Tennessee 37601-3621

RECEIVED
MAY 13 1988
DIV OF SWM

May 10, 1988

Ms. Melissa M. McGuire
Baker, Worthington, Crossley, Stansberry, and Woolf
Attorneys at Law
P. O. Box 3038 CRS
Johnson City, Tennessee 37602

RE: North American Rayon Corporation
Surface Impoundment
Sampling and Analysis Plan
TND 095051207

Dear Ms. McGuire:

The Tennessee Department of Solid Waste Management has completed the evaluation of the Sampling and Analysis Plan for the surface impoundment located at North American Rayon Corporation.

The Sampling and Analysis Plan is approved provided the following are included:

1. The waste generated from the decontamination of sampling equipment must be collected and disposed of properly.

2. One duplicate sample must be split with an actual sample and assign a false sampling number. The analytical results from the actual sample and the duplicate must fall within ±20% to be considered valid.

Please contact the Johnson City Field Office two (2) days prior to the sampling.

DOCKET NO 000066

#100-2 COR 000001

T095051207

If you have any questions or comments, please do not hesitate to contact me at 615/928-6487.

Sincerely,

Richard A. Whitson

Richard A. Whitson
Environmental Engineer
Division of Solid Waste Management

RAW/jj SWM-7

cc: Dr. Lou R. Raasch, NARC, Elizabethton
Mr. James H. Scarbrough, EPA, Region IV
Mr. Dwight Hinch, DSWM, Nashville
Mr. Dan Hyder, DSWM, Nashville
Mr. D. Larry Gilliam, DSWM, Johnson City
Mr. Darrell Hale, DSWM, Johnson City
DSWM, Nashville 10-23 28

DOCKET NO. 000066
COR 000002
T095051207

RECEIVED
Division of Solid Waste Management
Date 05/16/88 File No.
Received by OPS

GROUND-WATER MONITORING PLAN FOR EMERGENCY SPILL DIVERSION BASIN

NORTH AMERICAN RAYON CORPORATION
ELIZABETHTON, TENNESSEE

10 - 23 29

MAY 14, 1988

Prepared for:

BAKER, WORTHINGTON, CROSSLEY,
STANSBERRY & WOOLF

Project No. 2322-88-1107

Prepared by:

Westinghouse HAZTECH

Laura B. Harris
Project Manager

DOCKET NO. 000067
COR
000001
T095051207

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2.0	Applicability of Ground-Water Monitoring	1
3.0	Ground-Water Monitoring System	3
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3.2	Drilling Method and Well Construction	4
3.2.1	Decontamination Procedures	6
4.0	Sampling and Analysis	6
5.0	Ground-Water Quality Assessment	7
6.0	Recordkeeping and Reporting	8

LIST OF FIGURES

1. Proposed Monitor Well and Piezometer Locations. Emergency Spill Diversion Basin.....2

2. Generalized Diagram of Monitor Well Construction.....5

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1.0 INTRODUCTION

North American Rayon Corporation (NARCo), Elizabethton, Tennessee (TN) was constructed in 1928. NARCo conducts viscose manufacturing of textile and industrial continuous filament rayon fiber and vinyl coated fabric.

On November 18, 1987 a Hazardous Waste Generator Inspection was performed at NARCo by Darrell Hale with the TN Department of Health and Environment (TN DHE), Bureau of Environment. It was determined that a surface impoundment (SI), used as an emergency spill diversion basin, had received spent sulfuric acid, a characteristic hazardous waste as defined by Rule 1200-1-11-.02(3)(c). The SI of concern is 1 of 4 basins as shown on figure 1. The other 3 SI's are settling and drying basins, associated with NARCo's National Pollutant Discharge Elimination System (NPDES) program, receiving a non-hazardous fly ash and water mixture.

This ground-water monitoring plan has been developed for the SI in response to a March 24, 1988 Notice of Violation issued by TN DHE to NARCo. This plan has been developed in accordance with Rule 1200-1-11-.05(6), and follows protocols set forth in EPA's September 1986 RCRA Ground-Water Monitoring Technical Enforcement Guidance Document (hereafter "the Guidance Document").

2.0 APPLICABILITY OF GROUND-WATER MONITORING

Rule 1200-1-11-.05(6)(a)1 requires that the owner or operator of an SI used to manage hazardous waste to implement a ground-water monitoring program capable of determining the impact of the facility on the quality of ground-water in the uppermost aquifer beneath the facility.

Rule 1200-1-11-.05(6)(a)5 allows for a waiver of ground- water monitoring requirements for SIs used to neutralize wastes listed as hazardous in Rule 1200-1-11-.02(4) only because of corrosivity, and containing no other hazardous waste. This waiver is contingent upon demonstration, in writing, to the satisfaction of the Commissioner that there is no potential for migration of hazardous wastes from the SI to the ground water.

If 4 quarters of background sampling indicate that the ground water is unaffected by the spill diversion basin, NARCo will make application to the Commissioner for termination of ground-water monitoring within 6 months of the fourth quarterly sampling event. This will allow for at least one detection sampling event, from which data will be obtained for statistical comparison with background data.

COR
DOCKET NO. 000067 000003
T095051207

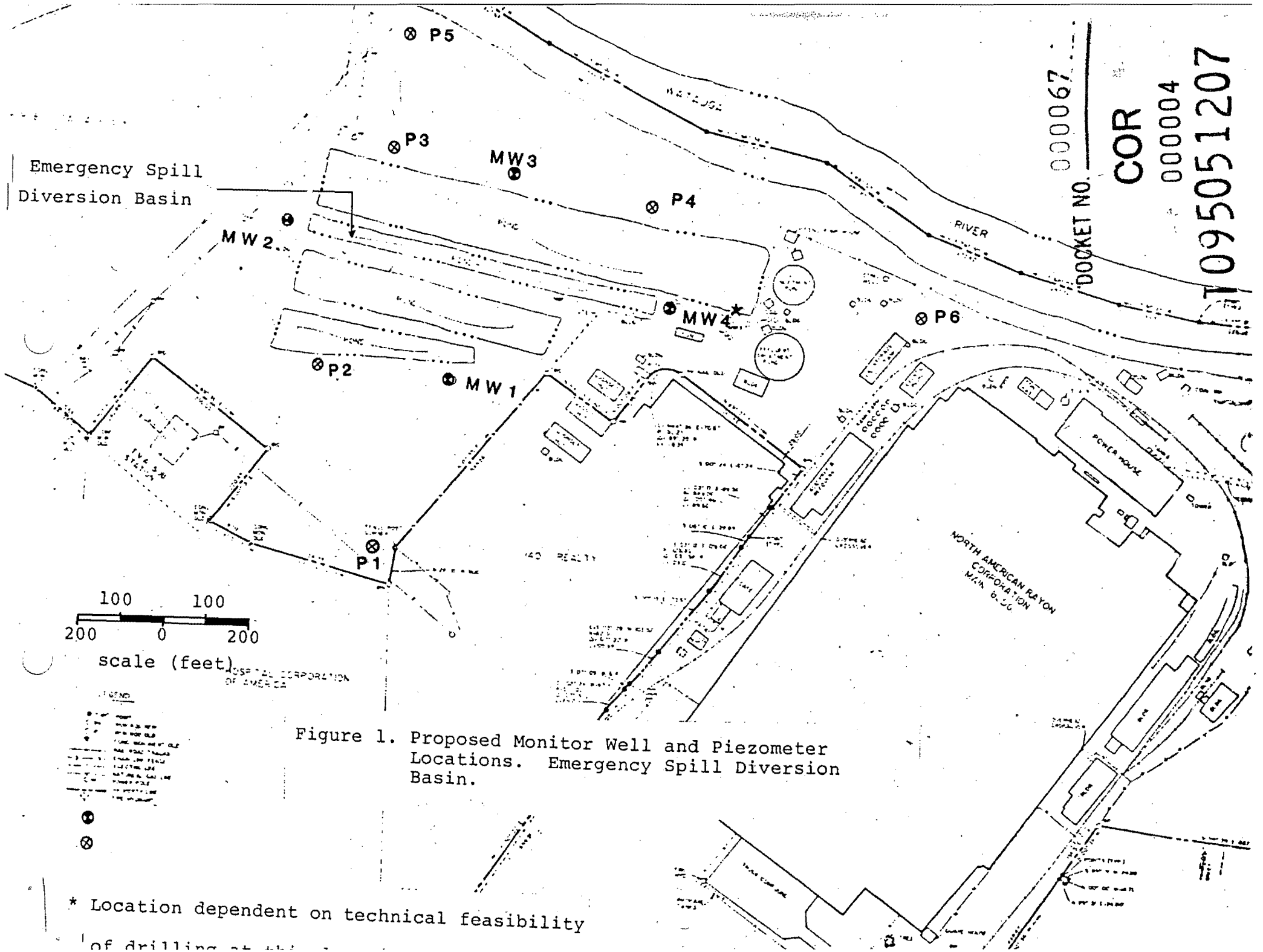

Figure 1. Proposed Monitor Well and Piezometer Locations. Emergency Spill Diversion Basin.

* Location dependent on technical feasibility of drilling at this

DOCKET NO. 000067
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T09505T207

3.0 GROUND-WATER MONITORING SYSTEM

Rule 1200-1-11-.05(6)(b) requires the following of a ground-water monitoring system:

- o system must be capable of yielding ground-water samples suitable for analysis.
- o must consist of at least 1 upgradient well capable of yielding ground-water samples unaffected by the facility, and indicative of background ground-water quality in the uppermost aquifer near the facility.
- o must consist of at least 3 downgradient wells capable of detecting statistically significant amounts of hazardous waste migrating from the facility to the uppermost aquifer.

The proposed ground-water monitoring system consists of 4 wells positioned as indicated on figure 1. Locations were chosen around the periphery of all SIs due to the proximity of the SIs to one another. Also shown on figure 1 are 5 piezometers, which will be used to study ground-water flow directions and seasonal variations in flow directions in the uppermost aquifer beneath the site. This arrangement of wells and piezometers has been selected based on two factors suspected as being major influences on ground-water flow beneath the site. One major influence may be discharge of water from the SIs to the uppermost aquifer, creating a mound in the water table directly beneath the impoundments. A second possible influence is that the Wautauga River may discharge to the aquifer. Normally in this climatic situation, ground-water levels in an unconfined aquifer in the soil overburden adjacent to a river would be very near the elevation of the surface of the river. However, during times of low water table, the Watauga River may begin discharging to the aquifer, reversing local flow directions.

Piezometers P1, P5, and P6 are intended to monitor the ground-water table in areas unaffected by (or away from) the mound created by the SIs. P5 and P6 will also be of great importance in determining whether seasonal reversals in flow are occurring beneath the facility.

The positioning of monitor wells around the SIs may not yield samples indicative of background ground-water quality in the uppermost aquifer, depending on the extent of mounding. The 2 southern most SIs currently are not receiving influent, and are expected to be dry within 6 months. At some point, these two SIs will no longer contribute to mounding of the water table. As the shape of the mound changes, one of the wells may yield ground-water samples indicative of ground-water quality immediately upgradient of the impoundment area. This determination will have to be based on evaluation of the water table over a period of 3 to 6 months. The possibility exists that one more well will be necessary to define background ground-water quality.

COR
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3.1 SUBSURFACE GEOLOGY

Previous borings conducted in and around the SIs indicate that river alluvium, composed of sandy silty clay, lies immediately below the surface to a depth of about 10 ft. Below this top layer of alluvium lies a layer of boulders 1 to 8 ft thick. Some borings penetrated more than one boulder zone, the zones being separated by sandy clayey alluvium. The boulder layer is underlain by silty clay residuum from weathering of bedrock.

Maclay (1962) reported the bedrock to be Honaker Dolomite, a middle Cambrian formation composed of thin to massive bedded units of dolomite and limestone. Chert is abundant in the residual soils derived from the Honaker Dolomite units. The Honaker Dolomite is reported to average about 1200 ft thick. The lower units of the formation are shaly.

Although no ground-water elevations are available from borings in the SI area, nearby borings indicate the water table to be 12 to 28 ft below surface. Bedrock lies 30 to 50 ft below surface. It is anticipated that monitor well borings will be terminated at or near bedrock surface.

3.2 DRILLING METHOD AND WELL CONSTRUCTION

Conventional augering has proven to be an ineffective drilling method for penetration of the boulder layer known to exist beneath the site. Rotary drilling has been selected as the preferred method for installation of monitor wells and piezometers.

Well construction materials have been selected based on the corrosive nature of the material known to have been discharged into the spill diversion basin, in addition to technical advice provided by the Guidance Document. Currently an asssessment of the spill diversion basin is planned. Based on information obtained by this assessment, the monitor well system will be revised if data indicate the need to do so, in order to ensure the integrity of the monitoring system and subsequent ground-water quality data.

The proposed monitor wells will be constructed as illustrated in the schematic diagram in figure 2. TriLoc brand 2-in PVC casing and screen are preferred for well construction. An alternate brand will be acceptable, assuming it meets or exceeds ASTM standards D 2665 and D 1784. Manufacturer specifications will be necessary to show compliance with these ASTM standards before alternate brands of PVC pipe are approved for use.

Boreholes shall be grouted with a mixture of portland cement and about 3% bentonite powder. Grout will be tremied into the annular space of wells after the bentonite seal has set.

COR
DOCKET NO. 000067 000006
T095051207

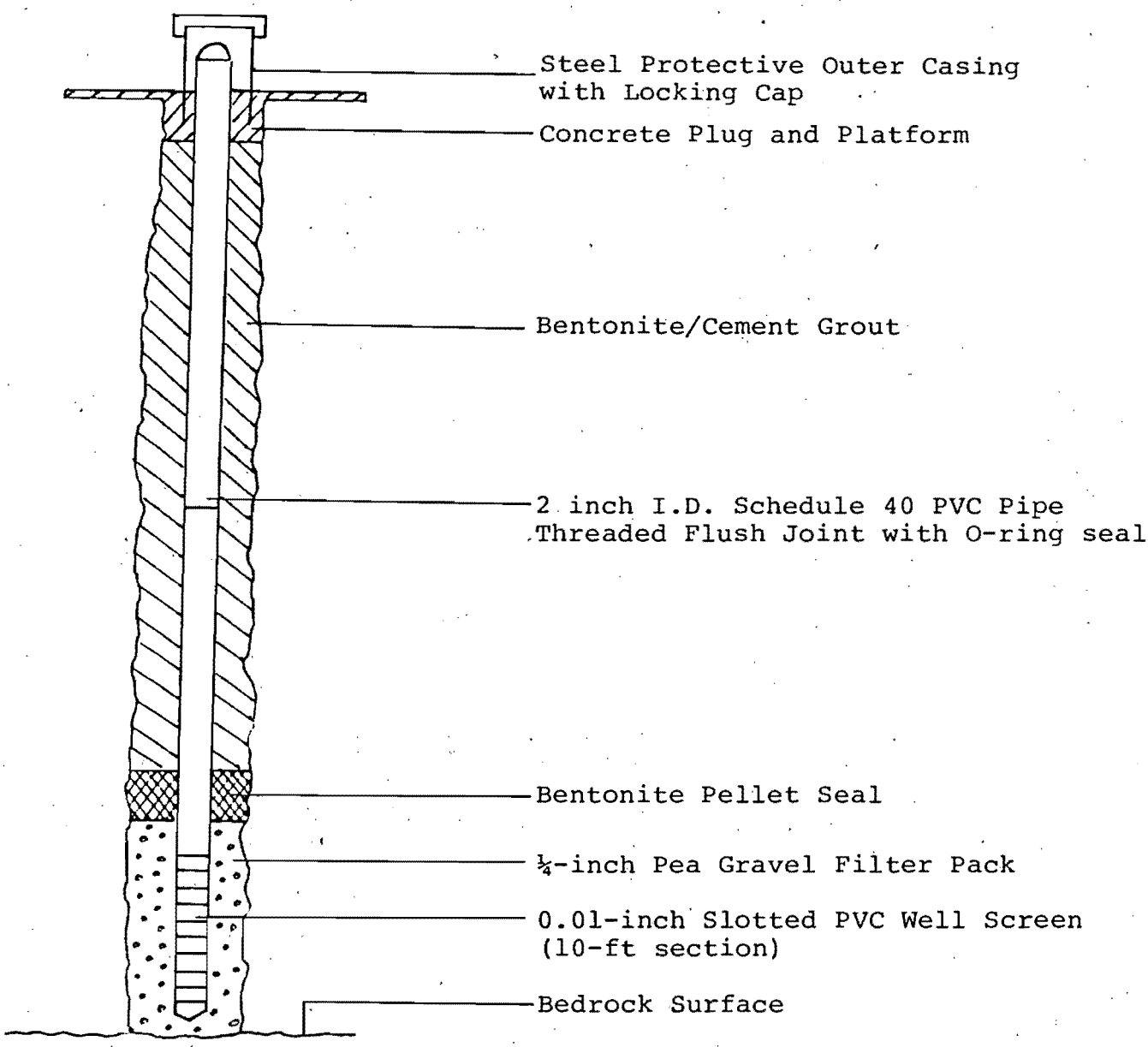

Figure 2. Generalized Diagram of Monitor Well Construction

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3.2.1 DECONTAMINATION PROCEDURES

Steam cleaning of all downhole drilling equipment will be required at the onset of drilling and between each borehole. Hand tools contacting downhole equipment will also require steam cleaning on the same schedule.

All PVC casing and screens will be steam cleaned prior to placement in the borehole.

4.0 SAMPLING AND ANALYSIS

Piezometers will be monitored bi-weekly for a period of 3 to 6 months. An electronic water level indicator will be used to monitor water levels in the piezometers. Water elevations will be measured in the monitor wells each time piezometers are monitored, as well as before purging associated with a sampling event.
In accordance with Rule 1200-1-11-.05(6)(c)3, all monitor wells will be sampled quarterly for 1 yr, in order to determine background concentrations for the following parameters:

o Parameters characterizing the suitability of ground water as a drinking-water supply:

	Maximum Level (mg/l)
- Arsenic	0.05
- Barium	1.0
- Cadmium	0.01
- Chromium	0.05
- Fluoride	1.4 - 2.4
- Lead	0.05
- Mercury	0.002
- Nitrate (as N)	10.0
- Selenium	0.01
- Silver	0.05
- Endrin	0.0002
- Lindane	0.004
- Methoxychlor	0.1
- Toxaphene	0.005
- 2,4-D	0.1
- 2,4,5-TP Silvex	0.01
- Radium	5 pC1/1
- Gross Alpha	15 pC1/1
- Gross Beta	4 millirem/yr
- Coliform Bacteria	1/100 ml

o Parameters establishing ground-water quality:

- Chloride
- Iron
- Manganese
- Phenols
- Sodium
- Sulfate

DOCKET NO. 000067 COR 000008
T095051207

o Parameters used as indicators of ground-water contamination:

- pH
- Specific conductance
- Total organic carbon (TOC)
- Total organic halogen (TOX), or not more than 3 hazardous constituents, or indicators thereof, found in the hazardous waste associated with the SI; to be selected by NARCo and approved by TN DHE.

Four replicate measurements of indicator parameters will be obtained for each sample.

If a waiver of ground-water monitoring is not granted following completion of background sampling, the monitor wells will be sampled with the following frequencies:

o Samples to establish ground-water quality will be collected annually.

o Samples to indicate ground-water contamination will be obtained semiannually. Four replicate measurements will be obtained for each sample.

Details of sampling and analytical procedures are included in the Ground-Water Sampling and Analysis Plan for NARCo (under separate cover).

5.0 GROUND-WATER QUALITY ASSESSMENT

Rule 1200-1-11-.05(6)(d)1. indicates that the owner or operator must prepare an outline of a ground-water quality assessment program. The outline must describe a more comprehensive ground-water monitoring program than previously implemented and be capable of determining the following:

o Whether hazardous waste or hazardous waste constituents have entered the ground water.

o The rate and extent of migration of hazardous waste and hazardous-waste constituents in the ground water.

o The concentrations of these constituents in the ground water.

The following ground-water assessment outline is applicable to the NARCo site provided a waiver of ground-water monitoring is not granted:

o Data collected during the second and subsequent years will be compared statistically with the first year's data. The Averaged Replicate t-test, described in the Guidance Document, will be used for statistical analyses.

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- NARCo will determine if upgradient or downgradient wells exhibit statistically significant differences compared to background values.

- If upgradient wells show statistically significant differences, these differences will be noted in a cover letter attached to the routine report to the Commissioner.

- If downgradient wells show a statistically significant difference, additional samples will be taken and split between 2 laboratories to determine if the difference was laboratory error.

- If these analyses contain significant differences, NARCo will notify the Commissioner, in writing, within 7 days of this confirmation that the facility may be affecting ground-water quality. NARCo will then prepare and implement a ground-water assessment program.

6.0 RECORDKEEPING AND REPORTING

According to Rule 1200-1-11-.05(6)(e), NARCo must keep accurate records of the analytical data collected from ground- water monitoring. During the first year, these data will be reported to the Commissioner within 15 days after the quarterly results are received. NARCo will separately identify for each monitor well any of the parameters characterizing the suitability of the ground water as a drinking-water supply whose concentrations have been found to exceed acceptable limits.

If ground-water monitoring is required during the second and subsequent years following closure, NARCo will provide an annual report to the Commissioner. This report will include analytical results for parameters establishing ground-water quality and the indicator parameters. NARCo will separately identify any significant differences from initial background found in the upgradient wells. Ground-water elevations also will be submitted in the annual report.

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T095051207

10-23 29

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May 16, 1988

HAND-DELIVERED

RECEIVED
Div. of Solid Waste Management
05/16/88 File No.
Received By JPS

Mr. Victor Sparks
Tennessee Department of
Health & Environment
1733 Sunset Drive
Johnson City, Tennessee 37601

Dear Victor:

Enclosed please find four (4) copies of the Groundwater Monitoring Plan and Groundwater Sampling and Analysis Plan for the Emergency Spill Diversion Basin at the North American Rayon Corporation.

I look forward to working with you on this project.

Sincerely yours,

Melissa

Melissa M. McGuire

ssr
Enclosures

DOCKET NO. 000068
COR 000001
TN9505120 7

Tennessee Department of Health and Environment
Bureau of Environment
1733 Sunset Drive
Johnson City, Tennessee 37601-3621

May 23, 1988

Melissa McGuire, Attorney
Baker, Worthington, Crossley, Stansberry
& Woolf
Hamilton Bank Building
P. O. Box 3036 CRS
Johnson City, Tennessee 37602

RE: Review of North American Rayon's Groundwater Monitoring Plan and Groundwater Sampling and Analysis Plan

Dear Ms. McGuire:

The Groundwater Monitoring Plan and the Groundwater Sampling and Analysis Plan have been reviewed by the Division of Solid Waste Management. No deficiencies were noted and these plans fullfill the requirements set forth in The Rules Governing Hazardous Waste Management in Tennessee.

If you have any questions regarding this review or any other aspects of the permitting process, contact our Division Field Office at 928-6487.

Sincerely,

Victor Sparks

Victor Sparks, Geologist
Division of Solid Waste Management

VS/jl SWM-7

cc: Mr. James H. Scarbrough, U. S. E.P.A., Region IV
Mr. Dwight Hinch, DSWM, Nashville
Mr. D. Larry Gilliam, DSWM, Johnson City
Mr. Richard A. Whitson, DSWM, Johnson City
Mr. Fred Willingham, DSWM, Johnson City
DSWM, Nashville 10-23 30
Carter County Health Department

DOCKET NO. 000069
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DOCKET NO.

Glen Bridwell

Tennessee Department of Health and Environment
Bureau of Environment
1733 Sunset Drive
Johnson City, Tennessee 37601-3621

RECEIVED
MAY 31 1988
DIV. OF SWM

May 25, 1988

Dr. Lou R. Raasch, Manager
Environmental Services
North American Rayon Corporation
West Elk Avenue
Elizabethton, Tennessee 37643

RE: Influent to Waste Water Treatment Plant

Notice of Violation

Dear Sir:

In a December 2, 1987, Division of Solid Waste Management inspection report under the paragraph heading Facility Description, it was noted that spent sodium hydroxide (PH 13) and spent sulfuric acid (PH 2) waste streams were discharged to the on-site waste water treatment unit. Subsequent follow-up inspections involving the on-site waste water treatment unit and the hazardous waste surface impoundment revealed that these two corrosive hazardous wastes are piped separately from the production process. At the waste water treatment unit they are simultaneously discharged into a tank where co-mingling of the two waste streams results in neutralization.

Rule 1200-1-11-.07(1)(b)4(iv) of the Rules Governing Hazardous Waste Management in Tennessee excludes this treatment process from the permit requirements; however, notification on each separate waste stream is required in accordance with Rule 1200-1-11-.03(2)(b). This notification is required if these waste streams do not meet the exclusions in Rule 1200-1-11-.02(1)c(ii)(III) or 1200-1-11-.03(2)(a)2.

Therefore, in order to attain compliance, notification on the forms provided must be made prior to June 15, 1988. In addition, North American Rayon Corporation must meet all of the generator requirements addressed in Rule 1200-1-11-.03.

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If you have any questions concerning this matter or the accuracy of this report, feel free to contact me at 928-6487 in Johnson City.

Sincerely,

Darrell S. Hale

Darrell S. Hale, R.P.E.
Environmental Specialist IV
Division of Solid Waste Management

DSH/jj SWM-6

cc: Mr. Glen Birdwell, DSWM, Nashville
DSWM, Nashville 10-23 32
Environmental Section, Carter County Health Department
Mr. D. Larry Gilliam, DSWM, Johnson City

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JMA 6-29-88 (10-22)

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Attached by

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JUN 29 1988
DIV. OF S.M.

June 23, 1988

TN-~~420~~ 102

Mr. Rick Whitson
Tennessee Department of
Health & Environment
1733 Sunset Drive
Johnson City, Tennessee 37601

RE: North American Rayon Diviersion Basin

Dear Rick:

This letter is to confirm our conversation yesterday regarding the future use of the diversion basin. You indicated yesterday that although the State did not encourage the use of the diversion basin and any use would be at North American's own risk, the Department of Health & Environment would not, at this time, order North American not to use the basin.

Thank you for meeting with me and Laura Harris on this matter yesterday. Please feel free to contact me regarding this matter.

Sincerely yours,

Melissa

Melissa M. McGuire

ssr
cc: Charles Green
J. C. Boyd
Lou Raasch
Bob Garrett

DOCKET NO. 000074

COR 000001

T095051207

#28

10-23 41

BAKER, WORTHINGTON, CROSSLEY, STANSBERRY & WOOLF

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June 29, 1988

HAND-DELIVERED

Mr. Rick Whitson
Tennessee Department of
Health and Environment
1733 Sunset Drive
Johnson City, Tennessee 37601

RE: North American Rayon Corporation Closure Plan

Dear Mr. Whitson:

Enclosed please find four (4) copies of the closure plan for the diversion basin and waste pile at the North American Rayon plant. If you have any questions concerning this submittal, please feel free to call me.

Sincerely yours,

Melissa McGuire

Melissa M. McGuire

ssr
Enclosures
cc: Charles Green
J. C. Boyd
Lou Raasch
Laura Harris

DOCKET NO. NAR-008

DOCKET NO. 000077
COR 000001
T095051207

CLOSURE PLAN FOR
WASTE PILE AND
SPILL DIVERSION BASIN
AT
NORTH AMERICAN RAYON CORP.
ELIZABETHTON, TENNESSEE

June 29, 1988

Prepared for

BAKER, WORTHINGTON, CROSSLEY,
STANSBERRY & WOOLF
Johnson City, Tennessee

Prepared by

WESTINGHOUSE HAZTECH
Decatur, Georgia

Project No. 2322-88-1107

Laura B. Harris
Project Manager

COR
000001

DOCKET NO. 000077 T095051207

EXECUTIVE SUMMARY

- North American Rayon Corporation, Elizabethton, Tennessee, was constructed in 1928 for production of continuous filament rayon fiber and vinyl fabric.

- The Tennessee Department of Health and Environment inspected the facility and determined that a surface impoundment had received spent sulfuric acid, and a waste pile located on-site contained lead debris, both characteristic hazardous wastes. Both waste management units will be closed.

- Sludge sampling in the lagoon indicated that selenium exist at levels above the maximum limit of 1.0 ppm as determined by EP Toxicity testing. Sulfides and zinc also exist, but are not regulated hazardous wastes and have no health based exposure criteria for soils. Evidence does not indicate that sulfides and/or zinc pose a threat to human health or the environment.

- Closure of both waste management units will involve removal of all hazardous waste and waste residues from the site. Ground-water monitoring will be performed around the lagoon area to document ground-water quality beneath the basin.

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DOCKET NO. 11 000077

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T095051207

1.0 INTRODUCTION

North American Rayon Corporation (NARCo), Elizabethton, Tennessee (TN) was constructed in 1928. NARCo conducts viscose manufacturing of textile and industrial continuous filament rayon fiber and vinyl fabric.

On November 18, 1987 a Hazardous Waste Generator Inspection was performed at NARCo by Darrell Hale with the TN Department of Health and Environment (TN DHE). It was determined that a surface impoundment (SI) had received spent sulfuric acid, a characteristic hazardous waste (EPA ID No. D002), and that a waste pile had received lead debris, also a characteristic waste (EPA ID No. D008).

This closure plan has been developed for NARCo in response to a March 24, 1988 Notice of Violation submitted to NARCo by the TN DHE. The closure plan has been divided into sections to address closure of each of the above-mentioned hazardous waste management units. This plan has been developed in accordance with Rule 1200-1-11-.05 of the TN DHE regulations governing hazardous waste management.

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2.0 WASTE PILE CLOSURE

NARCo began accumulating lead debris on an asphalt pad located on the southeast side of the plant (figure 1) in 1975. The debris consists of lead pipes and equipment parts resulting from overhaul of certain machinery. NARCo received verbal approval from Darrell Hale with the TN DHE to arrange for a recycler to take reclaimable materials from the waste pile. After the recycler has taken the majority of debris, it is anticipated that clean closure can be obtained by collecting the remaining solids for disposal at a permitted hazardous waste landfill and high pressure washing of the asphalt pad. Wash water will be collected and diverted to NARCo's present water treatment system. Solids collected with the wash water will be allowed to settle and will be disposed of at a permitted hazardous waste landfill. Any liners associated with wash water collection will also be disposed of at the hazardous waste landfill.

2.1 Estimate of Maximum Waste Inventory

Rule 1200-1-11-.05(7)(c)2.(iii) requires an estimate of the maximum inventory of wastes in storage and in treatment at any time during the life of the facility.

NARCo entered into an agreement with a recyler for collection of approximately 150,000 pounds (lbs) of material from the waste pile. Presently, the majority of debris has already been removed by the reclaimer. The debris is comprised of lead pipes and machine parts which have lead components. The estimate above includes any aluminum, steel, or iron material which may be included in the waste debris. After the recycler has completed removal to the extent practicable, a certified contractor will collect the remaining dry residue, wash the asphalt pad, and dispose of solids at a hazardous waste landfill. Therefore, the amount of lead contaminated material requiring disposal at the landfill will be minimal. Furthermore, less than 4000 gallons of wash water are expected to accumulate and be diverted to NARCo's on-site water treatment system.

2.2 Decontamination of Facility Equipment

Rule 1200-1-11-.05(7)(c)1.(iii) requires a description of the steps needed to decontaminate facility equipment during closure. It is anticipated that equipment remaining at the facility will not require decontamination because no facility equipment will be used, or otherwise exposed to, waste during closure of the waste pile.

Equipment used in cleaning the asphalt pad, such as personnel protective gear and shovels, will be decontaminated by pressure washing or disposed of with other lead contaminated debris.

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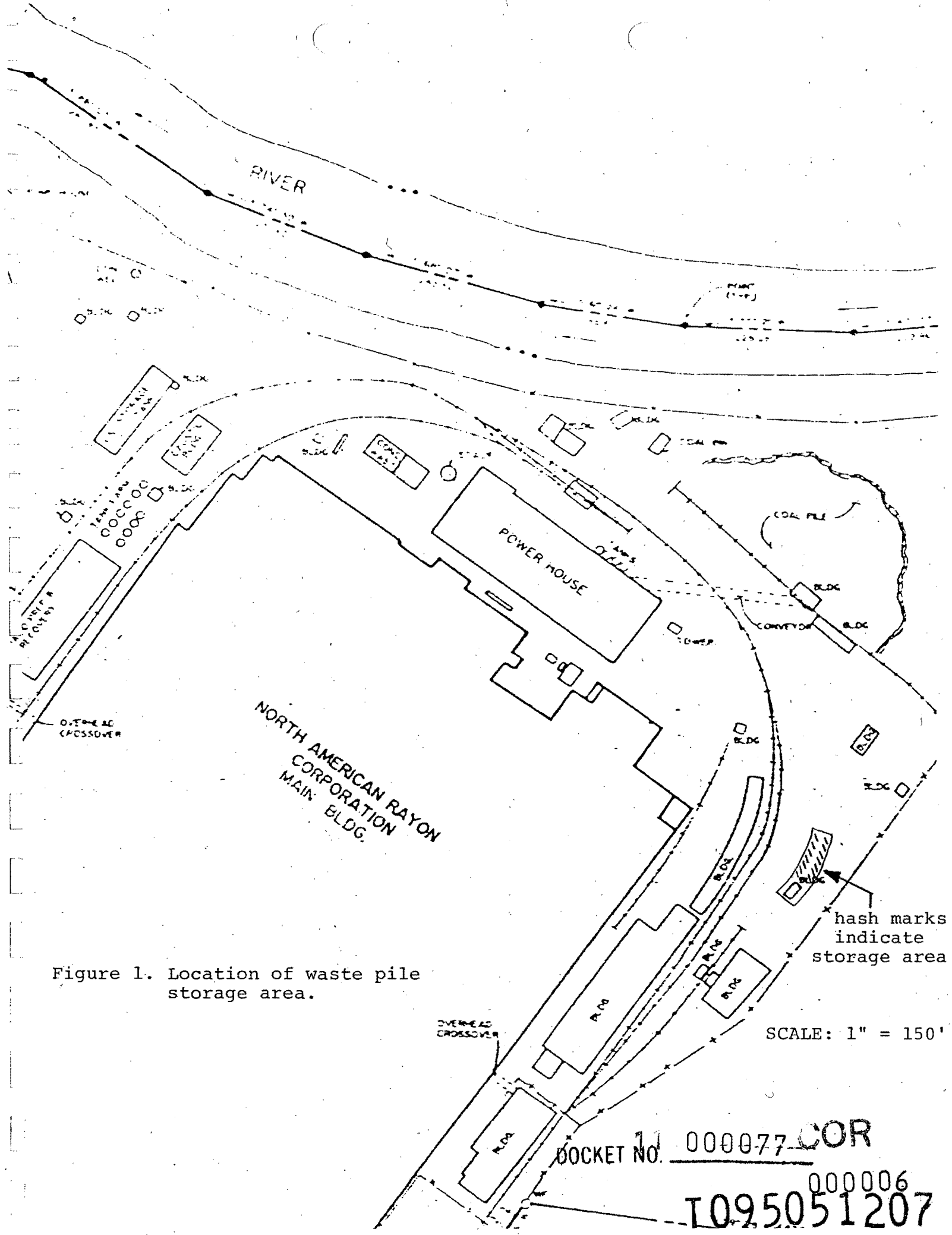

Figure 1. Location of waste pile storage area.

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3.0 CLOSURE OF EMERGENCY SPILL DIVERSION BASIN

The SI of concern is 1 of 4 basins as indicated in figure 2. The other 3 SIs are settling and drying basins, associated with NARCo's National Pollutant Discharge Elimination System (NPDES) program, receiving a non-hazardous fly-ash and water mixture.

On May 19, 1988 Westinghouse HAZTECH sampled sludge in the diversion basin along transects indicated in figure 2. Three (3) points along each of 5 transects were sampled. The depth of sludge at T1 was 3 feet (ft) on the date of sampling, the remainder of the SI contained 1 ft or less of sludge. Table 1 presents analytical data obtianed from this sampling.

what wells at each profile?

3.1 Estimate of Maximum Waste Inventory

In accordance with Rule 1200-1-11-.05(7)(c)2.(iii), an estimate of waste inventory has been developed for the SI. The SI is approximately 850 ft long, 15 ft wide at its base, and 15 ft deep. Based on an average of 1-ft of sludge in the SI, and removal of 6-in of subsoil, 708 cubic yards (cy) of material will be removed and disposed of. The actual volume of material requiring disposal may be higher if solidification of the material is required.

The amount of hazardous waste in the SI, based on EP Toxicity selenium values at sample location T1,P2 (figure 2), is 3 cy. This is based on removal of 2-ft of sludge and 6-in of subsoil from an area 6-ft square. The remaining material in the SI does not contain hazardous wastes as defined in Rule 1200-1-11-.02.

Sulfides exist at concentrations ranging form 490 to 14,000 ppm. Rule 1200-1-11.02(3)(d) indicates that sulfide bearing waste, which when exposed to pH conditions between 2 and 12.5, can generate toxic gases, vapors, or fumes in a quantity sufficient to present a danger to public health or the environment is a hazardous, reactive waste. There is currently no analytical method to determine the potential for hydrogen sulfide gas production from solid waste. However, the SI has existed since 1928, at pH conditions between 2 and 12.5, without demonstration that the material within it is reactive. There is no evidence that the sulfide compounds produce gases, vapors, or fumes in quantities sufficient to present a danger to public health or the environment. Finally, there are no health based criteria for sulfides, upon which dangerous or safe levels can be established. In conclusion, there is no indication that the waste is hazardous due to sulfide content.

Total zinc values for the sludge range from 578 to 1685 ppm. Zinc is not a regulated material under RCRA, and there are no health based criteria for zinc, excepting those established for protection of marine and freshwater aquatic life. Therefore, there is no basis for manifesting the waste as hazardous due to zinc levels.

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T095051207

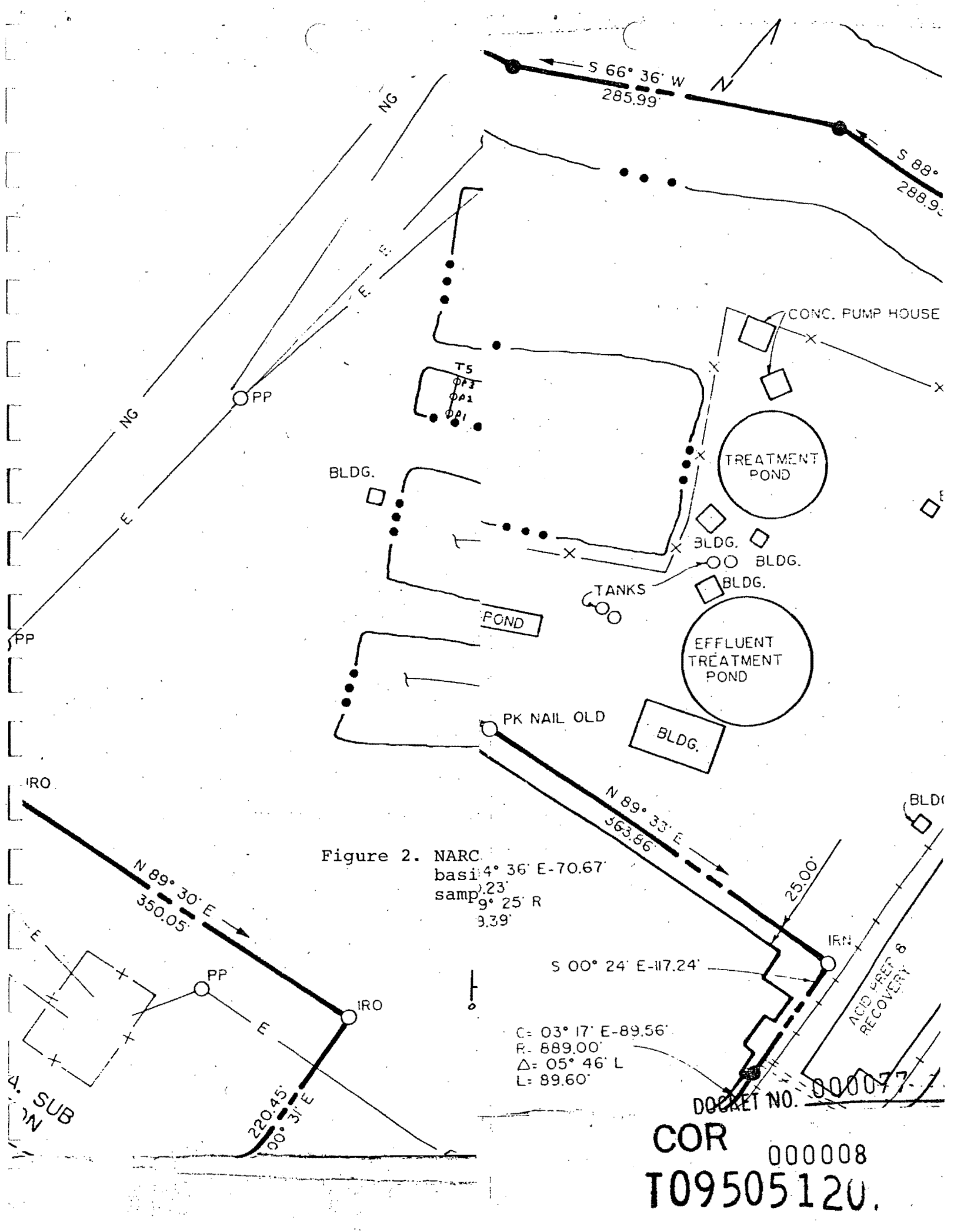

Figure 2. NARC
basi 4° 36' E-70.67'
samp .23'
9° 25' R
3.39'

COR 000008
T09505120.

TABLE 1. ANALYTICAL RESULTS OF
SLUDGE SAMPLING MAY 19, 1988

Volatile Organic Compounds

	T1,P3 (3-ft)	T3,P2 (1-ft)	T4,P3 (1-ft)	Detection Limit
	ppm			
1,1-Dichloroethylene	N.D*	N.D.	N.D.	0.025
Methylene Chloride	N.D.	N.D.	N.D.	0.025
1,2-Dichloroethylene	N.D.	N.D.	N.D.	0.025
1,1-Dichloroethane	N.D.	N.D.	N.D.	0.025
Chloroform	N.D.	N.D.	N.D.	0.025
1,1,1-Trichloroethane	N.D.	N.D.	N.D.	0.025
Carbon Tetrachloride	N.D.	N.D.	N.D.	0.025
1,2-Dichloroethane	N.D.	N.D.	N.D.	0.025
Trichloroethylene	N.D.	N.D.	N.D.	0.025
1,2-Dichloropropane	N.D.	N.D.	N.D.	0.025
Bromodichloromethane	N.D.	N.D.	N.D.	0.025
Trans-1,3-Dichloropropene	N.D.	N.D.	N.D.	0.025
Cis-1,3-Dichloropropene	N.D.	N.D.	N.D.	0.025
1,1,2-Trichloroethane	N.D.	N.D.	N.D.	0.025
1,1,2,2-Tetrachloroethylene	N.D.	N.D.	N.D.	0.025
Dibromochloromethane	N.D.	N.D.	N.D.	0.025
Chlorobenzene	N.D.	N.D.	N.D.	0.025
Bromoform	N.D.	N.D.	N.D.	0.025
1,1,2,2-Tetrachloroethane	N.D.	N.D.	N.D.	0.025
1,3-Dichlorobenzene	N.D.	N.D.	N.D.	0.025
1,4-Dichlorobenzene	N.D.	N.D.	N.D.	0.025
1,2-Dichlorobenzene	N.D.	N.D.	N.D.	0.025
Benzene	N.D.	N.D.	N.D.	0.025
Toluene	N.D.	N.D.	N.D.	0.025
Ethyl Benzene	N.D.	N.D.	N.D.	0.025
M-Xylene	N.D.	N.D.	N.D.	0.025
P-Xylene	N.D.	N.D.	N.D.	0.025
O-Xylene	N.D.	N.D.	N.D.	0.025

* N.D. - Not Detected

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COR - 000009
T09 1207

TABLE 1. (Continued)

EP Toxicity Metals and pH

Sample	Depth (ft)	pH (s.u.)	Ag	As	Ba	Cd	Cr	Hg	Pb	Se	Sn	Ni
			ppm									
T1,P3	3	7.18	<0.10	0.05	0.37	0.01	0.05	<0.01	<0.03	0.73	0.17	0.1
T1,P2	2	7.61	<0.10	0.05	0.81	<0.01	0.03	<0.01	0.03	1.05	0.15	0.1
T1,P1	1	8.00	<0.10	0.05	0.78	<0.01	0.02	<0.01	0.03	0.63	0.12	0.1
T2,P3	1	7.12	<0.10	0.05	0.19	<0.01	0.02	<0.01	<0.03	0.53	0.12	0.0
T2,P2	1	7.26	<0.10	0.05	0.34	<0.01	0.01	<0.01	<0.03	0.35	0.03	0.0
T2,P1	1	6.77	<0.10	0.05	0.17	<0.01	0.01	<0.01	0.03	0.33	0.07	0.0
T3,P3	1	6.25	<0.10	0.05	0.42	<0.01	0.01	<0.01	<0.03	0.22	0.10	0.0
T3,P2	1	4.25	<0.10	0.05	0.06	<0.01	<0.01	<0.01	0.03	0.09	0.02	0.0
T3,P1	1	5.24	<0.10	0.05	0.10	<0.01	<0.01	<0.01	0.03	0.03	0.02	0.0
T4,P3	1	5.38	<0.10	0.05	0.11	<0.01	<0.01	<0.01	0.03	0.03	0.04	0.0
T4,P2	1	6.29	<0.10	0.05	0.19	<0.01	0.01	<0.01	<0.03	<0.03	0.01	0.0
T4,P1	1	6.42	<0.10	<0.05	0.19	<0.01	<0.01	<0.01	0.03	0.03	0.06	0.0
T5,P3	1				Sample Lost due to Broken Container							
T5,P2	1	6.72	<0.10	0.05	0.57	<0.01	<0.01	<0.01	0.03	0.22	0.06	0.1
T5,P1	1				Sample Lost due to Broken Container							

Other Parameters

Sample	Depth (ft)	Phenols	Cyanide	Sulfide	Zinc (total)
		ppm			
T1,P3	3	0.08	N.D.*	14,000	1420
T3,P2	1	N.D.	N.D.	490	1685
T4,P3	1	N.D.	N.D.	10,000	578

* N.D. - Not Detected

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COR 000010
T095051207

3.2 Closure Description

It is NARCo's intention to close the SI in accordance with Rule 1200-1-11-.05(11)(g)1. Therefore, NARCo must remove standing liquids, waste and waste residues, liners (if any), and underlying and surrounding contaminated soil.

The SI contains a layer of sludge which varies in thickness from less than 1 ft to 3 ft, as described in the previous subsection. Closure will involve removing the sludge and upper 6-inches (in) of subsoil beneath the sludge. During May 1988, when the SI was sampled, approximately 6 in of water remained above the sludge layer. The sludge and subsoil are expected to be saturated with water at the time of closure. Any standing liquids are to be pumped to NARCo's on-site water treatment system. Solidification of waste material may be required prior to disposal. Solidification is to be achieved by mixing with cement.

EP Toxicity data for sludge samples indicate that one area, sample location T1,P2 (figure 2) contains 1.05 ppm selenium (EPA I.D. No. D010). This level of selenium exceeds the maximum limit of 1.0 ppm, although the difference is within the analytical accuracy of the test. Based on selenium levels, material excavated from the location of sample T1,P2, must be manifested as hazardous waste and must be disposed of at a permitted hazardous waste disposal facility.

The remaining non-hazardous material must be disposed of in a manner which does not violate applicable TN DHE regulations governing the disposal of solid waste. The material is to be disposed of in a manner consistent with the permit requirements of the disposal facility. Two alternatives exist; either the material will be disposed of at a permitted hazardous waste disposal facility, or it will be disposed of at a sanitary/industrial landfill with the approval of TN DHE and the landfill.

Prior to backfilling the excavation, soil samples are to be collected from the top 6-in of the floor of the excavation, in accordance with the transects and sample points shown in figure 2, and from each wall of the excavation along each transect. One duplicate sample is to be prepared for QC purposes. Sampling equipment is to be decontaminated between samples by the following method:

- Wash with laboratory detergent and tap water. Remove residues by scrubbing with a brush if necessary.
- Rinse with tap water.
- Rinse with distilled water.

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If EP Toxicity selenium levels are above the maximum limit of 1.0 ppm, further excavation will be performed. If additional

COR 000011
T095051207

excavation is necessary, based on analysis of the verification samples, additional soil samples will be collected for verification that remaining soil containing EP Toxic selenium levels has been removed. The excavation is to be backfilled with clean soil and graded to its original configuration.

NARCo intends to analyze verification samples for EP Toxicity selenium, total zinc, and sulfides. Sulfides and zinc have been included for documenting purposes and thoroughness, but are not intended as indicators of clean closure since they are not regulated under RCRA. Selenium, the only hazardous constituent in the SI which is regulated by RCRA, will be an indicator of whether the SI has been closed in accordance with 1200-1-11-.05 parts (7) and (10)(g).

3.3 Decontamination of Facility Equipment

Rule 1200-1-11-.05(7)(c)1.(iii) requires a description of the steps needed to decontaminate facility equipment during closure. It is anticipated that equipment remaining at the facility will not require decontamination because no facility equipment will be used, or otherwise exposed to, waste during closure of the SI.

Equipment used to excavate the sludge and subsoil will be decontaminated by pressure washing prior to backfilling and/or grading. Other equipment exposed to waste during closure activities will be pressure washed prior to removal from the site, or if the material is disposable it will be disposed of at either an industrial landfill, or at a hazardous waste landfill if appropriate. Wash water is to be collected and sent to NARCo's existing water treatment system.

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COR 000012
T095051207

4.0 SCHEDULE FOR CLOSURE OF THE WASTE PILE AND SI

Rule 1200-1-11-.05(7)(d)1. requires that NARCo remove, dispose of, or treat all hazardous waste associated with the waste pile and SI in accordance with an approved closure plan, within 90 days following receipt of the final volume of hazardous waste or 90 days after approval of a closure plan, if that is later. It is anticipated that 90 days will be adequate to perform closure activities on the waste pile area and SI. The schedule for closure will basically follow the schedule shown in figure 3. This schedule assumes both waste management units will be closed simultaneously.

4.1 Certification of Closure

Certification of closure of the waste pile and the SI, in accordance with Rule 1200-1-11-.05(7)(f), will be submitted to the Commissioner within 30 days of completion of closure activities.

DOCKET NO. 000077

COR 0 000013
T095051207

Time Unit: Days

Task	1	2	3	4	5	6	7	8	9
Mobilization									
Site Prep									
Asphalt Pad Decon									
Solidify* & Excavate at T1,P2									
Solidify* & Excavate rest of SI									
Verification Sampling & Analy.									
Equipment Decon									
Backfill & Grade									
Demobilization									

Figure 3. General schedule for closure of waste pile storage area and emergency spill diversion basin.

DOCKET NO: 000077
COR 000014
T09505 1207

5.0 POST-CLOSURE CARE AND USE OF PROPERTY

According to the March 24, 1988 Notice of Violation, issued to NARCo by TN DHE, requiring closure of the waste pile and emergency spill diversion basin, NARCo is not required to submit a Post Closure Permit Application for the site.

The proposed closure method for the waste pile storage area and SI is one that minimizes the need for further maintenance and eliminates the post-closure escape of hazardous waste constituents from the site. Therefore, post-closure care or restriction of access is not anticipated to be necessary for protection of human health or the environment. Entrance to the NARCo facility is already restricted by fencing and gates equipped with guards. All visitors are required to check in at the guard house before entering the property. Access to the SI area is further restricted by a fence and locked gate.

A ground-water monitoring program has been developed, and approved by TN DHE, for the SI. NARCo intends to monitor ground-water quality, in accordance with the approved program, for a period sufficient to obtain adequate data for statistical comparison. It is NARCo's understanding that TN DHE is requiring a demonstration that ground-water quality is unaffected by hazardous wastes activities associated with the SI before clean closure can be established.

touch base
w/ Gary

on resolution
of V.C.
Application concern

DOCKET NO. 000077

COR 000015
T095051207

6.0 COST ESTIMATE FOR CLOSURE

Rule 1200-1-11-.05(8)(c) requires a cost estimate, in current dollars, of the costs which would be incurred in closing the facility if the owner or operator abandoned it or became insolvent. The following subsection provides this cost estimate in accordance with stipulations contained in the above-cited rule.

6.1 Removal of Wastes and Disposal at Hazardous Waste Disposal Facility

The costs presented below are based on disposal of 1255 tons (approximately 896 cy at 1.4 tons per cy) of material at GSX's Pinewood, South Carolina hazardous waste disposal facility. This estimate assumes that the two waste management units of concern will be closed simultaneously, and that solidification of the SI contents is required.

Cost Source	Dollar ($) Amount
o Field Labor and Per Diems: based on 9 day duration for 6-man crew working 7 10-hr days per week	28,300
o Project Management and Technical Support: excluding travel and subsistence	1,000
o Construction Equipment and Support Vehicles: including fuel	18,200
o Materials and Expendables: Level C protective gear for 9-man crew, visqueen, etc.	4,200
o Portland Cement (local dealer): 265 tons	22,150
o Analytical: EP Tox Se; Zn; Sulfides; 25 samples	3,000
o Transportation: 66 loads	58,880
o Disposal: GSX, Pinewood, SC, 1255 tons	200,400
o Backfill: 60 loads	7,500
TOTAL	343,630

DOCKET NO. 000077

COR 000016
T0950513 07

7.0 FINANCIAL ASSURANCES

In accordance with financial requirements presented in Rule 1200-1-11-.05(8)(d) and (g), NARCo intends to guarantee closure performance by submission of a personal bond supported by a letter of credit to the Division Director. The letter of credit will be in conformance with subparagraph (g) of the above cited Rule. Wording of the performance bond and letter of credit will be in conformance with specifications provided by Rule 1200-1-11-.06(8)(p) 1. and 2., respectively.

DOCKET NO. 000077
COR 000017
T095051207

Tennessee Department of Health and Environment
Bureau of Environment
1733 Sunset Drive
Johnson City, Tennessee 37601-3621

Date: June 30, 1988

Mr. James Scarbrough, P.E.
Chief, RCRA Branch
Waste Management Division
U. S. Environmental Protection Agency
345 Courtland Street
Atlanta, GA 30365

RE: Information Transmittal

Dear Mr. Scarbrough:

Pursuant to the Tennessee/EPA RCRA Memorandum of Agreement, we are herewith transmitting to you copies of the following:

1. North American Rayon Corp. Diversion Basin and Wastepile Closure Plan - 6-29-88

____ Yes X No See attached sheet for additional listings.

Please call (615)928-6487 if there are problems or questions with this transmittal.

Sincerely,

D. Larry Gilliam

D. Larry Gilliam, Manager
Johnson City Field Office
Division of Solid Waste Management

Attachments (see list)

Copy without enclosures: Nashville DSWM

SWM-H

DOCKET NO. 000078

COR 000001
T095051207

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

REGION IV

345 COURTLAND STREET
ATLANTA, GEORGIA 30365

MEMORANDUM

DATE: JUL 14 1988

SUBJECT: State Enforcement Action Against North American Rayon

FROM: Javier E. Garcia
Environmental Engineer

TO: Allan E. Antley, Chief
Waste Compliance Section

THRU: Doyle T. Brittain

— Doyle — get facts, let's brief Jim if facts support overfile. Looks like a good case. AA

On June 14, 1988, the State of Tennessee issued an Order against North American Rayon for unathorized TSD activities. This facility was found to be operating a surface impoundment, receiving corrosive waste, and to have a waste pile of lead dross without a permit or interim status. In the Directors Order, the State assessed a penalty of $4,000. I consider this penalty to be inappropriate for this type of violation. I called the State and requested a copy of the enforcement package. My recommendation is to overfile the State action based on inappropriate penalty.

Javier
Lets discuss

300-04 DOCKET NO. 000079

COR 000001

T095051207

CERTIFI MAIL #29,577
RETURN RECEIPT REQUESTED

Tennessee Department of Health and Environment
Bureau of Environment
1733 Sunset Drive
Johnson City, Tennessee 37601-3621

August 9, 1988

Ms. Melissa McGuire
Attorney-at-Law
Baker, Worthington, Crossley, Stansberry and Woolf
P. O. Box 3038 CRS
Johnson City, Tennessee 37602

RE: North American Rayon Company
Groundwater Monitoring for Surface Impoundment
TND 09 505 1207

Dear Ms. McGuire:

In correspondence, dated May 23, 1988, the Division of Solid Waste Management noted no deficiencies in the Groundwater Monitoring Plan and the Groundwater Sampling and Analysis Plan for the surface impoundment located at North American Rayon Company.

The groundwater monitoring system has not been installed and sampled as of this date. Therefore, North American Rayon Company must install and sample the groundwater monitoring wells as specified in the plans by September 12, 1988.

If you have any questions or comments, do not hesitate to contact me at 615/928-6487.

Sincerely,

Richard A. Whitson

Richard A. Whitson
Environmental Engineer
Division of Solid Waste Management

DOCKET NO. NAC-009

RAW/jj SWM-7

cc: Dr. Lou Raasch, North American Rayon Company
Mr. James H. Scarbrough, EPA, Region IV
Mr. Dwight Hinch, DSWM, Nashville
Mr. Ron Potts, DSWM, Jackson
Mr. D. Larry Gilliam, DSWM, Johnson City
Mr. Darrell Hale, DSWM, Johnson City
DSWM, Nashville 10-23 45

DOCKET NO. 000080

COR 000001

T095051207

10-3 48

RECEIVED

Division of Solid Waste Management

8/29/88 File

BAKER, WORTHINGTON, CROSSLEY, STANSBERRY & WOOLF

ATTORNEYS AT LAW

NORTHEAST TENNESSEE OFFICE
207 MOCKINGBIRD LANE
POST OFFICE BOX 3038 CRS
JOHNSON CITY, TENNESSEE 37602

TELEPHONE 615 928-0181
TELECOPIER 615 928-5694

JAMES F. BAKER (1864-1924)
EDWARD H. BAKER (1902-1984)
EDWARD H. BAKER, JR.
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ED E. WILLIAMS, III

DENNIS R. McCLANE
RICHARD E. HEROD
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TELECOPIER 615 726-0464

KNOXVILLE, TENNESSEE 37902
BANK OF EAST TENNESSEE BUILDING
TELEPHONE 615 549-7000
TELECOPIER 615 525-8569

HUNTSVILLE, TENNESSEE 37756
COURTHOUSE SQUARE
TELEPHONE 615 663-2321
TELECOPIER 615 663-2111

NASHVILLE, TENNESSEE 37219
VANDERBILT PLAZA
TELEPHONE 615 329-9010
TELECOPIER 615 329-0791

HENDERSONVILLE, TENNESSEE 37075
MAPLE GLEN OFFICE BUILDING
TELEPHONE 615 822-8822
TELECOPIER 615 824-4684

August 26, 1988

Mr. Randy Curtis
Tennessee Department of
Health and Environment
1733 Sunset Drive
Johnson City, Tennessee 37601

RE: North American Rayon Corporation/September 12, 1988
Deadline for Groundwater Monitoring for Surface Impoundment
TND 09 505 1207

Dear Mr. Curtis:

Although we have not yet met, I understand that you are now overseeing the groundwater monitoring activities at local RCRA facilities. If you are not the appropriate person to receive this letter, please forward it to the correct person.

In a letter dated August 9, 1988, Rick Whitson required that North American install and sample groundwater monitoring wells as specified in their Groundwater Sampling and Analysis Plan for their surface impoundment, by September 12, 1988. North American commenced drilling these wells at the earliest time possible for the well driller. Work was commenced on August 23, 1988, and hopefully will be completed within a week. However, Laura Harris of Westinghouse Haztech feels that to obtain accurate samples, it will be necessary to allow the aquifer two to four weeks to recover from the disturbance that occurrs as part of drilling. Therefore, we are requesting an extension of these September 12, 1988, deadline until September 30, 1988.

DOCKET NO. 000082

COR 000001
T095051207
DOCKET NO. NAR-011

Since the September 12 deadline is rapidly approaching, I would appreciate a response on our request as soon as possible. Please feel free to call me if you have any questions regarding this request. Also, feel free to call Laura Harris for any technical information.

Thank you for your assistance in this matter.

Sincerely yours,

Melissa M. McGuire

Melissa M. McGuire

ssr
cc: Rick Whitson
Lou Raasch
Laura Harris

DOCKET NO. 000082

COR 000002
T095051207

cc: FYI & File

STATE OF TENNESSEE
DEPARTMENT OF HEALTH AND ENVIRONMENT
SOUTHWEST TENNESSEE REGIONAL OFFICE
295 SUMMAR AVENUE
JACKSON, TENNESSEE 38301-3984

CERTIFIED MAIL
P 708 527 744

September 22, 1988

Ms. Melissa McGuire, Attorney
Baker, Worthington, Crossley, Stansberry & Woolf
P. O. Box 3038 CRS
Johnson City, Tennessee 37602

Re: NOTICE OF DEFICIENCY
North American Rayon Company
Closure Plan
TND #09-505-1207

Dear Ms. McGuire:

The Tennessee Department of Health and Environment has completed a review of your Hazardous Waste Management, Interim Status Closure Plan dated June 29, 1988 for a hazardous waste surface impoundment and waste pile at the North American Rayon Company located in Johnson City, Tennessee. Based upon this review, it has been determined that your closure plan is incomplete and additional data and information will be required. It should be noted that your closure plan cannot be approved until the plan is complete, i.e. closure requirements have been met (reference Rule 1200-1-11-.05(7)(a)-(f), 11(g) and 12(h) of the Rules Governing Hazardous Waste Management in Tennessee). The deficiencies in the referenced closure plan are identified in the enclosed comments for your review and action.

A revised closure plan which corrects those deficiencies should be submitted within thirty (30) days from your receipt of this letter.

Your response to our comments must be in the form of a totally revised, complete closure plan or revised pages and figures to be inserted into the original plan submitted. If you choose to submit revised pages, map or drawings, please provide the following information on the revised item:

1. Page, map or drawing number should be shown.
2. For each item submitted, indicate it is a revision to another item in the original closure plan or a new item not contained in the original closure plan.
3. Date or code each item, for example, 32 R4/10/88 would be page, map or drawing number 32 revised 4/10/88.

Please submit your revision to:

Tennessee Department of Health and Environment
Division of Solid Waste Management
295 Summar Avenue
Jackson, Tennessee 38301

If you have any questions concerning this letter or the attached comments, please contact me at (901)424-9200.

Respectfully,

Ronald A. Potts
Environmental Engineer
Division of Solid Waste Management

RAP/rc

Enclosure

cc: DSWM, Larry Gilliam, Johnson City
DSWM, Dwight Hinch, Nashville
EPA Region IV, Susie Riddle
DSWM, Jackson File

DOCKET NO. 000083

COR 000002
T095051207

NOTICE OF DEFICIENCY
North American Rayon Company
Interim Status Closure Plan
Waste Pile and Surface Impoundment
Johnson City, Tennessee Facility
Dated: January 29, 1988
E.P.A. ID #TND 09 505 1207

Please clarify or submit additional information as specifically required below:

1. Provide the financial assurance documentation as required by Rule 120-1-11-.05(8)(d).

2. Provide additional information describing the removal of waste inventory from the surface impoundment. Specifically address removal of standing liquids remaining in the impoundment. Also, provide any analytical data associated with the liquid remaining in the impoundment and describe in detail how the sludge will be removed from the impoundment.

3. For both the waste pile and the surface impoundment, provide a complete description of how waste waters generated during closure will be collected and diverted/conveyed to the on-site wastewater treatment unit.

4. Provide the date that deposition of wastes in both units ceased or will cease.

5. Provide sufficient documentation to ensure that the diversion of waste waters generated during closure to the on-site treatment unit will not produce a major upset of the system and will not create a possible violation of a pre-treatment or NPDES permit.

6. Explain in detail the soil sampling procedures which will be used during the closure process. The facility should develop and submit QA/QC plans for all testing and analysis to be performed <u>on-site</u>.

7. Provide an estimate of the expected date of final closure.

8. Provide a description of the methods for sampling and testing to demonstrate the success of decontamination.

RAP/rc

DOCKET NO. 11 000083
COR
T095051207

WES

TENNESSEE DEPARTMENT OF HEALTH AND ENVIRONMENT
CUSTOMS HOUSE
701 BROADWAY
NASHVILLE, TENNESSEE 37219-5403

RECEIVED
EPA/REGION IV
OCT 27 1 45 PM '88
REGIONAL
MANAGEMENT BRANCH

October 18, 1988

Mr. James H. Scarbrough
Chief, RCRA Branch
Waste Management Division
U.S. Environmental Protection Agency
345 Courtland Street
Atlanta, Georgia 30365

Re: August 22, 1988 E.P.A. Comments Concerning North American Rayon Company Closure Plan for Hazardous Waste Management Units

Dear Mr. Scarbrough:

The purpose of this letter is to respond to your comments dated August 22, 1988 concerning the above referenced closure plan.

We appreciate your concern and comments on this plan., Comments numbered 1, 3, 4, 7 and 8 have been included in the Notice of Deficiency to the facility dated September 22, 1988.

The remaining comments contained in your letter are addressed separately below:

Comment #2 and 5:

Considering the hazardous constituents identified in this closure plan, namely lead and selenium, this Division does not believe that decontamination of the waste pile pad and equipment used during closure would be greatly enhanced through the use of steam cleaning as opposed to high pressure washing.

Comment #9:

This comment cited 40 CFR Part 264 as the authority for requiring the information described. However, this facility is preparing a closure plan in accordance with 40 CFR Part 265. Therefore we feel that it is premature to request information under the authority of 40 CFR Part 264 at this time.

COR 000001
DOCKET NO. 000084 T095051207
DOCKET NO. NAR-012

Comment #6:

Since the closure plan is being prepared in accordance with 40 CFR Part 265, information concerning geology and hydrology are apparently not expressly required. However, we are fully aware that if contamination of groundwater has occurred from either of these units a post closure permit application will be required which will in turn require the submittal of this information.

If you have any questions concerning this letter or if we may be of further assistance, please contact me at (615) 741-3424.

Sincerely,

Thomas D. Hinch

Thomas D. Hinch, Chief
Hazardous Waste Permitting Unit
Division of Solid Waste Management

TDH/F5098292

cc: DSWM Johnson City Field Office
Ron Potts, DSWM Jackson Field Office

DOCKET NO. 000084

COR 000002
T095051207

10-23

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RECEIVED
Division of Solid Waste Management
Date 11/16/88 File No.
Received By 90

Westinghouse
Environmental Services

Westinghouse HAZTECH, Inc.

Technical
5280 Panola Industrial Boulevard
Decatur, Georgia 30035
(404) 981-9332
(404) 981-9339 (24 Hr.)
FAX (404) 593-3959

November 11, 1988

Mr. Randy Curtis, Geologist
Tennessee Department of
Health & Environment
1733 Sunset Drive
Johnson City, TN 37601

Project No. 2322-88-1107

Subject: North American Rayon Corp.
Groundwater Analytical Data
Sample Event - September 12, 1988

Dear Randy:

Enclosed are the above-referenced data for ground-water samples collected at the North American Rayon Corporation on September 12, 1988. The following paramters characterizing the suitability of ground-water as a drinking-water supply have been found to exceed EPA standards:

- Arsenic - MW1, MW3, MW4, MW5, MW6
- Camium - MW3
- Fluoride - MW4
- Selenium - MW1, MW3, MW4, MW5, MW6

Please note that wells MW5, MW6, and MW7 were sampled within two days of completion, and within one day of air-jetting. Wells MW1, MW2, MW3 and MW4 were sampled within two weeks of construction, and within five days of air-jetting.

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T095051207

A ground-water elevation contour map is enclosed. A revised contour map including piezometer measurements will be submitted to your office as soon as available.

Please contact my office if you would like to discuss these data.

Sincerely,

Laura B. Harris

Laura B. Harris
Project Manager

LBH:jlc
Enclosure

cc: Melissa McGuire
Lou Raasch

DOCKET NO. 000088

COR
000002
T095051207

TABLE 1

GROUND-WATER ANALYTICAL DATA
FOR MONITOR WELLS 1-4

Sample Event: Sept. 12, 1988

Parameters characterizing the suitability of ground-water as a drinking-water supply:

	MW1	MW2	MW3	MW4	EPA Drinking Water Standard
Arsenic (ppm)	0.18	<0.05	0.69	0.33	0.05
Barium (ppm)	0.10	0.01	0.12	0.03	1.0
Cadmium (ppm)	<0.01	<0.01	<0.01	<0.01	<0.01
Chromium (ppm)	0.01	<0.01	<0.01	0.03	0.05
Flouride (ppm)	0.37	<0.10	<0.10	3.4	1.4-2.4
Lead (ppm)	<0.03	<0.03	<0.03	<0.03	0.05
Mercury (ppm)	<0.0008	<0.0008	<0.0008	<0.0008	0.0002
Nitrate (N) (ppm)	6.6	<0.10	<0.10	6.4	10.0
Selenium (ppm)	0.25	<0.03	0.22	0.15	0.01
Silver (ppm)	<0.10	<0.10	<0.10	<0.10	0.05
Endrin (ppb)	<0.03	<0.03	<0.03	<0.03	0.20
Lindene (ppb)	<0.0008	<0.0008	<0.0008	<0.0008	4.0
Methoxychler (ppb)	<0.30	<0.30	<0.30	<0.30	100
Toxaphene (ppb)	<1.20	<1.20	<1.20	<1.20	5.0
2,4-D (ppb)	<5.2	<5.2	<5.2	<5.2	100
2,4,5-TP Silvex (ppb)	<0.10	<0.10	<0.10	<0.10	10
Radium (pCi/l)	1.8 ± 0.2	<0.1	0.2	0.3 ± 0.1	5
Gross Alpha (pCi/l)	<3	<3	3 ± 3	7 ± 2	15
Gross Beta (pCi/l)	6 ± 2	9 ± 2	15 ± 3	79 ± 3	4 millirem/yr
Coliform Bacteria (col/100me)	<1	<1	<1	<1	1

DOCKET NO. 000088

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TABLE 1 (continued)

Parameters establishing ground-water quality:

	MW1	MW2	MW3	MW4
Chloride (ppm)	4.5	14	16	7.5
Iron (ppm)	0.69	0.30	3.66	5.91
Manganese(ppm)	0.45	4.5	2.7	1.9
Phenols (ppm)	<0.01	<0.01	<0.01	<0.01
Sodium (ppm)	51.30	471	678	244
Sulfate (ppm)	154	387	338	242

Parameters used as indicators of ground-water contamination:

		MW1	MW2	MW3	MW4
pH (s.u.)		7.80	6.60	7.54	7.50
		7.65	6.58	7.50	7.35
		7.90	6.55	7.45	7.28
		7.85	6.56	7.43	7.28
	Mean	7.80	6.57	7.48	7.35
Specific Conductance		550	2570	2850	1250
		555	2600	2890	1280
		560	2600	2820	1300
		NA*	2600	2770	1200
	Mean	553.3	2592.5	2832.5	1257.5

		MW1	MW2	MW3	MW4
TOC (ppm)		11.08	52.69	141.93	75.16
		10.18	54.80	174.91	66.71
		10.35	58.55	151.70	63.10
		10.35	56.61	144.69	64.97
	Mean	10.49	55.66	153.31	67.48

TABLE 1 (continued)

		MW1	MW2	MW3	MW4
TOX (ppb)		<5.0	16	36	8.8
		8.8	24	37	<5.0
		34	<5.0	38	9.8
		<5.0	<5.0	38	9.3
	Mean	13.2	12.5	37.2	8.2
Temperature (°C)		20	23	22	22
Water Level	(ft msl)	1426.80	1438.67	1482.85	1457.80

*NA data not obtained

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TABLE 2

GROUND-WATER ANALYTICAL DATA
FOR MONITOR WELLS 5-7

Sample Event: Sept. 12, 1988

Parameter	MW5	MW6	MW7
Arsenic (ppm)	<0.11	0.97	<0.05
Barium (ppm)	0.02	0.15	0.05
Cadmium (ppm)	<0.01	0.01	<0.01
Chromium (ppm)	0.02	0.03	0.01
Flouride (ppm)	<0.1	<0.1	1.5
Lead (ppm)	<0.03	0.05	<0.03
Mercury (ppm)	<0.0008	<0.0008	<0.0008
Nitrate (as N) (ppm)	0.32	0.16	<0.1
Selenium (ppm)	0.09	0.51	<0.03
Silver (ppm)	<0.10	<0.10	<0.10
Endrin (ppb)	<0.03	<0.03	<0.03
Lindene (ppb)	<0.0008	<0.0008	<0.0008
Methoxychler (ppb)	<0.30	<0.30	<0.30
Toxaphene (ppb)	<1.20	<1.20	<1.20
TOC (ppm)	18.80	239.75	633.78
Phenols (ppb)	<10	50	<10
TKN (ppm)	<0.6	5.74	42.72
Chloride (ppm)	8.8	8.7	18

DOCKET NO. 000088

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TABLE 2 (Continued)

Volatile Organic Compounds

Parameter	MW5	MW6	MW7	Duplicate MW7
Vinyl Chloride (ppb)	<5.0	<5.0	<5.0	<5.0
1,1-Dichloroethylene (ppb)	<1.0	<1.0	<1.0	<1.0
Methylene Chloride (ppb)	<1.0	<1.0	<1.0	<1.0
1,2-Dichloroethylene (ppb)	<1.0	<1.0	<1.0	<1.0
1,1-Dichloroethane (ppb)	<1.0	<1.0	<1.0	<1.0
Chloroform (ppb)	<1.0	<1.0	<1.0	<1.0
1,1,1-Tricholorethane (ppb)	<1.0	<1.0	<1.0	<1.0
Carbon Tetrachloride (ppb)	<1.0	<1.0	<1.0	<1.0
1,2-Dichloroethane (ppb)	<1.0	<1.0	<1.0	<1.0
Trichloroethylene (ppb)	<1.0	<1.0	<1.0	<1.0
1,2-Dichloropropane (ppb)	<1.0	<1.0	<1.0	<1.0
Bromodichloromethane (ppb)	<1.0	<1.0	<1.0	<1.0
Trans-1,3-Dichloropropene (ppb)	<1.0	<1.0	<1.0	<1.0
Cis-1,3-Dichloropropene	<1.0	<1.0	<1.0	<1.0
1,1,2-Trichloroethane (ppb)	<1.0	<1.0	<1.0	<1.0
1,1,2,2-Tetrachloroethylene (ppb)	<1.0	<1.0	<1.0	<1.0
Dibromochloromethane (ppb)	<1.0	<1.0	<1.0	<1.0
Chlorobenzene (ppb)	<1.0	<1.0	<1.0	<1.0
Bromoform (ppb)	<1.0	<1.0	<1.0	<1.0
1,1,2,2-Tetrachloroethane (ppb)	<1.0	<1.0	<1.0	<1.0
1,3-Dichlorobenzene (ppb)	<1.0	<1.0	<1.0	<1.0

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TABLE 2 (Continued)

Parameter	MW5	MW6	MW7	Duplicate MW7
1,4-Dichlorobenzene (ppb)	<1.0	<1.0	<1.0	<1.0
1,2-Dichlorobenzene (ppb)	<1.0	<1.0	<1.0	<1.0
Benzene (ppb)	<1.0	<1.0	<1.0	<1.0
Toulene (ppb)	1.72	1.21	1.19	1.09
Ethyl Benzene (ppb)	<1.0	<1.0	<1.0	<1.0
M-Xylene (ppb)	2.48	3.37	1.81	1.50
P-Xylene (ppb)	<1.0	<1.0	<1.0	<1.0
O-Xylene (ppb)	<1.0	<1.0	<1.0	<1.0
1,2,4-Trimethylbenzene (ppb)	3.62	5.20	2.88	2.20

		MW5	MW6	MW7
pH (su)		7.35	7.03	6.83
		7.43	7.00	6.81
		7.47	6.98	6.82
		7.47	6.97	6.82
	Mean	7.43	7.00	6.82
Specific Conductance		265	2100	2350
		265	2250	2400
		265	2300	2450
		270	2290	2460
	Mean	266	2235	2415
Temperature (°C)		21.0	21.5	21.0
Water Level (ft-msl)		1457.49	1458.49	1465.08

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10-23

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Westinghouse
Environmental Services

Westinghouse HAZTECH, Inc.

Technical
5280 Panola Industrial Boulevard
Decatur, Georgia 30035
(404) 981-9332
(404) 981-9339 (24 Hr.)
FAX (404) 593-3959

November 22, 1988

RECEIVED
Division of Solid Waste Management
Date 11/28/88 File No.
Received by

Mr. Randy Curtis, Geologist
Tennessee Department of Health
& Environment
Division of Solid Waste Management
1733 Sunset Drive
Johnson City, TN 37601-3621

Project No: 2322-88-1107

Subject: NARCO Ground-water Elevation Contour Map

Dear Randy:

Enclosed is the above referenced map for ground-water measurements collected on November 11, 1988 at North American Rayon Corporation (NARCo), Elizabethton, Tennessee.

Sincerely,

Laura

Laura Harris
Project Manager

LH:jlc
Enc.

cc: Lou Raasch
Melissa McGuire

DOCKET NO. 000082 COR
000002
T095051207

WES

Lori (Put in file)

NORTH AMERICAN RAYON CORPORATION
AN EMPLOYEE OWNED COMPANY
West Elk Avenue Elizabethton, Tennessee 37643

December 28, 1988

U. S. Environmental Protection Agency
Attention: James H. Scarbrough
345 Courtland Street, N.E.
Atlanta, GA 30365

RE: RCRA Post-Closure Care Permit Requirements

Dear Mr. Scarbrough:

This letter is in response to yours of November 20, 1988, requesting information regarding whether the North American Rayon Corporation would be requesting an equivalency determination from the EPA on the closure of a surface impoundment.

Although the closure plan has not yet been approved, North American Rayon is proposing a clean closure of the site. Therefore, we will probably seek an equivalency determination in the future.

If you have any questions on this matter, please feel free to call me.

Sincerely yours,

Lou R. Raasch

Lou R. Raasch, Manager
Environmental Services

LRR:ab

cc: J. C. Boyd
C. Green
G. Shockley

DOCKET NO. 000092

COR
000001

T095051207

WEST ELK AVENUE • ELIZABETHTON, TENNESSEE 37643
EXECUTIVE OFFICES & PLANT (615) 542-2141 • SOUTHERN SALES OFFICE (615) 543-8686
NORTHERN SALES OFFICE • 500 FIFTH AVENUE • NEW YORK, NEW YORK 10110 • (212) 840-2592

REPORT ON
MONITOR WELL AND PIEZOMETER INSTALLATIONS
AT NORTH AMERICAN RAYON CORPORATION
AUGUST-SEPTEMBER 1988

10-23 70

FEBRUARY 2, 1989

Prepared for
Baker, Worthington, Crossley,
Stansberry and Woolf

Prepared by
Westinghouse HAZTECH, Inc.
Decatur, Georgia

Project No. 2322-88-1107

Laura Harris

Laura Harris
Project Manager

DOCKET NO. 000093 COR
000001
T095051207

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T095051207

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T095051207

1.0 INTRODUCTION

The Tennessee Department of Health and Environment (TN DHE) has required North American Rayon Corporation (NARCo) of Elizabethton, Tennessee to develop and implement ground-water monitoring programs for 2 waste management units located at the Elizabethton facility. One of the waste management units is a surface impoundment (SI) which had received untreated wastewater containing spent sulfuric acid, therefore being subject to regulation as a hazardous waste management unit. The second waste management unit is a closed industrial landfill regulated by TN DHE as a non-hazardous solid waste unit.

NARCo retained Westinghouse HAZTECH, Inc. of Decatur, Georgia to develop and implement ground-water monitoring programs for the landfill and SI. A ground-water monitoring plan for the SI (under separate cover) was submitted to TN DHE, and approved on May 23, 1988. Westinghouse HAZTECH submitted a ground-water monitoring plan for the landfill (under separate cover) to TN DHE and received approval on July 12, 1988. On August 23, 1988 Westinghouse HAZTECH and Wilson Bros. Well Drilling, of Gray, Tennessee, began installation of 6 piezometers and 7 monitor wells at the site. Installation of ground-water monitoring systems for both waste management units was completed on September 11, 1988.

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2.0 DISCUSSION OF DRILLING AND WELL CONSTRUCTION

On August 23, 1988 through September 11, 1988 Wilson Bros. conducted borings and installed 6 piezometers and 7 monitor wells at the locations shown on figure 1. Two Schramm air/wet rotary rigs were used during the project, one being a model T685 and the other a modified T64. The air compressors providing airflow to the drill stem produce 850 cubic feet of air per minute (cfm) under 350 pounds per square inch (psi) pressure. On several occasions the saturated soil choked air circulation and it was necessary to circulate water. When air circulation is lost, no soil cuttings are delivered to the surface and the borehole fills with its own cuttings. Water was obtained from a fire hydrant located on site and stored in steel water tanks mounted on trucks. When used, water was pumped at a rate of 30 gallons per minute (gpm).

An 8 1/4-in diameter roller cone bit was routinely used for drilling the wells, exceptions are noted in the discussion of individual wells

Tri-Loc brand Schedule 40 2-in PVC casing and screen were used in well construction, except as indicated in the text. Screens have 0.01 in slots and are 10 ft long.

In most cases boreholes collasped when the drilling tools were removed from the borehole. A 6 5/8-in outside diameter (O.D.). steel casing was driven through the collasped material and a 6 1/8-in air percussion hammer bit was used to evacuate the material within the steel casing. The outer casing was constructed by welding sections of the pipe together. The PVC well pipe was positioned in the outer casing. The filter pack was placed by alternately adding sand and pulling the outer casing up to allow the sand to empty from its base. In most instances where collaspe of the borehole was encountered, the filter pack extends to a point where saturated, fluid clay would not displace the bentonite pellets when they were released from the base of the outer casing. Some boreholes were so unstable that the outer casing could not be completely removed until the bentonite had had time to saturate, increasing its density and coherence to a point that it could support the borehole wall. If the pellets were placed above the level of water in the bore hole, water was added from a water truck. Bentonite pellets were allowed to set for a minimum of 3 hr before grouting the remainder of the borehole annulus.

Sand for filter packs was taken from a stockpile kept on site for the sand filters associated with NARCo's wastewater treatment system. Bagged sand was used for MW2 only. All filter packs are comprised of coarse quartz sand. Filter packs commonly had to be extended 10 to 20 ft above the screen so that the bentonite pellets could be

placed in a horizon as competent as practicable The more fluid clay soils would displace the bentonite pellets, preventing formation of a seal.

Bentonite seals are constructed of Pel Plug High Yield Western Bentonite pellets supplied by Polymer Drilling Systems of El Dorado, Arkansas.

Wells and piezometers were grouted with Coplay Type I portland cement, mixed with approximately 3% Aquagel sodium (Na) bentonite powder. This mixture is less likely to crack upon drying than cement alone. Grout was pumped into the borehole annulus by tremie method.

Protective steel covers, 6 5/8-in O.D., were secured in the grout to a depth of 3 ft below grade. In most instances protective covers were spray painted orange before placement at the well. In the event that protective covers were painted following placement at the well, a well seal was used to seal off the opening of the protective casing. Finally, weep holes were drilled approximately 2 1/2 in from the base of the protective cover.

Wells and piezometers were air jetted for 30 min to 1 hour (hr). A Smith 100 air compressor, in conjunction with 1-in O.D. PVC pipe positioned just above the base of the well, was used to air jet wells. The air compressor had a 100 psi maximum pressure, 60% of which was delivered to the well. A low pressure surge was used initially, gradually building up to a steady air flow. Air jetting continued until ground-water showed no further decrease in turbidity.

2.1 Discussion of Wells and Piezometers

Wells and piezometers are discussed individually in the following subsections in the order in which they were drilled. Generalized diagrams of a piezometer and a monitor well are included as figures 2 and 3. Depths quoted in the text are relative to ground surface.

2.1.1 Monitor Well MW2

MW2 was drilled on 8-23-88 to a depth of 47.5 ft with the T685 rig. Road fill was penetrated for 19 ft, at which depth a cobble layer was encountered. This cobble layer is prominent over the site. The cobble layer continued to 24 ft at this location. Gravelly clayey sand was encountered beneath the cobble layer and extends to a weathered shale at 47.5 ft. The outer casing was set to 40 ft. On 8-24-88 the outer casing was found to be filled with mud to a depth of 27 ft. Attempts to clear the hole were unsuccessful. A decision was made to drill into bedrock. From 47.5 ft to the bottom of the borehole weathered tan sandy shales are interlayered with a 1-ft layer of unconsolidated clay soil. The hole was terminated at 60 ft

COR 000006

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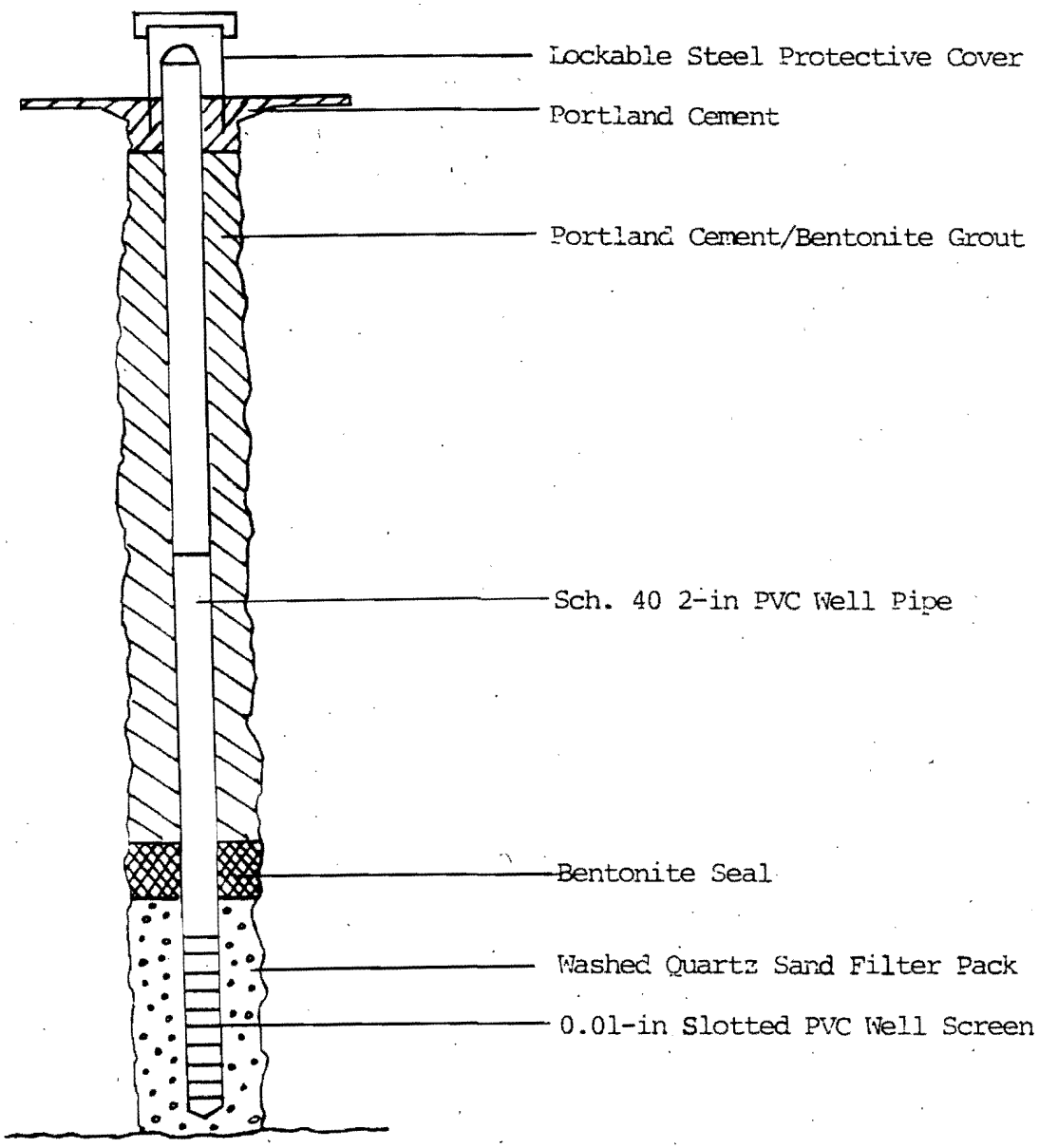

Figure 2. Generalized diagram of monitor well construction.

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T095051207

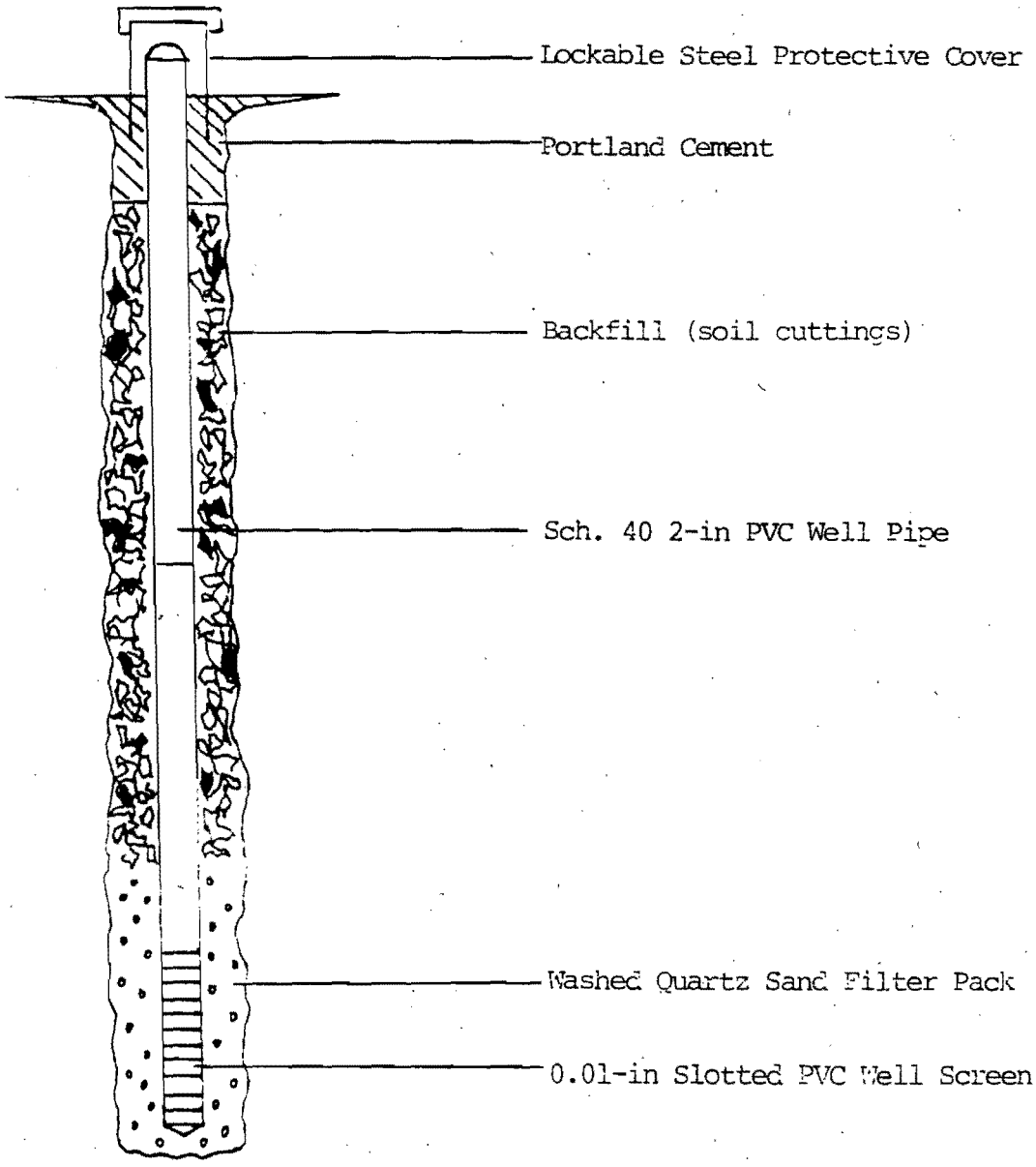

Figure 3. Generalized diagram of piezometer construction.

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and the outer casing driven to 59 ft. This well is screened from 58.5 to 48.5 ft. The filter pack extends to 34 ft, and the bentonite seal from 34 to 31.5 ft.

2.1.2 Piezometer P3

Piezometer P3 was originally drilled on 8-24-88 to 50 ft with the T64 rig. The outer casing was difficult to drive through the cobbles which had fallen into the borehole. The pipe was later found to be broken at a depth of 25 ft below surface. Attempts to salvage the borehole were unsuccessful. P3 was relocated several ft west of its original position on 8-25-88 and drilled to 35 ft. Fill material was encountered to a depth of 14 ft at which time black and tan clay was penetrated. The cobble layer occupies from 17.5 to 29 ft. Beneath the cobbles are layers of cobbley clayey sands. Bedrock was not encountered. The screened interval of P3 is 34.5 to 24.5 ft, with a filter pack extending to 16 ft.

2.1.3 Monitor Well MW3

Monitor Well MW3 was drilled on 8-25-88 to 34 ft with the T685 rig. The borehole remained open when the tools were removed and the well was constructed without using an outer casing. Subsurface characteristics at MW3 are similar to those at P3. MW3 is screened from 33.5 to 23.5 ft. The filter pack extends to 21 ft, and is overlain by a 3-ft thick bentonite seal.

2.1.4 Piezometer P4

Piezometer P4 was drilled on 8-25-88 to 49 ft with the T685 rig. The subsurface at this location is similar to MW3 and P3. From 34 to 49 ft cobble layers and sand layers, each layer being 2 or 3 ft thick, are interbedded. The hole remained open to a depth of 42 ft and the piezometer was constructed without using outer casing. P4 is screened from 41.5 to 31.5 ft. The filter pack extends to 17 ft.

2.1.5 Piezometer P2

Piezometer P2 was originally drilled on 8-25-88 to a depth of 35 ft with the T64 rig. The cobble layer extends from 2 to 12 ft below surface. Saturated gravelly clayey sand was encountered at 12 ft. The piezometer was constructed on 8-25-88. On 8-26-88 the water level in P2 was 25 ft below surface. Suspecting the screen to be clogged, the piezometer was air jetted. However, this failed to produce a higher water level. The saturation encountered at 12 ft has been attributed to discharge from a nearby SI. A decision was made to pull the well materials from P2 and drill the borehole to greater depth. On 9-1-88 P2 was extended to 60 ft. Grey sandy limestone/dolostone was encountered at 57 ft. The PVC well pipe rose 3 ft during

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the course of pulling the outer casing. P2 is screened from 56.5 to 46.5 ft. The filter pack extends to 29 ft.

2.1.6 Piezometer P1

Piezometer P1 was drilled on 8-26-88 to a depth of 49 ft with the T685 rig. The cobble layer extends from 6 to 32 ft, where a weathered tan shale was penetrated. Grey crystalline limestone/dolostone was encountered at 35 ft. Due to the slow progress made by the roller cone bit and no evidence of the water table, a decision was made to case off the top 40 ft and continue with a hammer bit. At 41 ft weathered shale was encountered. At 49 ft the borehole produced substantial amounts of ground water and the hole was terminated. After pulling the tools, the uncased portion of the borehole remained open to 48.5 ft. The piezometer is screened from 48 ft to 38 ft. A filter pack extends to 30 ft. A 2-ft thick bentonite seal was inadvertently placed above the filter pack. The seal will not affect the performance of the piezometer. The borehole annulus was backfilled with soil cuttings above the bentonite seal.

2.1.7 Monitor Well MW1

Monitor well MW1 was drilled on 8-26-88 to a depth of 57 ft with the T64. Cobbles and coarse sand occur to a depth of 12 ft where the texture became clayey and silty. On 8-29-88 this borehole was extended to 62 ft. From 57 to 62 ft the texture became gravelly and less fluid. Chert and tan shale fragments were evident in the cuttings. Bedrock was not encountered. Outer casing was driven to 61 ft. The well pipe, sand, and bentonite pellets were put in place. The portion of the borehole above the pellets was unstable and it was felt the the outer casing should be pulled only enough to allow room for the pellets to swell. The pellets swelled more than expected and entered the outer casing, wedging the PVC well pipe inside the outer casing. After many attempts to dislodge this bridge, a decision was made to pull the well and clear the borehole. On 8-30-88 MW1 was rebored to 61 ft and the well reconstructed. MW1 is screened from 60 to 50 ft. The filter pack extends to 33 ft and is overlain by a 2.5-ft thick bentonite seal.

2.1.8 Monitor Well MW4

Monitor well MW4 was drilled on 8-29-88 to a depth of 59.7 ft with the T685. Outer casing was driven the full length of the borehole. From the surface to a depth of 14 ft coarse gravelly sand grades to clayey silt. Saturated gravelly clayey sands were encountered from 14 ft to 59.7 ft. When the well pipe was placed in the borehole the sand would not support the PVC pipe and it sank. Quartz pea gravel and sand (both stockpiled at the water treatment

area) were put in the borehole until the bottom would support the PVC pipe.

MW4 is screened from 59.2 to 49.2 ft. A filter pack extends to 37 ft. A 4-ft thick bentonite seal overlies the filter pack.

2.1.9 Piezometer P6

Piezometer P6 was drilled on 8-30-88 to a depth of 75 ft with the T685 rig. Clayey silt and clayey sand occur to the top of the cobble layer at 13.5 ft. At 18 ft tan gravelly clayey sandy silt was encountered. At 49 ft the bit slowed, possibly due to a boulder, as there was no change in cuttings. Limestone/dolostone was encountered at 62 ft. At 64.5 ft a cherty shale was penetrated. Outer casing was set to 42 ft and the borehole cleared to 61.5 ft. P6 is screened from 61.5 to 51.5 ft.

2.1.10 Piezometer P5

Piezometer P5 was drilled on 9-2-88 with the T64 rig. Grey crystalline limestone/dolostone was encountered at 11.5 ft and is overlain by cobbles and coarse sand. Due to the slow progress of the roller cone bit the borehole was cased and the roller cone bit replaced by an air hammer bit. A gravel filled void was encountered at 13.5 ft. This gravel continued to 40 ft, excluding 3 in of limestone/dolostone encountered at 27.8 ft. The borehole was terminated at 41.5 ft in a grey crystalline limestone/dolostone encountered at 40 ft. The borehole was cased with a smaller diameter casing. The piezometer was constructed and all outer casings were removed. The piezometer is screened from 36 to 26 ft. A filter pack extends to 15 ft.

2.1.11 Monitor Well MW5

Monitor well MW5 was initially drilled on 9-1-88, but the borehole was relocated when the outer casing broke off 39 ft below the surface. Attempts to retrieve the pipe were unsuccessful. The present location of MW5 is 21.4 ft east of the abandoned borehole. The second borehole was drilled to 59 ft on 9-8-88. Gravelly sandy silty clay with sandstone fragments yields to sandy silty clay with shale fragments at 12 ft. Grey crystalline limestone/dolostone interbedded with weathered tan sandy shale occurs from 25.8 ft to the bottom of the borehole.

The borehole remained stable when the drilling tools were removed from the borehole. Outer casing was not used during well construction. MW5 is screened from 58.5 ft to 48.5 ft. The filter pack extends to 27.5 ft and is overlain by 2 ft of bentonite.

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2.1.12 Monitor Well MW6

Monitor well MW6 was drilled on 9-8-88 with the T64 rig. The borehole was drilled to 50 ft in depth, however it collasped to 47 ft. Drilling proceeded through the clay cap of the closed landfill. An old road bed was penetrated at 14 ft. Waste from the landfill (flyash, cinders, rayon) was drilled from 16 to 30 ft. At 30 ft river cobbles, some very large, were encountered Cobbles, interlayered with sand deposits extend the remaining length of the borehole.

Outer casing was used during the construction of this well. When the lower 20-ft section was removed from the borehole, the pipe had a curvature of approximately 1 ft over its length. It is thought that a large boulder became loosened and fell against the outer casing. The monitor well most likely has a curvature also.

Unlike the other wells and piezometers, MW6 is constructed of well pipe and screen purchased from Driller Service, Hickory, North Carolina. This pipe conforms to specifications of the Tri-Loc pipe and screen.

MW6 is screened from 46.5 to 36.5 ft, in the river cobbles and sand beneath the landfill. The filter pack extends to 33.5 ft. The bentonite seal lies above the filter pack and is 3.5 ft thick.

2.1.13 Monitor Well MW7

Monitor well MW7 was drilled on 9-10-88 with the T685 rig. The subsurface at this location is similar to MW6. The landfill was penetrated at a depth of 14 ft and extends to 50 ft. River cobbles and sand were encountered below the landfill.

MW7 is screened from 49.5 to 39.5 ft, in the river sediments beneath the landfill. The filter pack extends to 33 ft and is overlain by 3 ft of bentonite.

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Westinghouse
Environmental Services

Westinghouse HAZTECH, Inc.

5280 Panola Industrial Boulevard
Decatur, Georgia 30035
(404) 981-9332
(404) 981-9339 (24 Hr.)
FAX (404) 981-1786

February 9, 1989

Melissa McGuire
Attorney at Law
Baker, Worthington, Crossley
Stansberry & Woolf
Hamilton Bank Building
207 Mockingbird Lane
Johnson City, Tennessee 37601

Project 2322-88-1107

Subject: Ground-water Sampling at NARC March 1, 1989

Dear Melissa:

Please be advised that Westinghouse HAZTECH intends to sample monitor wells at North American Rayon Corporation, Elizabethton, Tennessee on March 1, 1989. It is my understanding that you will notify Randy Curtis of the State of Tennessee of our intentions. On or about Wednesday, February 22, 1989 I will notify you and Mr. Curtis by phone as to whether the March 1 sample date is still valid.

This upcoming sampling event will involve sampling the surface impoundment monitor wells, MW1, MW2, MW3, and MW4. Monitor wells MW5, MW6, and MW7, associated with the landfill, are on a semiannual sampling schedule and were sampled in December 1988, therefore they will not be included in this upcoming event. The landfill wells will be scheduled for sampling in June 1989. You will note that the landfill wells were sampled in September and December 1988, an accelerated schedule. The reason for accelerated sampling was that the September sample event occurred very soon after the wells were installed and it was felt that this fact may have influenced ground-water data.

Feel free to contact me if you have any questions.

Sincerely,

Laura

Laura Harris
Project Manager

cc: Lou Raasch

DOCKET NO. 000094

COR 000001

T095051207

Westinghouse
Environmental Services

Westinghouse HAZTECH, Inc.

5280 Panola Industrial Boulevard
Decatur, Georgia 30035
(404) 981-9332
(404) 981-9339 (24 Hr.)
FAX (404) 981-1786

February 16, 1989

Parshall Bush
RCRA Analytical Services, Inc.
183 Paradise Blvd.
Suite 108
Athens, Georgia 30607

Subject: PChem, Thomas Industries, NARC
Ground-water Sampling - March 1988

Dear Parshall:

As you can see everybody is due for ground-water sampling in March. Attached please find an analysis request sheet for NARC with the requested analyses highlighted. The following analyses are requested for PChem and Thomas.

PChem	Thomas
TOC*	TOC*
TOX*	tetrachloroethylene*
iron	trichloroethylene*
manganese	acetone
sodium	1,2-dichloroethylene
phenols	chloroform
sulfate	1,1,1-trichloroethane
chloride	vinyl chloride
	1,1-dichloroethylene
	arsenic
	chromium
	lead
	selenium

* run analyses in quadruplicate

Provide PChem with sufficient containers to sample 6 wells. Please provide Thomas sufficient containers to sample 10 wells. NARC requires sufficient containers to sample 5 wells. Additionally, all three facilities need two extra polyethylene containers for field analyses and field blanks.

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Sample containers should be as follows for the indicated analyses:

TOC and TOX: amber glass with teflon lined lid

Metals: polyethylene

VOA: VOA vile

Phenols: glass

Chloride and Sulfate: polyethylene

Additional container specifications pretaining to NARC analyses are included on the attached sheets. I will let you be the judge of volumes required for each site/analysis. If multiple containers are required please make this evident.

I would also like to request that arsenic and selenium be run by Atomic Absorption rather than ICP.

If you have any coolers from previous shipments to your lab, please use them to send containers to our clients. You may ship them as soon as you are prepared. NARC and Thomas are scheduled for sampling March 1, 1989. PChem has not been scheduled yet. Ship Thomas' containers to me at the letterhead address. Addresses for PChem and NARC follow:

PChem	North American Rayon
100 Latexo Rd.	West Elk Ave.
Latexo, TX 75849	Elizabethton, TN 37643
ATTN: Lois Waits	ATTN: Lou Raasch

Parshall, please contact me if you have any concerns or questions regarding this request(s).

Sincerely,

Westinghouse HAZTECH, Inc.

Laura

Laura Harris
Project Scientist

enclosures

DOCKET NO. 000096

COR 000002

T095051207

NORTH AMERICAN RAYON COMPANY
Elizabethton, TN

Parameters	Method	Preservative	Holding Time	Container/Amount
GROUP A Parameters Characterizing Suitability of Groundwater as a Drinking Water Supply, MW 1,2,3,4.				
Metals:				
Arsenic	EPA 206.3	HNO_3	6 mos.	P,G/500 ml
Mercury	EPA 245.1			
Selenium	EPA 270.3			
Barium, Cadmium, Chromium, Lead, Silver	EPA 200.7			
Nitrate	EPA 300.1	H_2SO_4	48 hrs.	P,G/200 ml
Fluoride	EPA 300.1	Cool, 4°C	28 days	P/500 ml
Coliform Bacteria	SM 909C	Cool, 4°C	6 hrs.	Sterile P,G/ 200 ml
Pesticides:				
Endrin, Lindane, Methoxychlor, Toxaphene	EPA 8080	Cool, 4°C	7 days	G/1L Teflon cap
Phenoxy Herbicides				
2,4-D, 2,4,5-TP Silvex	EPA 8150	Cool, 4°C	7 days	G/1L Teflon cap
Radium, Gross Alpha, Gross Beta	SM 703	HNO_3	6 mos.	P/1 gal

DOCKET NO. 000096

COR 000003

T095051207

NORTH AMERICAN RAYON COMPANY
Elizabethton, TN

Parameters	Method	Preservative	Holding Time	Container/Amount
GROUP B Parameters Establishing Groundwater Quality, MW 1,2,3,4				
Metals:				
Iron, Manganese, Sodium	EPA 200.7	HNO_3	6 mos.	P/500 ml
Phenols	EPA 420.3	H_2SO_4 Cool, 4°C	28 days	G/500 ml
Chloride, Sulfate	EPA 300.1	Cool, 4°C	28 days	P,G/1L
GROUP C Parameters Used as Indicators of Groundwater Contamination, MW 1,2,3,4				
pH	EPA 150.1	Analyze immediately in field		
Conductivity	EPA 120.1	Analyze immediately in field		
TOC	EPA 415.2	H_2SO^4 or HCl Cool, 4°C	28 days	G,P/200 ml 4 replicates
TOX	SM506	HNO_3 Cool, 4°C	—	Amber Glass Teflon lid/1L 4 replicates

P=polyethylene, G=glass containers
Polyethylene containers are preferred over glass when both are useable.
Do not duplicate containers when Groups A & B are both requested (i.e. metals, inorganics).
Methods: EPA prefix designates methods from SW846 "Methods for Chemical Analysis of Water and Wastes", or any related updates.
SM prefix designates methods from "Standard Methods for the Examination of Water and Wastewater, 16th Edition".

DOCKET NO. 000096
COR 000004
T095051207

10-23 J.C.F.O.74 R.W

TENNESSEE DEPARTMENT OF HEALTH AND ENVIRONMENT
CUSTOMS HOUSE
701 BROADWAY
NASHVILLE, TENNESSEE 37219-5403

CERTIFIED MAIL # P 490 783 929
RETURN RECEIPT REQUESTED

February 16, 1989

Ms. Melissa McGuire, Attorney
Baker, Worthington, Crossley,
Stansberry and Woolf
Hamilton Bank Building
P.O. Box 30 8 CRS
Johnson City, TN 37602

RE: Financial Assurance in Support of the Closure of the Hazardous Waste Site of North American Rayon Corporation of Elizabethton, Tennessee

Dear Ms. McGuire:

Pursuant to Tennessee Hazardous Waste Management Regulations, Rule Chapter 1200-1-11-.05(8)(d), we respectfully request that North American Rayon Corporation file with the Division a financial assurance mechanism in the amount of $579,750. In referencing Rule Chapter 1200-1-11-.05(8)(d), we note the following:

"(d) Financial Assurance for Closure - By 90 days after the effective date of these regulations, an owner or operator of each facility must file and maintain with the Division Director financial assurance for closure of the facility in accordance with the requirements of this subparagraph.

1. The owner or operator must choose from the financial assurance mechanisms as specified in subparagraph (g) of this paragraph. (NOTE: See also subparagraphs (h),(i),(j), and (k) of this paragraph.)

2. The owner or operator must file and maintain financial assurance in an amount at least equal to the current closure cost estimate.

(i) Whenever the closure cost estimate increases to an amount greater than the amount of financial assurance currently filed with the Division Director, the owner or operator must, within 60 days after the increase, file additional financial assurance at least equal to this increase.

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(ii) Whenever the current closure cost estimate decreases, and upon the written request of the owner or operator, the Division Director shall, provided he validates the decrease, reduce the amount of financial assurance required for the facility to the amount of the current closure cost estimate. Upon such occurrence, the Division Director shall, as appropriate considering the financial assurance mechanism(s) on file, either cause to be released to the owner or operator cash or collateral equal to this reduction or allow the owner or operator to substitute for the mechanism(s) on file a new mechanism(s) in the reduced amount."

Please find attached copies of Rule Chapters 1200-1-11-.05(8)(g) and 1200-1-11-.06(8)(p) which describe the types and wording of financial mechanisms authorized by the Regulations. We request that you file one of these mechanisms, properly worded with the Division Director by March 20, 1989. The mailing address is:

Mr. J. Tom Tiesler, Director
Division of Solid Waste Management
Tennessee Department of Health and Environment
Customs House, 4th Floor
701 Broadway
Nashville, Tennessee 37219
Attn: O. J. Wingfield

If you have any questions pertinent to this matter please call me at (615) 741-3424.

Sincerely,

O. J. Wingfield

O. J. Wingfield
Financial Compliance Officer

OJW/F1029047

Attachments

cc: Mr. Dale Ozier, Section Chief
Mr. Glenn Birdwell, Chief Enforcement
Mr. Rick Whitson, SWM, Johnson City Field Office
Mr. Ronnie Bowers

DOCKET NO. 000095
COR 000002
T095051207

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BAKER, WORTHINGTON, CROSSLEY, STANSBERRY & WOOLF

ATTORNEYS AT LAW

NORTHEAST TENNESSEE OFFICE
207 MOCKINGBIRD LANE
POST OFFICE BOX 3038 CRS
JOHNSON CITY, TENNESSEE 37602

TELEPHONE 615 928-0181
TELECOPIER 615 928-5694

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HOWARD H. BAKER (1902-1964)
HOWARD H. BAKER, JR.
ROBERT F. WORTHINGTON, JR.
ROBERT L. CROSSLEY
DON C. STANSBERRY, JR.
LOUIS C. WOOLF
ROBERT G. McCULLOUGH
CHARLES W. BONE
WILLIAM H. SKELTON
ERNEST A. PETROFF
ROBERT G. McDOWELL
JOHN A. McREYNOLDS, JR.
RODGER B. KESLEY
SAM J. McALLESTER, III
RICHARD T. SOWELL
A. HARRISON JOHNSON, JR.
ED E. WILLIAMS, III
DENNIS R. McCLANE
RICHARD E. HEROD
W. LEE RAWLS
HUGH B. BRIGHT, JR.
JAMES L. BECKNER
C. MICHAEL NORTON
HOWARD E. JARVIS
W. KYLE CARPENTER
L.H. (BILL) ARMISTEAD, III
DAVID C. ANDREW
KENNETH P. EZELL, JR.
JAMES E. DRINNON, JR.
STEPHEN A. MARCUM
JAMES A. DeLANIS
J. RANDOLPH BIBB, JR.
H. BRUCE GUYTON
STEVEN J. EISEN
ANTHONY M. IANNACIO
GARY C. SHOCKLEY
WANDA G. SOBIESKI
WILLIAM R. WRIGHT
JAMES A. McINTOSH
NICHOLAS A. DELLA VOLPE
ROBERT C. REID
ROBYN JARVIS ASKEW
JANET P. MEDLIN
M. DENISE MORETZ
JEFFREY H. BENEDICT
EDWARD A. COX, JR.
STEPHEN M. CRAMPTON
JANIE C. PORTER
K. JOI TIPPS
KIMBERLY K. WHALEY
VANCE L. BROEMEL
KEITH D. FRAZIER
MARTHA M. GENTRY
JUDITH L. KARES
MICHAEL B. KINNARD
MELISSA M. McGUIRE
GREGORY M. McWHORTER
DANIEL J. MOORE
RICHARD H. ROBERTS
MONTY L. WALTON
JEFF W. ANDERSON
BEN A. BURNS
PATTI T. COTTEN
KELLY R. DUGGAN
DIANE M. MESSER
ROBERT D. VAN DE VUURST
KEITH C. DENNEN
ROBERT K. GIESELMANN
SUSAN R. LIMOR
P. EDWARD PRATT
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OF COUNSEL

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TELEPHONE 202 347-4360
TELECOPIER 202 347-4540

NASHVILLE, TENNESSEE 37219
1700 NASHVILLE CITY CENTER
TELEPHONE 615 726-5600
TELECOPIER 615 726-0464

HUNTSVILLE, TENNESSEE 37756
COURTHOUSE SQUARE
TELEPHONE 615 663-2321
TELECOPIER 615 663-2111

HENDERSONVILLE, TENNESSEE 37075
MAPLE GLEN OFFICE BUILDING
TELEPHONE 615 822-8822
TELECOPIER 615 824-4684

February 21, 1989

RECEIVED
Division of Solid Waste Management
Date 2/22/89 File No.
Received by

Mr. Randy Curtis
Tennessee Department of
Health and Environment
1733 Sunset Drive
Johnson City, Tennessee 37601

RE: Groundwater Sampling at North American Rayon Corporation

Dear Randy:

Enclosed is a letter from Laura Harris regarding groundwater sampling at North American Rayon which I received on February 14, 1989.

If you have any questions regarding this letter, please feel free to call me.

Sincerely yours,

Melissa McGuire

Melissa M. McGuire

ssr
Enclosure

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TN-420

RECEIVED
Division of Solid Waste Management
Date 3/1/89 File No.
Received by gg

Westinghouse
Environmental Services

Westinghouse HAZTECH, Inc.

5280 Panola Industrial Boulevard
Decatur, Georgia 30035
(404) 981-9332
(404) 981-9339 (24 Hr.)
FAX (404) 981-1786

RECEIVED
MAR 10 1989
DIV. OF SWM

February 23, 1989

Rick Whitson
Solid Waste Management
Tennessee Department of
Health and Environment
1733 Sunset Drive
Johnson City, Tennessee 37601

Project 2322-88-1107

Subject: North American Rayon Corporation (NARC)
Elizabethton, Tennessee

Dear Mr. Whitson:

Westinghouse HAZTECH, Inc. has been retained by NARC to assist them in closing an on-site surface impoundment (SI) which has been determined to be a non-permitted hazardous waste management unit. This determination was made by the Division of Solid Waste Management following a generator inspection on November 18, 1987.

Westinghouse HAZTECH has sampled sludge in the SI on two separate occasions, once on May 19, 1988 and once on October 11, 1988. Analytical data and locations maps are attached. The SI currently contains 3 feet of flyash sludge at its eastern end, grading to less than 1 foot at its western end. The flyash sludge and the top 6 inches of subsoil will be removed from the SI. This amounts to 708 cubic yards of material. Sampling analytical data indicate that the SI contains approximately 177 cubic yards of material capable of producing hydrogen sulfide gas in excess of the regulatory limit of 500 ppm (D003 waste), and approximately 177 cubic yards of material having a flash point below 60° Centigrade (D001 waste). A sample submitted for GC/MS analysis did not indicate the presence of organic compounds, which commonly cause low flash point. We believe that if the waste is homogenized prior to disposal, it is likely that the sludge will not exhibit any hazardous characteristics. Future testing will determine whether this assumption is correct.

NARC has submitted a closure plan that includes several alternatives for disposing of the material in the SI. NARC has also recently considered an additional alternative, which is to pump the contents of the SI through the on-site

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waste water treatment plant. This alternative seems reasonable as most of the material in the SI would have gone through the treatment plant had it not been diverted to the SI, and the material in the SI is not significantly different from the waste water routinely treated at the treatment plant.

Review of NARC's closure plan for the SI is being handled by Ronald Potts in the Jackson, Tennessee office of the Department of Health and Environment. Melissa McGuire of Baker, Worthington law firm, representing NARC, and I have spoken to Mr. Potts about treatment of the SI contents in NARC's on-site water treatment plant. He suggested that we contact you and come to an arrangement mutually agreeable to NARC and the Johnson City field office. Since NARC's water treatment system is an NPDES permitted facility, we are also contacting Water Pollution Control regarding any objections or permit stipulations that would preclude this alternative of closing the SI. Please find enclosed a copy of correspondence to David Saulsbury, Water Pollution Control.

Mr. Whitson, please review the enclosed analytical data and consider the feasibility of this proposal. If you feel that a mutually agreeable arrangement can be reached we would like to meet with you to discuss this matter in detail. Feel free to call me at (404) 981-9332 if you require additional information.

Sincerely,

Westinghouse HAZTECH, Inc.

Laura Harris

Laura Harris
Project Manager

/lh
enclosures

cc: Ron Potts; Solid Waste Management
Lou Raasch; NARC
Melissa McGuire; Baker, Worthington

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DOCKET NO. 000098 T095051207

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Westinghouse
Environmental Services

Westinghouse HAZTECH, Inc.

5280 Panola Industrial Boulevard
Decatur, Georgia 30035
(404) 981-9332
(404) 981-9339 (24 Hr.)
FAX (404) 981-1786

February 23, 1989

David Saulsbury
Water Pollution Control
Tennessee Department of
Health and Environment
1733 Sunset Drive
Johnson City, Tennessee 37601

Project 2322-88-1107

Subject: North American Rayon Corporation (NARC)
Elizabethton, Tennessee

Dear Mr. Saulsbury:

Westinghouse HAZTECH, Inc. has been retained by NARC to assist them in closing an on-site surface impoundment (SI) which has been determined to be a non-permitted hazardous waste management unit. This determination was made by the Division of Solid Waste Management following a generator inspection on November 18, 1987.

NARC previously used the SI as an emergency spill diversion basin. As I am sure you are aware, NARC uses sulfuric acid in their manufacturing process. The spill diversion basin was used in the past for waste water that, if allowed to enter the water treatment plant, would exceed the neutralization capabilities of the system. The Division of Solid Waste Management determined that the SI had received spent sulfuric acid, a hazardous waste by characteristic, and was therefore a hazardous waste management unit.

Westinghouse HAZTECH has sampled sludge in the SI on two separate occasions, once on May 19, 1988 and once on October 11, 1988. Analytical data and location maps are attached. The SI currently contains 3 feet of flyash sludge at its eastern end, grading to less than 1 foot at its western end. The flyash sludge and the top 6 inches of subsoil will be removed from the SI. This amounts to 708 cubic yards of material. Sampling analytical data indicate that the SI contains approximately 177 cubic yards of material capable of producing hydrogen sulfide gas in quantities harmful to health and the environment (>500 ppm), and approximately 177 cubic yards of material having a flash point below 60° Centigrade.

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Federal regulations classify such wastes as "reactive" and "flammable", respectively. A sample submitted for Gas Chromatograph/Mass Spectroscopy analysis did not indicate the presence of organic compounds, which commonly cause low flash point. We believe that if the waste is homogenized prior to disposal, it is likely that the sludge will not exhibit any hazardous characteristics. Future testing with determine whether this assumption is correct.

NARC has submitted a closure plan that includes several alternatives for disposing of the material in the impoundment. NARC has also recently considered an additional alternative, which is to pump the contents of the SI through the on-site waste water treatment plant. This alternative seems reasonable as most of the material in the SI would have gone through the treatment plant had it not been diverted to the SI, and the material in the SI is not significantly different from the waste water routinely treated at the treatment plant.

Review of NARC's closure plan for the SI is being handled by Ronald Potts in the Jackson, Tennessee office of the Department of Health and Environment. Melissa McGuire of Baker, Worthington law firm, representing NARC, and I have spoken to Mr. Potts about treatment of the SI contents in NARC's on-site water treatment plant. He indicated that we should pursue this matter with the Johnson City field office, and suggested that we contact Rick Whitson. We are initiating discussions with Mr. Whitson on the feasibility of this proposal. However, we felt that since the treatment plant is an NPDES permitted facility, we should also contact Water Pollution Control. Please review the attached analytical data and provide written comment as to whether Water Pollution Control has any objections to this plan and whether this activity is prohibited by NARC's NPDES permit stipulations.

Mr. Saulsbury, on behalf of NARC I thank you for your time and cooperation. Please feel free to contact me at (404) 981-9332 if you require additional information.

Sincerely,

Westinghouse HAZTECH, Inc.

Laura Harris

Laura Harris
Project Manager

/lh
Enclosures
cc: Rick Whitson; Solid Waste
Ron Potts; Solid Waste
Lou Raasch; NARC
Melissa McGuire; Baker, Worthington

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Division of Solid Waste Management
Date 03-14-89 File No.
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Westinghouse
Environmental Services

Westinghouse HAZTECH, Inc.

5280 Panola Industrial Boulevard
Decatur, Georgia 30035
(404) 981-9332
(404) 981-9339 (24 Hr.)
FAX (404) 981-1786

February 27, 1989

David Saulsbury
Water Pollution Control
Tennessee Department of Health
and Environment
1733 Sunset Drive
Johnson City, Tennessee 37601

Project 2322-88-1107

Subject: North American Rayon Corporation (NARC)
Sample Location Diagrams and Analytical Data

Dear Mr. Saulsbury:

The attached diagrams and analytical data should have been included with my correspondence dated February 23, 1989, regarding NARC. Please pardon the omission.

Sincerely,

Westinghouse HAZTECH, Inc.

Laura

Laura Harris
Project Manager

cc: Rick Whitson; Solid Waste
Ron Potts; Solid Waste
Melissa McGuire; Baker, Worthington
Lou Raasch; NARC

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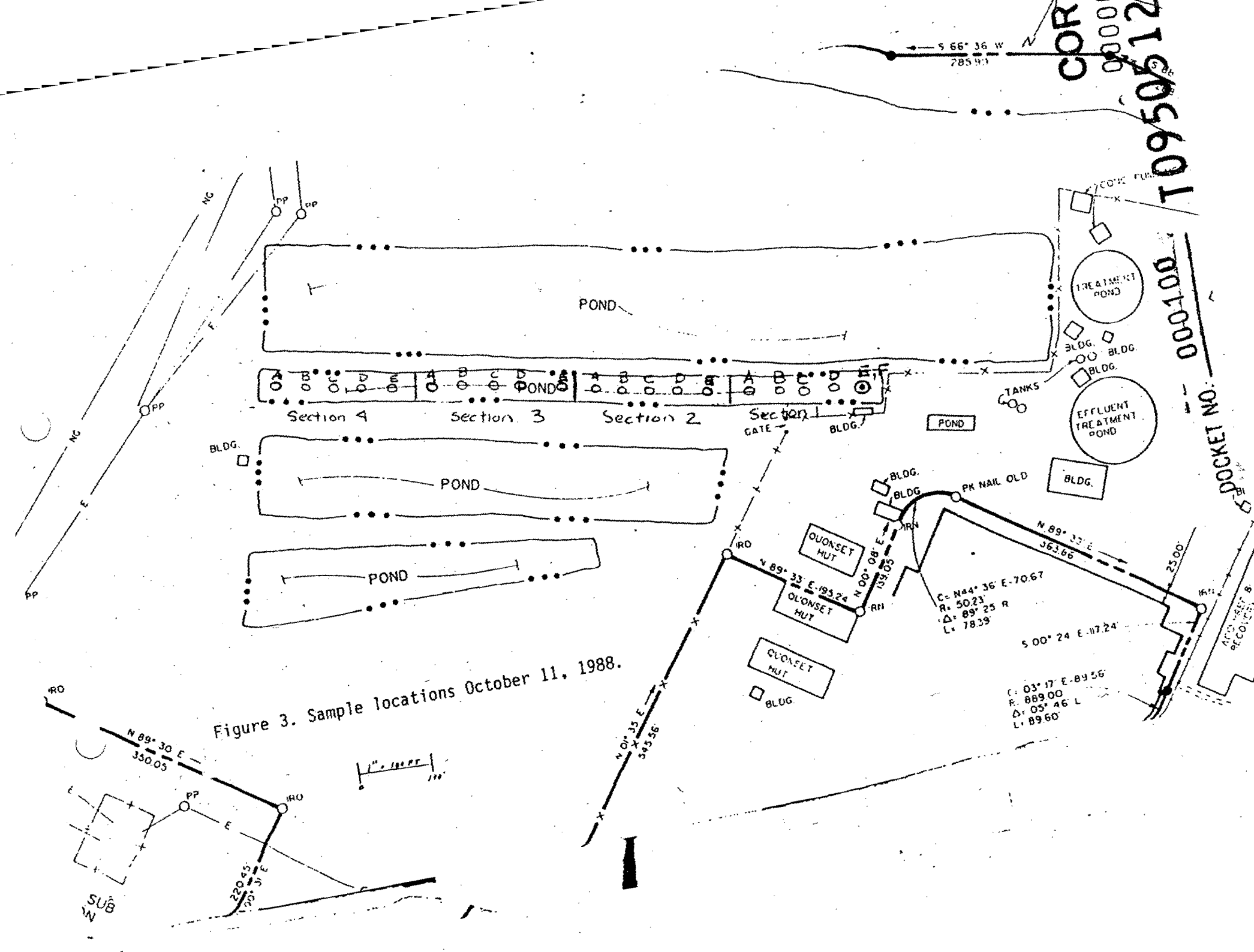

Figure 3. Sample locations October 11, 1988.

TABLE 1. ANALYTICAL RESULTS OF
SLUDGE SAMPLING MAY 19, 1988

Volatile Organic Compounds

	T1,P3 (3-ft)	T3,P2 (1-ft)	T4,P3 (1-ft)	Detection Limit
	ppm			
1,1-Dichloroethylene	N.D*	N.D.	N.D.	0.025
Methylene Chloride	N.D.	N.D.	N.D.	0.025
1,2-Dichloroethylene	N.D.	N.D.	N.D.	0.025
1,1-Dichloroethane	N.D.	N.D.	N.D.	0.025
Chloroform	N.D.	N.D.	N.D.	0.025
1,1,1-Trichloroethane	N.D.	N.D.	N.D.	0.025
Carbon Tetrachloride	N.D.	N.D.	N.D.	0.025
1,2-Dichloroethane	N.D.	N.D.	N.D.	0.025
Trichloroethylene	N.D.	N.D.	N.D.	0.025
1,2-Dichloropropane	N.D.	N.D.	N.D.	0.025
Bromodichloromethane	N.D.	N.D.	N.D.	0.025
Trans-1,3-Dichloropropene	N.D.	N.D.	N.D.	0.025
Cis-1,3-Dichloropropene	N.D.	N.D.	N.D.	0.025
1,1,2-Trichloroethane	N.D.	N.D.	N.D.	0.025
1,1,2,2-Tetrachloroethylene	N.D.	N.D.	N.D.	0.025
Dibromochloromethane	N.D.	N.D.	N.D.	0.025
Chlorobenzene	N.D.	N.D.	N.D.	0.025
Bromoform	N.D.	N.D.	N.D.	0.025
1,1,2,2-Tetrachloroethane	N.D.	N.D.	N.D.	0.025
1,3-Dichlorobenzene	N.D.	N.D.	N.D.	0.025
1,4-Dichlorobenzene	N.D.	N.D.	N.D.	0.025
1,2-Dichlorobenzene	N.D.	N.D.	N.D.	0.025
Benzene	N.D.	N.D.	N.D.	0.025
Toluene	N.D.	N.D.	N.D.	0.025
Ethyl Benzene	N.D.	N.D.	N.D.	0.025
M-Xylene	N.D.	N.D.	N.D.	0.025
P-Xylene	N.D.	N.D.	N.D.	0.025
O-Xylene	N.D.	N.D.	N.D.	0.025

* N.D. - Not Detected

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TABLE 1. (Continued)

EP Toxicity Metals and pH

Sample	Depth (ft)	pH (s.u.)	Ag	As	Ba	Cd	Cr	Hg	Pb	Se	Sn	Ni
			ppm									
T1,P3	3	7.18	<0.10	0.05	0.37	0.01	0.05	<0.01	<0.03	0.73	0.17	0.16
T1,P2	2	7.61	<0.10	0.05	0.81	<0.01	0.03	<0.01	0.03	1.05	0.15	0.11
T1,P1	1	8.00	<0.10	0.05	0.78	<0.01	0.02	<0.01	0.03	0.63	0.12	0.10
T2,P3	1	7.12	<0.10	0.05	0.19	<0.01	0.02	<0.01	<0.03	0.53	0.12	0.09
T2,P2	1	7.26	<0.10	0.05	0.34	<0.01	0.01	<0.01	<0.03	0.35	0.03	0.06
T2,P1	1	6.77	<0.10	0.05	0.17	<0.01	0.01	<0.01	0.03	0.33	0.07	0.01
T3,P3	1	6.25	<0.10	0.05	0.42	<0.01	0.01	<0.01	<0.03	0.22	0.10	0.05
T3,P2	1	4.25	<0.10	0.05	0.06	<0.01	<0.01	<0.01	0.03	0.09	0.02	0.08
T3,P1	1	5.24	<0.10	0.05	0.10	<0.01	<0.01	<0.01	0.03	0.03	0.02	0.02
T4,P3	1	5.38	<0.10	0.05	0.11	<0.01	<0.01	<0.01	0.03	0.03	0.04	0.02
T4,P2	1	6.29	<0.10	0.05	0.19	<0.01	0.01	<0.01	<0.03	<0.03	0.01	0.01
T4,P1	1	6.42	<0.10	<0.05	0.19	<0.01	<0.01	<0.01	0.03	0.03	0.06	0.01
T5,P3	1		Sample Lost due to Broken Container									
T5,P2	1	6.72	<0.10	0.05	0.57	<0.01	<0.01	<0.01	0.03	0.22	0.06	0.14
T5,P1	1		Sample Lost due to Broken Container									

Other Parameters

Sample	Depth (ft)	Phenols	Cyanide	Sulfide	Zinc
		ppm			
T1,P3	3	0.08	N.D.*	14,000	14'0
T3,P2	1	N.D.	N.D.	490	1685
T4,P3	1	N.D.	N.D.	10,000	578

* N.D. - Not Detected

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T09505 1207

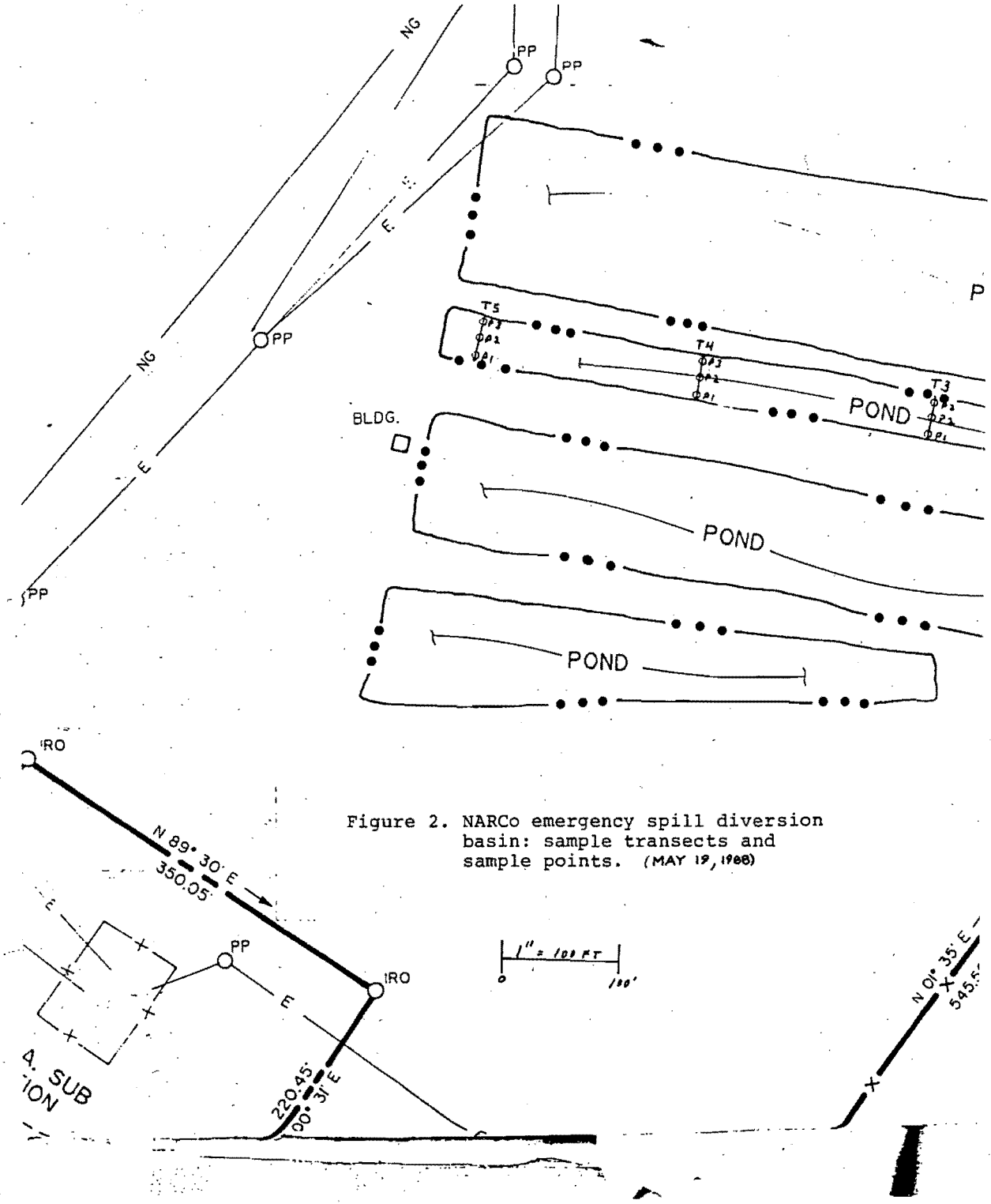

Figure 2. NARCo emergency spill diversion basin: sample transects and sample points. (MAY 19, 1988)

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TABLE 2. ANALYTICAL DATA FOR SAMPLES COLLECTED OCTOBER 11, 1988

Location	Flash Point (°)	Reactive Sulfide (ppm)	EP Toxicity Selenium (ppm)
Section 1 - ABCDE	60.2	<18.1	NA*
Section 2 - ABCDE	56.2	352	NA
Section 3 - ABCDE	>65.2	162	NA
Section 4 - ABCDE	>65.2	660	NA
Section I-F	NA	NA	<0.005

*NA = Not Analyzed

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T095051207

10-23 78

BAKER, WORTHINGTON, CROSSLEY, STANSBERRY & WOOLF

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TELEPHONE 615 928-0181
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HOWARD H. BAKER (1902-1964)
HOWARD H. BAKER, JR.
ROBERT F. WORTHINGTON, JR.
ROBERT L. CROSSLEY
DON C. STANSBERRY, JR.
LOUIS C. WOOLF
ROBERT G. McCULLOUGH
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ERNEST A. PETROFF
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W. LEE RAWLS
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C. MICHAEL NORTON
HOWARD E. JARVIS
W. KYLE CARPENTER
L.H. (BILL) ARMISTEAD, III
DAVID C. ANDREW
KENNETH P. EZELL, JR.
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STEPHEN M. CRAMPTON
JANIE C. PORTER
K. JOI TIPPS
KIMBERLY K. WHALEY
VANCE L. BROEMEL
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MARTHA M. GENTRY
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MICHAEL B. KINNARD
MELISSA M. McGUIRE
GREGORY M. McWHORTER
DANIEL J. MOORE
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MONTY L. WALTON
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BEN A. BURNS
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KELLY R. DUGGAN
DIANE M. MESSER
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KEITH C. DENNEN
ROBERT K. GIESELMANN
SUSAN R. LIMOR
P. EDWARD PRATT
AMY E. SPENCER
JAMES C. BRADSHAW
TRACIE A. GROVE
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JULIAN M. OLEJNICZAK
JOHN B. WHITESELL

DURWARD S. JONES
WILLIAM E. ANDERSEN
OF COUNSEL

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BANK OF EAST TENNESSEE BUILDING
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TELECOPIER 615 663-2111

HENDERSONVILLE, TENNESSEE 37075
MAPLE GLEN OFFICE BUILDING
TELEPHONE 615 822-8822
TELECOPIER 615 824-4684

February 27, 1989

Mr. Randy Curtis
Tennessee Department of
Health and Environment
1733 Sunset Drive
Johnson City, Tennessee 37601

RE: North American Rayon Corporation Groundwater Analytical Data - December 28, 1988 Sampling

Dear Mr. Curtis:

Enclosed please find a copy of a letter that I received on this date from Laura Harris of Westinghouse Haztech concerning the groundwater analytical data for North American Rayon Corporation. As you will note, the data for selenium and arsenic is suspect due to the method of analysis and the fact that the groundwater is high in calcium.

If you have any questions regarding the enclosed material, please feel free to call me.

Sincerely yours,

Melissa McGuire

Melissa M. McGuire

ssr
Enclosure

DOCKET NO. 000101

COR
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T095051207

Westinghouse
Environmental Services

Westinghouse HAZTECH, Inc.

5280 Panola Industrial Boulevard
Decatur, Georgia 30035
(404) 981-9332
(404) 981-9339 (24 Hr.)
FAX (404) 981-1786

February 22, 1989

Ms. Melissa McGuire
Baker, Worthington, Crossley,
Stransberry, and Woolf
Attorneys-at-Law
Hamilton Bank Building
207 Mockingbird Lane
Johnson City, TN 37601

Project No. 2322-88-1107

SUBJECT: North American Rayon Corp.
Groundwater Analytical Data
Sample Event - December 28, 1988

Dear Ms. McGuire:

Enclosed are the above-referenced data for ground water samples collected at the North American Rayon Corporation in Elizabethton, Tennessee on December 28, 1988. The following drinking water parameters were found to exceed the EPA standard:

- Arsenic - MW-1, MW-2, MW-3, MW-4
- Selenium - MW-1, MW-2, MW-3
- Fluoride - MW-4
- Nitrate - MW1, MW4

Laboratory analyses were performed by RCRA Analytical Services, Inc. of Athens, Georgia. Metals have been analyzed by Inductively Coupled Plasma Spectroscopy (ICP) except for mercury which is analyzed by Atomic Absorption (AA). RCRA has confirmed that water samples having high calcium, aluminum, and iron contents cause interference in measuring arsenic and selenium on the ICP apparatus. This interference does not occur when these elements are analyzed by AA. ICP and AA analysis of ground-water samples from another site situated in limestone terrain indicated that error in measurements of arsenic and selenium by ICP increases as

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calcium concentration increases. ICP analysis of a sample indicated 2 ppm arsenic whereas the same sample was non-detectable when analyzed by AA. The arsenic and selenium data transmitted herein are based on analysis by ICP and are suspected of being inaccurate. Sample volumes were inadequate for re-analysis by AA. From now on arsenic and selenium, as well as mercury, will be analyzed by AA.

A ground water elevation countour map is enclosed. Please call if you have any questions.

Sincerely,

Laura

Laura B. Harris
Project Manager

LBH/jlv
Enclosure

cc: Lou Raasch

DOCKET NO. 000101 COR
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GROUND-WATER ANALYTICAL DATA
FOR MONITOR WELLS 1-4

Sample Events 12-28-88

Parameters characterizing the suitability of ground water as a drinking water supply:

	MW-1	MW-2	MW-3	MW-4	EPA Drinking Water Standard
Metals (ppm)					
Arsenic	0.20	0.24	0.27	0.07	0.05
Barium	0.14	0.02	<0.05	<0.01	1.0
Cadmium	<0.01	<0.01	<0.01	<0.01	0.01
Chromium	0.03	0.04	0.03	0.01	0.05
Lead	0.02	0.03	0.04	<0.03	0.05
Mercury	<0.001	<0.001	<0.001	<0.001	0.0002
Selenium	0.12	0.19	0.13	0.01	0.01
Silver	0.04	0.03	0.02	0.02	0.05
Inorganics (ppm)					
Fluoride	0.15	0.15	0.34	2.50	1.4-2.4
Nitrate (N)	1.50	0.08	<0.05	1.11	1.00
Pesticides (ppb)					
Endrin	<0.03	<0.03	<0.03	<0.03	0.20
Lindane	<0.008	<0.008	<0.008	<0.008	4.0
Methoxychlor	<0.30	<0.30	<0.30	<0.30	100
Toxaphene	<1.20	<1.20	<1.20	<1.20	5.0
Phenoxy Herbicides, ppb					
2,4-D	<5.2	<5.2	<5.2	<5.2	100
2,4,5-TP	<0.1	<0.1	<0.1	<0.1	10
Fecal Coliform, per 100 ml	<1	<1	<1	<1	1
Radium, pCi/l	<0.1	0.1	<0.1	0.1	5
Gross Alpha, pCi/l	5	4	4	4	15
Gross Beta, pCi/l	67	18	10	5	4 mrem/yr

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Parameters Establishing Ground Water Quality (ppm):

	MW-1	MW-2	MW-3	MW-4
Iron	0.03	0.03	0.02	0.01
Manganese	0.003	7.025	0.210	0.006
Sodium	61.45	466.9	618.29	214.4
Chloride	6.49	13.9	18.6	7.61
Sulfate	230	1425	984	384
Phenols	<10	<10	<10	<10

Parameters Used as Indicators of Ground Water Contamination:

TOC (ppm)	0.66	2.54	8.18	2.70
TOX (ppb)	10.1	16.6	44.8	21.8
pH* (s.u.)	7.8	6.8	7.6	9.4
Specific Conductance* (umhos/cm)	520	2400	2450	950
Water Level (ft-msl)	1463.43	1470.39	1487.51	1467.40

*Data Collected Week of 2/13/89

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Ground Water Analytical Data
for Wells 5-7
Sample Event: 12/28/88

Landfill Semi-Annual Parameters	MW-5	MW-6	MW-7
TOC (ppm)	1.52	24.8	86.1
Phenols (ppb)	<10	<10	<10
TKN (ppm)	< 2.8	4.2	30.8
Nitrate (ppm)	<0.05	<0.05	<0.05
Chloride (ppm)	4.64	16.3	21.6
Lead (ppm)	<0.03	<0.03	<0.03
Chromium (ppm)	<0.01	2.05	<0.01
pH* (s.u.)	6.8	6.9	6.7
Specific Conductance* (umhos/cm)	210	200	2200

*Data Collected Week of 2/14/89

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Volatile Organic Compounds

Parameter (ppm)	MW5	MW6	MW7	Duplicate MW7
Vinyl Chloride	<0.005	<0.005	<0.005	<0.005
1,1-Dichloroethylene	<0.001	<0.001	<0.001	<0.001
Methylene Chloride	<0.001	<0.001	<0.001	<0.001
Trans-1,2-Dichloroethylene	<0.001	<0.001	<0.001	<0.001
1,1-Dichloroethane	<0.001	<0.001	<0.001	<0.001
Chloroform	<0.001	<0.001	<0.001	<0.001
1,1,1-Tricholorethane	<0.001	<0.001	<0.001	<0.001
Carbon Tetrachloride	<0.001	<0.001	<0.001	<0.001
1,2-Dichloroethane	<0.001	<0.001	<0.001	<0.001
Trichloroethylene	<0.001	<0.001	<0.001	<0.001
1,2-Dichloropropane	<0.001	<0.001	<0.001	<0.001
Bromodichloromethane	<0.001	<0.001	<0.001	<0.001
Trans-1,3 Dichloropropene	<0.001	<0.001	<0.001	<0.001
Cis-1,3-Dichloropropene	<0.001	<0.001	<0.001	<0.001
1,1,2-Trichloroethane	<0.001	<0.001	<0.001	<0.001
1,1,2,2-Tetrachloroethylene	<0.001	<0.001	<0.001	<0.001
Dibromochloromethane	<0.001	<0.001	<0.001	<0.001
Chlorobenzene	<0.001	<0.001	<0.001	<0.001
Bromoform	<0.001	<0.001	<0.001	<0.001
1,1,2,2-Tetrachloroethane	<0.001	<0.001	<0.001	<0.001
1,3-Dichlorobenzene	<0.001	<0.001	<0.001	<0.001

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Parameter	MW5	MW6	MW7
1,4-Dichlorobenzene	<0.001	<0.001	<0.001
1,2-Dichlorobenzene	<0.001	<0.001	<0.001
Acetone	1.040	0.994	<0.001
Benzene	<0.001	<0.001	<0.001
Toluene	<0.001	1.21	<0.001
Ethyl Benzene	<0.001	<0.001	<0.001
M-Xylene	<0.001	0.003	<0.001
P-Xylene	<0.001	<0.001	<0.001
O-Xylene	<0.001	<0.001	<0.001
Water Level (ft-msl)	1464.12	1469.19	1472.07

CERTIFIED MAIL #29,238
RETURN RECEIPT REQUESTED

Tennessee Department of Health and Environment
Bureau of Environment
1733 Sunset Drive
Johnson City, Tennessee 37601-3621

March 16, 1989

Ms. Laura Harris, Project Manager
Westinghouse HAZTECH, Inc.
5280 Panola Industrial Boulevard
Decatur, Georgia 30035

RE: North American Rayon Corporation (NARC)
Carter County

Dear Ms. Harris:

The Division of Water Pollution Control acknowledges receipt of your February 23, 1989, correspondence detailing alternatives for impoundment closure at North American Rayon Corporation (NARC). Specifically, the correspondence requested that the Division comment on the acceptability of pumping material from the surface impoundment to the existing industrial wastewater treatment system. We have reviewed the submittal and note the following deficiencies:

1. North American Rayon Corporation still experiences periodic exceedances of the zinc limit established by NPDES permit TN0004421. The majority of these exceedances are attributable to discharge 010. The Division feels that an additional zinc and solids loading to the treatment system will further adversely affect the ability of the system to meet NPDES limits.

2. The submission lacked information to adequately characterize and evaluate the waste stream and the proposed activity. That is, information should have been provided concerning the following:

   a. The daily volume of material pumped to the system.

   b. The pumping rate of material.

   c. The point of introduction of the material to the system.

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T095051207

d. The anticipated concentration of metals and other materials in the waste stream.

e. The impact of the activity on the various unit processes.

f. Necessary changes in operational strategy and procedures of the treatment system to properly accomodate and treat the additional loading.

g. The anticipated impact on effluent quality.

If you have any questions regarding this correspondence, please contact David Saulsbury at 928-6487.

Sincerely,

A. L. Fulkerson, Manager
Johnson City Basin Office
Division of Water Pollution Control

ALF/DKS/jl WPC-1

cc: Dr. Lou Raasch, North American Rayon Corporation
Ms. Melissa McGuire
DSWM, Johnson City✓
DSWM, Jackson
Industrial Facilities Section, DWPC, Nashville

DOCKET NO. 000103
COR 000002
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3/22/89

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MARCH 20, 1989

Melissa McGuire
Attorney at Law
Baker, Worthington, Crossley,
Stansberry & Woolf
Hamilton Bank Building
207 Mockingbird Lane
Johnson City, Tennessee 37601

SUBJECT: North American Rayon Corp (Narc)
Additional Ground-Water Analytical Data
Sample Event- December 28, 1988

Dear Melissa:

This letter is written in follow-up to my correspondence to you, dated February 22, 1989, regarding analytical data associated with NARC's ground-water samples collected in December 1988. Please recall that reported arsenic and selenium values were measured by Inductively Coupled Plasma Spectroscopy (ICP) and are suspected to be inaccurate. The chemist at the laboratory was able to re-evaluate arsenic and selenium by atomic absorption (AA). The ground-water samples collected in December for metals analysis were used for both measurements (AA and ICP).

Data associated with each analytical method are presented below:

Well	Arsenic (PPM) ICP	Arsenic (PPM) AA	Selenium(PPM) ICP	Selenium(PPM) AA
MW1	0.20	<0.001	0.12	<0.001
MW2	0.24	<0.001	0.19	<0.001
MW3	0.27	0.001	0.13	<0.001
MW4	0.07	0.001	0.01	<0.001

All four wells are well below the EPA Drinking Water Standards for arsenic (0.005 ppm) and selenium (0.001 ppm).

DOCKET NO. 000105
COR - 000001
T095051207

Please contact me if you require additional information.

Sincerely,
Westinghouse HAZTECH, Inc.

Laura Harris

Laura Harris
Project Manager

cc: Lou Raasch, NARC
Randy Curtis, State of Tennessee

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COR

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T095051207

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APR 18 1989

CLOSURE PLAN FOR WASTE PILE AND SPILL DIVERSION BASIN AT NORTH AMERICAN RAYON CORP. ELIZABETHTON, TENNESSEE

April 17, 1989

Prepared for

BAKER, WORTHINGTON, CROSSLEY,
STANSBERRY & WOOLF
Johnson City, Tennessee

Prepared by

WESTINGHOUSE HAZTECH
Decatur, Georgia

Project No. 2322-88-1107

Laura Harris
Project Manager

DOCKET NO. 000106

COR 000001

T095051207

10-23 83

3/22/89

Westinghouse
Environmental Services

Westinghouse HAZTECH, Inc.

5280 Panola Industrial Boulevard
Decatur, Georgia 30035
(404) 981-9332
(404) 981-9339 (24 Hr.)
FAX (404) 981-1786

MARCH 20, 1989

Melissa McGuire
Attorney at Law
Baker, Worthington, Crossley,
Stansberry & Woolf
Hamilton Bank Building
207 Mockingbird Lane
Johnson City, Tennessee 37601

SUBJECT: North American Rayon Corp (Narc)
Additional Ground-Water Analytical Data
Sample Event- December 28, 1988

Dear Melissa:

This letter is written in follow-up to my correspondence to you, dated February 22, 1989, regarding analytical data associated with NARC's ground-water samples collected in December 1988. Please recall that reported arsenic and selenium values were measured by Inductively Coupled Plasma Spectroscopy (ICP) and are suspected to be inaccurate. The chemist at the laboratory was able to re-evaluate arsenic and selenium by atomic absorption (AA). The ground-water samples collected in December for metals analysis were used for both measurements (AA and ICP).

Data associated with each analytical method are presented below:

Well	Arsenic (PPM) ICP	Arsenic (PPM) AA	Selenium(PPM) ICP	Selenium(PPM) AA
MW1	0.20	<0.001	0.12	<0.001
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cc: Lou Raasch, NARC
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Laura Harris

Laura Harris
Project Manager

cc: Lou Raasch, NARC
Randy Curtis, State of Tennessee

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FAX (404) 981-1786

April 17, 1989

Ronald A. Potts
Tennessee Department of
Health and Environment
Division of Solid Waste Management
295 Summar Avenue
Jackson, Tennessee 38301

Project 2322-88-1107

Subject: North American Rayon Corp. (NARC)
Ammended Closure Plan

Dear Mr. Potts:

The above referenced closure plan submitted on this date was found to contain an error in sample preservation for liquid samples analyzed for total sulfides. Enclosed are four copies of the ammended plan with this error corrected.

Please pardon any inconvenience this has caused.

Sincerely,

Westinghouse HAZTECH, Inc.

Laura Harris

Laura Harris
Project Manager

ENC

cc: Lou Raasch
Melissa McGuire
O.J. Winfield

DOCKET NO. 000106

COR 000002

T095051207

EXECUTIVE SUMMARY

- North American Rayon Corporation, Elizabethton, Tennessee, was constructed in 1928 for production of continuous filament rayon fiber and vinyl fabric.

- The Tennessee Department of Health and Environment inspected the facility and determined that a surface impoundment had received spent sulfuric acid, and a waste pile located on-site contained lead debris, both characteristic hazardous wastes. Both waste management units will be closed.

- Closure of both waste management units will involve removal of all hazardous waste and waste residues from the waste management units. Ground-water monitoring is currently being performed around the lagoon area to document ground-water quality beneath the basin.

DOCKET NO. 000106

COR 000003

T095051207

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FIGURES

Figure 1 - Location of waste pile storage area
Figure 2 - NARCO emergency spill diversion basin: sample transects and sample points
Figure 3 - Sample locations October 11, 1988
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Figure 5 - General schedule for closure of waste pile storage area and emergency spill diversion basin

TABLES

Table 1 - Analytical Results of Sludge Sampling May 19, 1988
Table 2 - Analytical Data for Samples Collected October 11, 1988 and March 8, 1989

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1.0 INTRODUCTION

North American Rayon Corporation (NARCo), Elizabethton, Tennessee (TN) was constructed in 1928. NARCo conducts viscose manufacturing of textile and industrial continuous filament rayon fiber and vinyl fabric.

On November 18, 1987 a Hazardous Waste Generator Inspection was performed at NARCo by Darrell Hale with the TN Department of Health and Environment (TN DHE). It was determined that a surface impoundment (SI) had received spent sulfuric acid, a characteristic hazardous waste (EPA ID No. D002), and that a waste pile had received lead debris, also a characteristic waste (EPA ID No. D008).

This closure plan has been developed for NARCo in response to a March 24, 1988 Notice of Violation submitted to NARCo by the TN DHE and includes revisions requested in a September 22, 1988 Notice of Deficiency submitted to Baker, Worthington Law firm regarding the NARCo closure plan. The closure plan has been divided into sections to address closure of each of the above-mentioned hazardous waste management units. This plan has been developed in accordance with Rules 1200-1-11-.05 (7) (a)-(f), 11 (g) and 12 (h) of the TN DHE regulations governing hazardous waste management.

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2.0 WASTE PILE CLOSURE

NARCo began accumulating lead debris on an asphalt pad, approximately 105 ft x 26 ft, located on the southeast side of the plant (figure 1) in 1975. This practice ceased November 18, 1987. The debris consists of lead pipes and equipment parts resulting from overhaul of certain machinery. NARCo received verbal approval from Darrell Hale with the TN DHE to arrange for a recycler to take reclaimable materials from the waste pile. After the recycler has taken the majority of debris, it is anticipated that clean closure can be obtained by collecting the remaining solids for disposal at a permitted hazardous waste landfill and high pressure washing of the asphalt pad. A berm will be constructed around the pad and a sump formed within the bermed area. Polyethlene will be used to prevent wash water from coming in contact with soils. Wash water collected in the sump is to be conveyed to the on-site water treatment plant by purging into an influent pipeline to the treatment plant. Solids collected on liners will be disposed of at a permitted hazardous waste landfill. Liners associated with wash water collection will also be disposed of at the hazardous waste landfill.

It is estimated that less than 4000 gallons (gal) of wash water will be generated during waste pile closure. This water will be conveyed to the water treatment sewer gradually, as it is accumulated. Pumping rates are expected to be approximately 10-20 gallons per minute (gpm). This wash water will contain particulate lead, which will be precipitated by chemical treatment and removed by filtration in the waste water treatment plant. No surfactants or solvents will be used in closing the waste pile and therefore, will not be constituents in the wash water. The treatment plant normally handles 5 to 6 million gallons per day (MGD). The addition of a few thousand gallons of wash water should have little or no effect on the normal operation of the treatment plant.

To document the effectiveness of washing, the asphalt pad will be swab sampled prior to, and following, closure. Swab samples will be collected in the following manner:

- A Whatman No. 2 filter paper, moistened with a solution of distilled water and 5% nitric acid, will be used to collect the samples;
- Three 100-cm^2 areas will be swabbed in a cross-hatched pattern;
- The 3 areas to be sampled will be equally spaced along the pad;
- Clean sample gloves will be worn when handling swabs and when sampling;

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- Each area to be sampled will be done so with an unused, clean swab;

- All three swabs will be folded, placed in the same glass container, and shipped to an off-site laboratory for total lead analysis.

The above procedure is to be done before and after washing the pad. Laboratory analysis of a set of 3 swabs (a composite) will indicate the average amount of lead present per unit area of the asphalt pad (300 cm^2 total area sampled per composite).

2.1 Estimate of Maximum Waste Inventory

Rule 1200-1-11-.05(7)(c)2.(iii) requires an estimate of the maximum inventory of wastes in storage and in treatment at any time during the life of the facility.

NARCo entered into an agreement with a recycler for collection of approximately 150,000 pounds (lbs) of material from the waste pile. Presently, the majority of debris has already been removed by the reclaimer. The debris is comprised of lead pipes and machine parts which have lead components. The estimate above includes any aluminum, steel, or iron material which may be included in the waste debris. After the recycler has completed removal to the extent practicable, a certified contractor will collect the remaining dry residue, wash the asphalt pad, and dispose of solids at a hazardous waste landfill. Therefore, the amount of lead contaminated material requiring disposal at the landfill will be minimal. Furthermore, less than 4000 gallons of wash water are expected to accumulate and be diverted to NARCo's on-site water treatment system.

2.2 Decontamination of Facility Equipment

Rule 1200-1-11-.05(7)(c)1.(iii) requires a description of the steps needed to decontaminate facility equipment during closure. It is anticipated that equipment remaining at the facility will not require decontamination because no facility equipment will be used, or otherwise exposed to, waste during closure of the waste pile.

Equipment used in cleaning the asphalt pad, such as personnel protective gear and shovels, will be decontaminated by pressure washing or disposed of with other lead contaminated debris.

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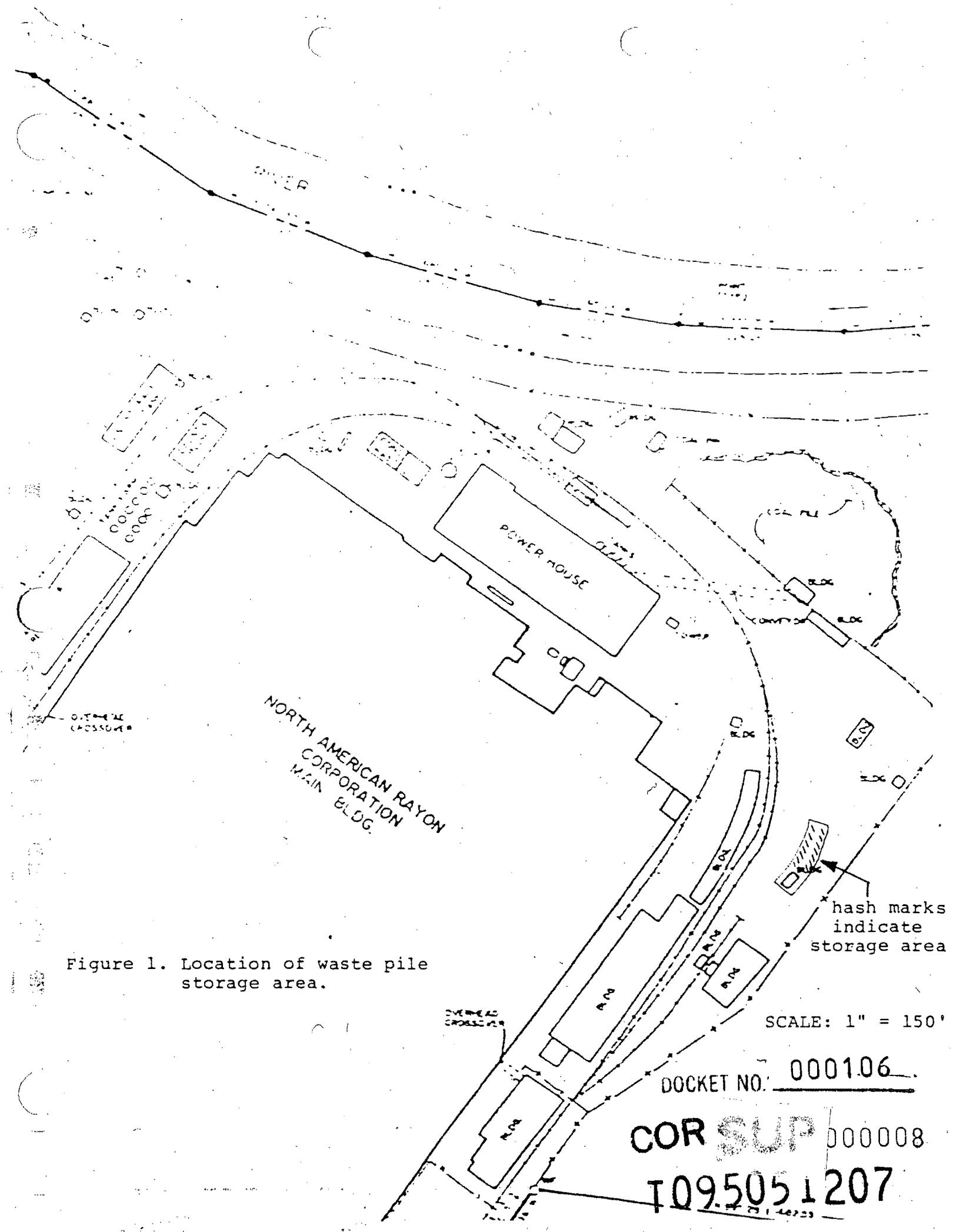

Figure 1. Location of waste pile storage area.

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3.0 CLOSURE OF EMERGENCY SPILL DIVERSION BASIN

The SI of concern is 1 of 4 basins as indicated in figure 2. The other 3 SIs are settling and drying basins, associated with NARCo's National Pollutant Discharge Elimination System (NPDES) program, receiving a non-hazardous fly-ash and water mixture.

On May 19, 1988 Westinghouse HAZTECH sampled sludge in the diversion basin along transects indicated in figure 2. Three (3) points along each of 5 transects were sampled. The depth of sludge at T1 was 3 feet (ft) on the date of sampling, the remainder of the SI contained 1 ft or less of sludge. Table 1 presents analytical data obtained from this sampling.

On October 11, 1988, Westinghouse HAZTECH personnel sampled sludge in the SI for a second time to further assess the hazardous characteristics of the waste. Discrete samples were collected at the locations shown in Figure 3. The sample collected from location "F" in section 1 (sample 1F) was submitted for EP Toxicity selenium analysis. Samples from locations A,B,C,D, and E of each section were composited and submitted for reactive sulfide analysis and flash point determination. Analytical results are presented in Table 2. A portion of the material collected was reserved, for further analysis, to study the characteristics of the homogenized waste and/or for profile analysis. However, the samples were not properly cooled due to an equipment failure.

On March 8, 1989 Westinghouse HAZTECH sampled sludge in the SI for a third time to replace the material discussed above. Discrete samples were collected at the locations shown in figure 4. Within each quadrant, discrete samples were composited. One composite sample was prepared from the quadrant samples and submitted for flash point, reactive sulfide, and E.P. Toxicity selenium analysis. The purpose of these analyses was to study material indicative of the homogenized sludge. Analytical data are included on Table 2.

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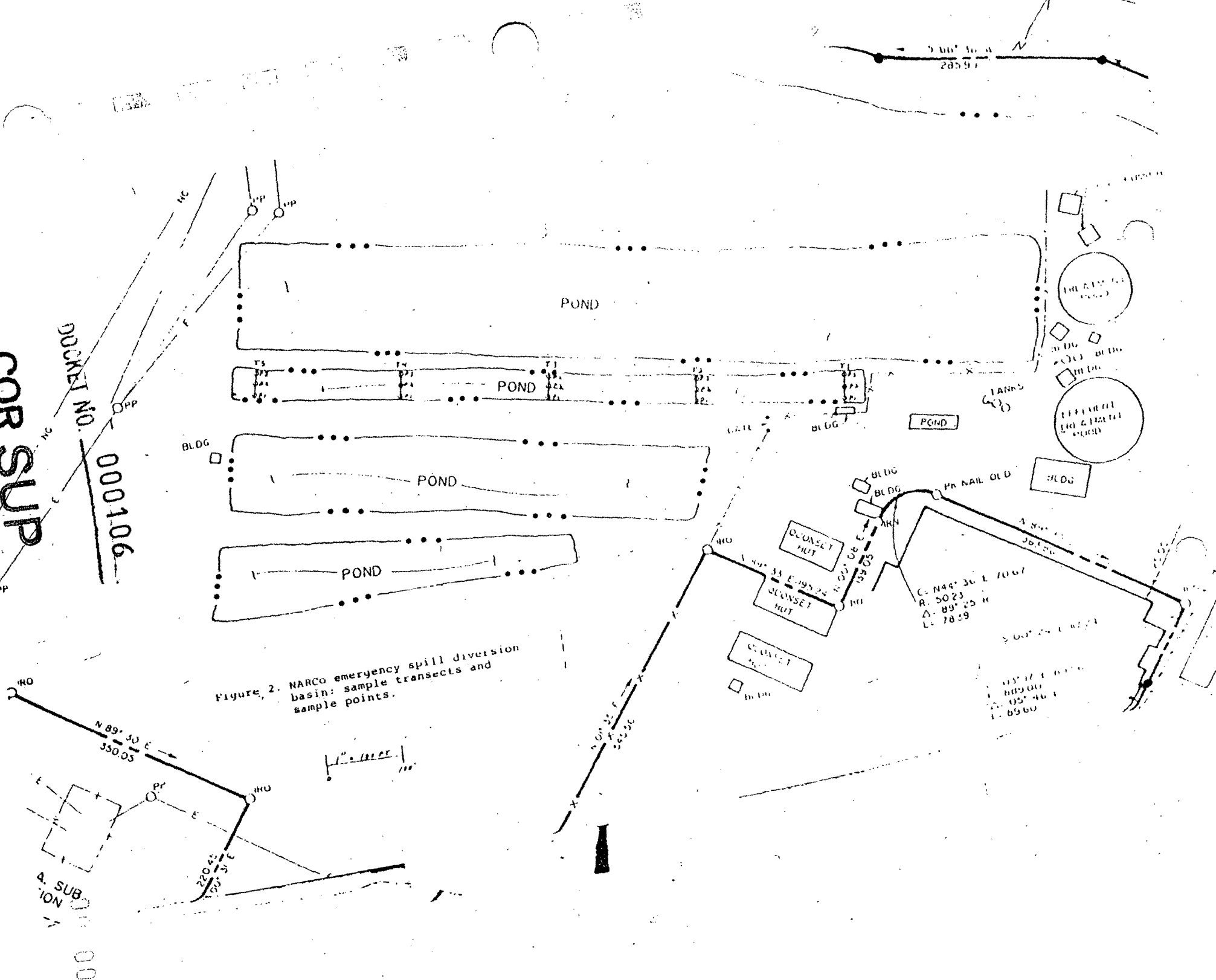

Figure 2. NARCo emergency spill diversion basin: sample transects and sample points.

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TABLE 1. ANALYTICAL RESULTS OF
SLUDGE SAMPLING MAY 19, 1988

Volatile Organic Compounds

	T1,P3 (3-ft)	T3,P2 (1-ft)	T4,P3 (1-ft)	Detection Limit
	ppm			
1,1-Dichloroethylene	N.D*	N.D.	N.D.	0.025
Methylene Chloride	N.D.	N.D.	N.D.	0.025
1,2-Dichloroethylene	N.D.	N.D.	N.D.	0.025
1,1-Dichloroethane	N.D.	N.D.	N.D.	0.025
Chloroform	N.D.	N.D.	N.D.	0.025
1,1,1-Trichloroethane	N.D.	N.D.	N.D.	0.025
Carbon Tetrachloride	N.D.	N.D.	N.D.	0.025
1,2-Dichloroethane	N.D.	N.D.	N.D.	0.025
Trichloroethylene	N.D.	N.D.	N.D.	0.025
1,2-Dichloropropane	N.D.	N.D.	N.D.	0.025
Bromodichloromethane	N.D.	N.D.	N.D.	0.025
Trans-1,3-Dichloropropene	N.D.	N.D.	N.D.	0.025
Cis-1,3-Dichloropropene	N.D.	N.D.	N.D.	0.025
1,1,2-Trichloroethane	N.D.	N.D.	N.D.	0.025
1,1,2,2-Tetrachloroethylene	N.D.	N.D.	N.D.	0.025
Dibromochloromethane	N.D.	N.D.	N.D.	0.025
Chlorobenzene	N.D.	N.D.	N.D.	0.025
Bromoform	N.D.	N.D.	N.D.	0.025
1,1,2,2-Tetrachloroethane	N.D.	N.D.	N.D.	0.025
1,3-Dichlorobenzene	N.D.	N.D.	N.D.	0.025
1,4-Dichlorobenzene	N.D.	N.D.	N.D.	0.025
1,2-Dichlorobenzene	N.D.	N.D.	N.D.	0.025
Benzene	N.D.	N.D.	N.D.	0.025
Toluene	N.D.	N.D.	N.D.	0.025
Ethyl Benzene	N.D.	N.D.	N.D.	0.025
M-Xylene	N.D.	N.D.	N.D.	0.025
P-Xylene	N.D.	N.D.	N.D.	0.025
O-Xylene	N.D.	N.D.	N.D.	0.025

* N.D. - Not Detected

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TABLE 1. (Continued)

EP Toxicity Metals and pH

Sample	Depth (ft)	pH (s.u.)	Ag	As	Ba	Cd	Cr	Hg	Pb	Se	Sn	Ni
			ppm									
T1,P3	3	7.18	<0.10	0.05	0.37	0.01	0.05	<0.01	<0.03	0.73	0.17	0.16
T1,P2	2	7.61	<0.10	0.05	0.81	<0.01	0.03	<0.01	0.03	1.05	0.15	0.11
T1,P1	1	8.00	<0.10	0.05	0.78	<0.01	0.02	<0.01	0.03	0.63	0.12	0.10
T2,P3	1	7.12	<0.10	0.05	0.19	<0.01	0.02	<0.01	<0.03	0.53	0.12	0.09
T2,P2	1	7.26	<0.10	0.05	0.34	<0.01	0.01	<0.01	<0.03	0.35	0.03	0.06
T2,P1	1	6.77	<0.10	0.05	0.17	<0.01	0.01	<0.01	0.03	0.33	0.07	0.01
T3,P3	1	6.25	<0.10	0.05	0.42	<0.01	0.01	<0.01	<0.03	0.22	0.10	0.05
T3,P2	1	4.25	<0.10	0.05	0.06	<0.01	<0.01	<0.01	0.03	0.09	0.02	0.08
T3,P1	1	5.24	<0.10	0.05	0.10	<0.01	<0.01	<0.01	0.03	0.03	0.02	0.02
T4,P3	1	5.38	<0.10	0.05	0.11	<0.01	<0.01	<0.01	0.03	0.03	0.04	0.02
T4,P2	1	6.29	<0.10	0.05	0.19	<0.01	0.01	<0.01	<0.03	<0.03	0.01	0.01
T4,P1	1	6.42	<0.10	<0.05	0.19	<0.01	<0.01	<0.01	0.03	0.03	0.06	0.01
T5,P3	1		Sample Lost due to Broken Container									
T5,P2	1	6.72	<0.10	0.05	0.57	<0.01	<0.01	<0.01	0.03	0.22	0.06	0.14
T5,P1	1		Sample Lost due to Broken Container									

Other Parameters

Sample	Depth (ft)	Phenols	Cyanide	Sulfide	Zinc (total)
		ppm			
T1,P3	3	0.08	N.D.*	14,000	1420
T3,P2	1	N.D.	N.D.	490	1685
T4,P3	1	N.D.	N.D.	10,000	578

* N.D. - Not Detected

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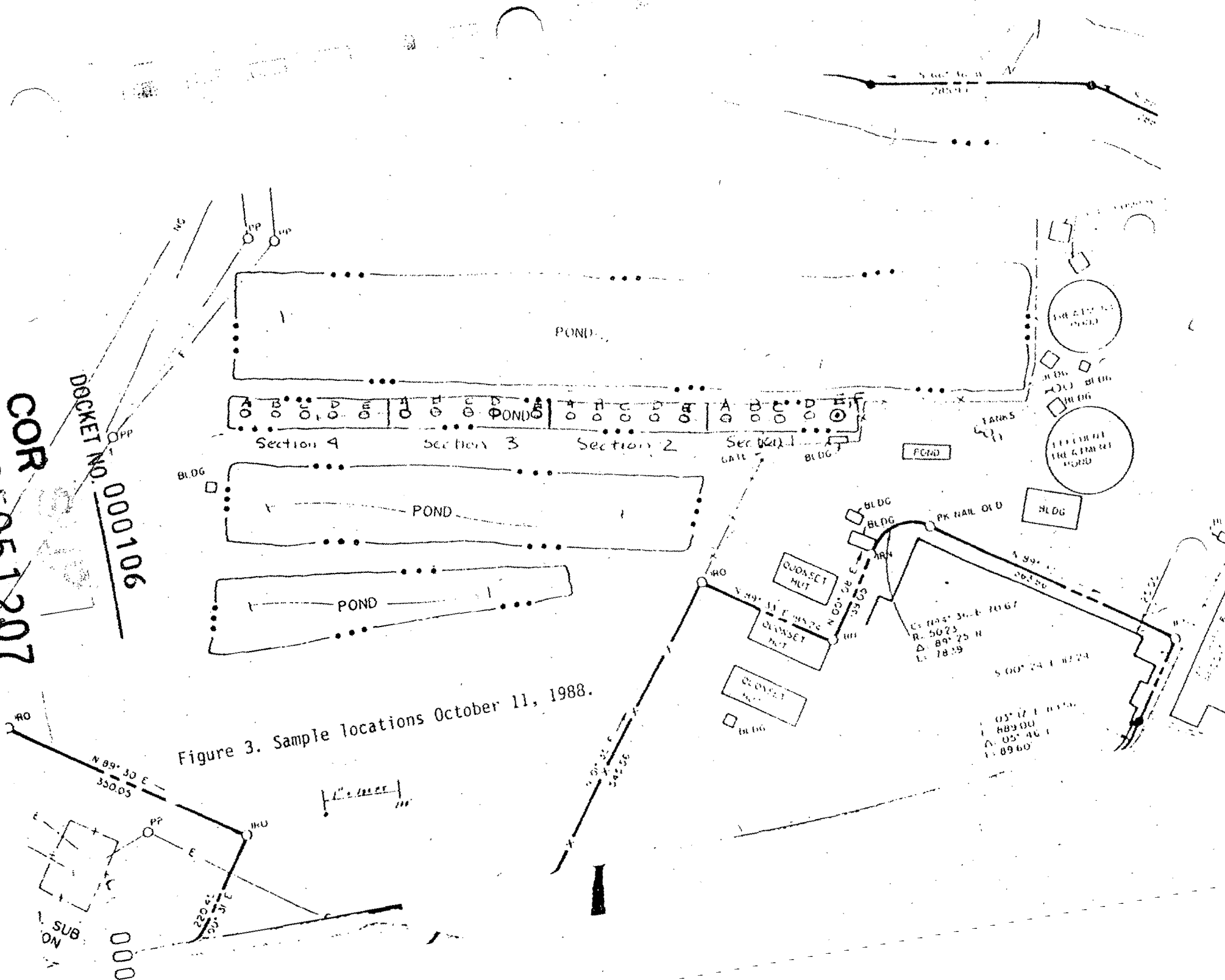

Figure 3. Sample locations October 11, 1988.

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TABLE 2.
ANALYTICAL DATA FOR SAMPLES
COLLECTED OCTOBER 11, 1988

Location	Flash Point	Reactive Sulfide (ppm)	EP Toxicity Selenium (ppm)
Section 1 - ABCDE	60.2	<18.1	NA*
Section 2 - ABCDE	56.2	352	NA
Section 3 - ABCDE	>65.2	162	NA
Section 4 - ABCDE	>65.2	NA	<0.005

*NA = Not Analyzed

ANALYTICAL DATA FOR COMPOSITE
SAMPLE COLLECTED MARCH 8, 1989

Location	Flash Point	Reactive Sulfide (ppm)	EP Toxicity Selenium (ppm)
Section 1,2,3,4	>65.2	662	<0.005

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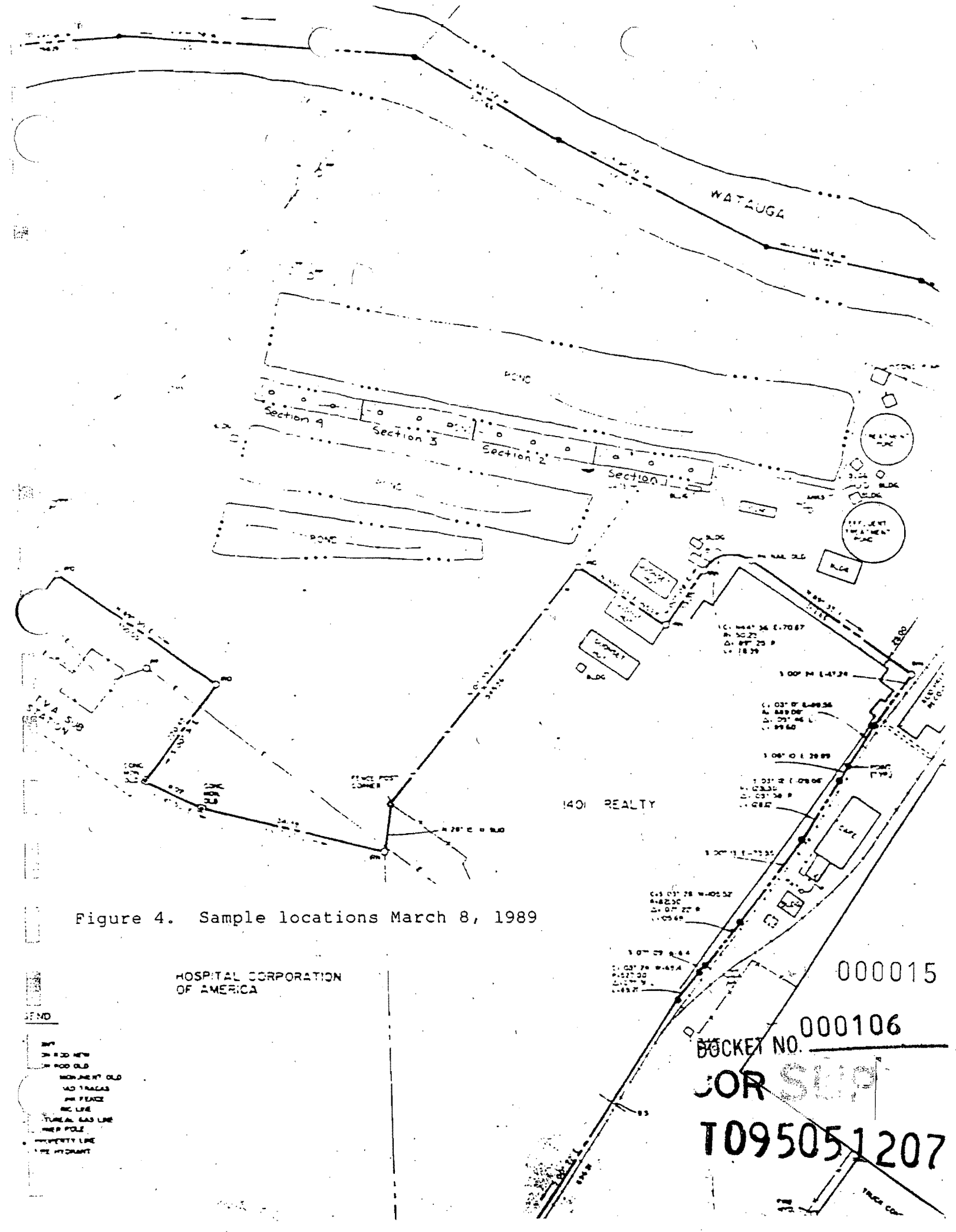

Figure 4. Sample locations March 8, 1989

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Division of Solid Waste Management
Date 5/10/89 File No.
Received by JJ

Westinghouse
Environmental Services

Westinghouse HAZTECH, Inc.

5280 Panola Industrial Boulevard
Decatur, Georgia 30035
(404) 981-9332
(404) 981-9339 (24 Hr.)
FAX (404) 981-1786

May 5, 1989

Mr. Randy Curtis
Geologist
Tennessee Department of
Health and Environment
1733 Sunset Drive
Johnson City, Tennessee 37601

Subject: North American Rayon Corporation (NARC)
March 18, 1989 Notice of Violation

Dear Mr. Curtis:

This letter is written in reponse to the above-referenced Notice of Violation regarding ground-water sampling at the NARC site in March of this year.

The following discussions are based on information obtained from the references listed below:

- o Standard Methods for the Examination of Water and Wastewater. Sixteenth edition.
- o Methods for the Chemical Analysis of Water and Wastes. EPA, 1983.
- o Test Methods for Evaluating Solid Wastes: Physical/Chemical Methods (SW 846). Third edition.
- o Handbook for Sampling and Sample Preservation of Water and Wastewater. EPA, 1982.
- o RCRA Ground-water Monitoring Technical Enforcement Guidance Document (TEGD). EPA, 1986.

After reviewing the various analytical methods it is apparent that revisions to the NARC ground-water sampling and analysis plan are required. A revised plan will be submitted to your office when available.

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TOC

TOC bottles provided by the lab were not as requested. Attached is a copy of correspondence to RCRA Analytical requesting certain sample containers and analyses for this monitoring event. Pleas note that amber glass bottles with teflon lids were requested.

Most of the above references recommend glass containers, and that the sample be protected from sunlight. Standard Methods and SW 846 do not indicate that sample containers should have no headspace. The containers provided by RCRA for TOC samples are designed such that it is impossible to close the container without trapping air bubbles. Efforts were made to reduce the amount of air trapped in the sample containers as much as possible. Also, the method descriptions do not indicate that sample volume effects quality of analytical data.

Based on the above information, Westinghouse HAZTECH request that the TOC data associated with this sample event be considered viable. Further, the surface impoundment of concern has been sampled and has not demonstrated the presence of volatile organic compounds which would contribute to the volatile fraction of TOC.

Nitrate

Westinghouse HAZTECH also requested a certain container(s) for samples for nitrate analysis. The laboratory erred in combining nitrate with fluoride, sulfate, and chloride, which do not require chemical preservatives. The manuals referenced above indicate that unpreserved nitrate samples must be analyzed within 48 hours. The samples for nitrate analysis were not analyzed within this time frame. While the nitrate results may be suspect due to this, it is felt that the data should be kept on record, as opposed to not having the data on record at all.

Coliform Bacteria

The sample containers used for coliform analyses were correct for the concentrations of coliform colonies previously detected at the site. Standard Methods indicates that 50 - 100 ml of sample be filtered when well and spring water is being analyzed. SW 846 recommends that a sample container of 120 ml or more be used, and that 2.5 cm of headspace be left in the container after filling. Westinghouse HAZTECH feels that there is no basis to suspect coliform data associated with this sample event as being invalid.

Sequence of Sample Withdrawal

While the sample withdrawal sequence presented in the sampling and analysis plan was not strictly adhered to, it is over ambitious to disregard the validity of analytical data on this basis. The sequence presented in the sampling and analysis plan is based on "a preferred order of collection" presented in the TEGD. No highly volatile parameters are analyzed in NARC wells 1, 2, 3, and 4, which were sampled in March of this year. Deviation from a preferred order in this instance should not cause analyses to be suspect.

Further, the sample enters the sample pump at a point within the water column in the well that may be as much as 20 feet below the water table surface. The sample is not exposed to atmospheric conditions as would be a sample collected by bailing, where the sample point is near the water table surface in close proximity to atmospheric conditions.

Westinghouse HAZTECH will revise the current sampling and analysis plan and submit to your office as soon as it is available. Please contact me at (404) 981-9332 if you would like to discuss this further.

Sincerely,

Westinghouse HAZTECH, Inc.

Laura Harris

Laura Harris
Project Manager

ENC

cc: Lou Raasch
Melissa McGuire

DOCKET NO. 000109

COR 000004
T095051207

RECEIVED
Division of Solid Waste Management
Date 5/10/89 File No.
Received by

Westinghouse
Environmental Services

Westinghouse HAZTECH, Inc.

5280 Panola Industrial Boulevard
Decatur, Georgia 30035
(404) 981-9332
(404) 981-9339 (24 Hr.)
FAX (404) 981-1786

TN-2-102

May 5, 1989

Mr. Randy Curtis
Geologist
Tennessee Department of
Health and Environment
1733 Sunset Drive
Johnson City, Tennessee 37601

Subject: North American Rayon Corporation
Transmittal of Ground-water Analytical Data
For March 1989 Sampling

Dear Mr. Curtis:

Westinghouse HAZTECH is pleased to provide you the above-referenced analytical data. The data are presented in the attached tables. A ground-water elevation contour map is also attached.

The EPA drinking water standard for fluoride was exceeded in samples collected from MW4. With this exception, all wells demonstrated compliance with EPA drinking water standards.

Please contact me at (404) 981-9332 if you require additional information.

Sincerely,

Westinghouse HAZTECH, Inc.

Laura Harris

Laura Harris
Project Manager

ENC

cc: Lou Raasch
Melissa McGuire

DOCKET NO. 000108
COR 000001
T095051207

NORTH AMERICAN RAYON CORPORATION

ANALYTICAL DATA FOR GROUND-WATER SAMPLES
COLLECTED MARCH 8 AND 9, 1989

Parameters characterizing suitability of ground-water as a drinking water supply:

	Units	MW1	MW2	MW3	MW4	EPA Standard
Arsenic	ppm	<0.0002	<0.0002	0.0034	0.0003	0.05
Mercury	ppm	<0.0008	<0.0008	<0.0008	<0.0008	0.002
Selenium	ppm	<0.0008	<0.0008	<0.0008	<0.0008	0.01
Barium	ppm	0.08	0.02	0.05	0.01	1
Cadmium	ppm	<0.004	<0.004	<0.004	<0.004	0.01
Chromium	ppm	0.009	0.009	<0.005	<0.005	0.05
Lead	ppm	<0.025	0.007	0.03	<0.025	0.05
Silver	ppm	<0.007	<0.007	<0.007	0.0003	0.05
Nitrate	ppm	1.1	<0.1	<0.1	0.46	10
Fluoride	ppm	0.12	0.18	0.45	2.5	1.4-2.4
Coliform	col/100 ml	<1	<1	<1	<1	1
Endrin	ppb	<0.03	<0.03	<0.03	<0.03	0.2
Lindane	ppb	<0.008	<0.008	<0.008	<0.008	4
Methoxychlor	ppb	<0.30	<0.30	<0.30	<0.30	100
Toxaphene	ppb	<1.12	<1.12	<1.12	<1.12	5
2,4-D	ppb	<5.2	<5.2	<5.2	<5.2	100
2,4,5-TP	ppb	0.95	<0.1	<0.1	<0.1	10
Radium	pCi/l	<0.1	0.2	<0.1	<0.1	5
Gross Alpha	pCi/l	4	7	<5	7	15
Gross Beta	pCi/l	6	8	14	47	4 millirem/yr

Parameters establishing ground-water quality:

	Units	MW1	MW2	MW3	MW4
Iron	ppm	0.51	0.22	0.95	0.05
Manganese	ppm	0.26	6.81	1.77	0.44
Sodium	ppm	58.83	407.04	486.97	194.77
Phenols	ppm	<0.010	<0.010	<0.010	<0.010
Chloride	ppm	6.22	17.1	22.7	9.4
Sulfate	ppm	233.45	1200.39	952.24	493.35

DOCKET NO. 000108

COR- 000002
T095051207

Parameters used as indicators of ground-water contamination:

	Units		MW1	MW2	MW3	MW4
pH	s.u.		7.48	6.67	7.25	9.68
			7.49	6.48	7.3	9.7
			7.51	6.47	7.33	9.75
			7.54	6.46	--	9.83
		mean	7.505	6.52	7.293333	9.74
Conductivity	umhos/cm		640	2100	2250	920
			638	2050	2260	950
			630	2100	--	930
			635	2100	--	950
		mean	635.75	2087.5	2255	937.5
TOC	ppm		0.49	1.75	5.14	1.64
			0.55	1.79	5.18	1.54
			0.58	1.83	5.43	1.49
			0.52	1.75	5.3	1.51
		mean	0.535	1.78	5.2625	1.545
TOX	ug/l		<5.0	16	29	15
			<5.0	18	29	7.5
			<5.0	21	35	15
			<5.0	14	44	7.9
		mean	<5.0	17.25	34.25	11.35
Temperature	degrees C		13.2	17.3	14.4	14
Water Elev.	ft-msl		1461.85	1472.76	1484.87	1464.55

DOCKET NO: 000108

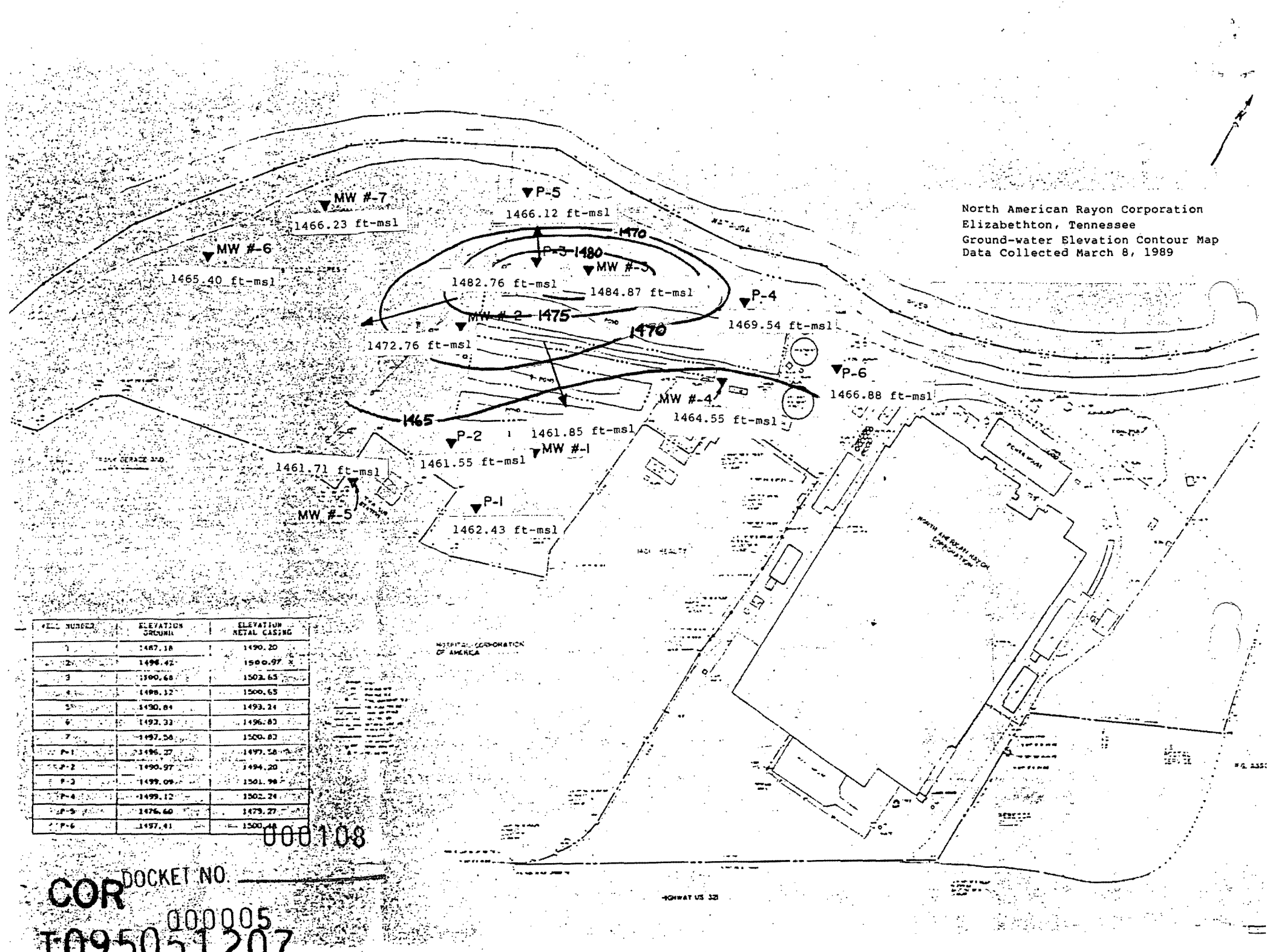
COR 000003
T095051207

Quality Control/Quality Assurance Data:

	Units	MW1 Dup	Blank
Arsenic	ppm	<0.0002	<0.0002
Mercury	ppm	<0.0008	<0.0008
Selenium	ppm	<0.0008	<0.0008
Barium	ppm	0.09	<0.001
Cadmium	ppm	<0.004	<0.004
Chromium	ppm	0.009	0.007
Lead	ppm	<0.025	<0.025
Silver	ppm	0.01	<0.007
Iron	ppm	1.05	<0.005
Manganese	ppm	0.38	0.002
Sodium	ppm	59.09	0.15
Fluoride	ppm	--	<0.1
Chloride	ppm	--	0.77
Nitrate	ppm	--	<0.1
Sulfate	ppm	--	<2
TOC	ppm	--	0.31
Coliform	col/100 ml	--	<1

000108
DOCKET NO.
COR 000004
T095051207

North American Rayon Corporation
Elizabethton, Tennessee
Ground-water Elevation Contour Map
Data Collected March 8, 1989



WELL NUMBER	ELEVATION GROUND	ELEVATION METAL CASING
1	1487.18	1490.20
2	1498.42	1500.97
3	1500.68	1503.65
4	1498.12	1500.65
5	1490.84	1493.24
6	1493.33	1496.83
7	1497.56	1500.83
P-1	1496.27	1497.58
P-2	1490.97	1494.20
P-3	1499.09	1501.98
P-4	1499.12	1502.24
P-5	1476.60	1479.27
P-6	1497.41	1500.48

000108

COR DOCKET NO. _____

000005

T095051207

10-23 90

BAKER, WORTHINGTON, CROSSLEY, STANSBERRY & WOOLF
ATTORNEYS AT LAW
NORTHEAST TENNESSEE OFFICE
207 MOCKINGBIRD LANE
POST OFFICE BOX 3038 CRS
JOHNSON CITY, TENNESSEE 37602
TELEPHONE 615 928-0181
TELECOPIER 615 928-5694

KNOXVILLE, TENNESSEE 37902
BANK OF EAST TENNESSEE BUILDING
TELEPHONE 615 549-7000
TELECOPIER 615 525-8569

NASHVILLE, TENNESSEE 37219
1700 NASHVILLE CITY CENTER
TELEPHONE 615 726-5600
TELECOPIER 615 726-0464

WASHINGTON, D.C. 20004
1001 PENNSYLVANIA AVENUE, N.W.
TELEPHONE 202 347-4360
TELECOPIER 202 347-4540

HUNTSVILLE, TENNESSEE 37756
COURTHOUSE SQUARE
TELEPHONE 615 663-2321
TELECOPIER 615 663-2111

HENDERSONVILLE, TENNESSEE 37075
MAPLE GLEN OFFICE BUILDING
TELEPHONE 615 822-8822
TELECOPIER 615 824-4684

RECEIVED
Division of Solid Waste Management
Date 6/5/89 File No.
Received by

June 2, 1989

Mr. Larry Gilliam
Tennessee Department of
Health and Environment
1733 Sunset Drive
Johnson City, Tennessee 37601

RE: North American Rayon Corporation - Groundwater Monitoring

Dear Mr. Gilliam:

In the Notice of Violation issued to North American Rayon on March 18, 1989, Randy Curtis required that all violations be corrected no later than June 15, 1989. Westinghouse Haztech is in the process of arranging the next quarterly groundwater sampling at the North American site. On behalf of North American, I would like to request an extension until June 30 to complete this sampling.

Thank you for your assistance in this matter. Please let us know if the extension is acceptable.

Sincerely yours,

Melissa M. McGuire

Melissa M. McGuire

ssr
cc: Lou Raasch
Laura Harris

DOCKET NO. 000110
COR 000001
T095051207

10-03

92

RECEIVED

Division of Solid Waste Management

Date 6/12/89 File No.

Received by

Westinghouse
Environmental Services

Westinghouse HAZTECH, Inc.

5280 Panola Industrial Boulevard
Decatur, Georgia 30035
(404) 981-9332
(404) 981-9339 (24 Hr.)
FAX (404) 981-1786

June 7, 1989

Mr. Lynn Patillo
City of Elizabethton
P.O. Box 6040
Elizabethton, Tennessee 37644

TN-L-442

Subject: Bemberg Superfund Site Upgradient Well
North American Rayon Corporation (NARC)
Project No. 2322-88-1107

Dear Mr. Patillo:

Last Friday I spoke with Randy Curtis and Mike Moody, both with the Tennessee Department of Health and Environment, Johnson City office, regarding the possibility of using the Bemberg upgradient well as part of a ground-water monitoring system for North American Rayon. Both Mr. Moody and Mr. Curtis approved of this practice. Mr. Moody indicated that I should pursue this matter with you.

Westinghouse HAZTECH, Inc. installed 7 wells and 6 piezometers at the NARC plant. To be in compliance with state and federal regulations, NARC's ground-water monitoring system must have at least one upgradient well capable of yielding ground-water samples unaffected by the facility. However, due to a mound in the water table created by recharge from 4 surface impoundments located in the study area, all locations away from the impoundments are hydraulically downgradient of the study area. There is no location for an upgradient well unaffected by the facility on NARC property.

On behalf of NARC, I am writing this letter to request that NARC be given access to the Bemberg upgradient well for use as part of their ground-water monitoring system. NARC will be performing a sample event this month, and wishes to include the upgradient Bemberg well in this sampling. NARC will need to perform 4 sample events from June to December. After December, NARC will require access to the well biannually. Occasionally, they may need additional access to verify data which indicates their facility may be impacting ground-water quality beneath their facility.

DOCKET NO. 000111
COR 000001
T095051207

Mr. Patillo, please feel free to contact Mr. Moody or Mr. Curtis in the Johnson City field office to discuss this matter. I would appreciate any effort on your behalf to expedite this matter. Please contact me at (404)981-9332 so we can discuss this further.

Sincerely,

Westinghouse HAZTECH, Inc.

Laura Harris

Laura Harris
Project Manager

cc: Lou Raasch
Melissa McGuire
Randy Curtis

DOCKET NO. 000111
COR 000002
T095051207

10-23

94

RECEIVED
Division of Solid Waste Management
Date 6/14/89 File No.
Received by Federal Express

Westinghouse
Environmental Services

Westinghouse HAZTECH, Inc.

5280 Panola Industrial Boulevard
Decatur, Georgia 30035
(404) 981-9332
(404) 981-9339 (24 Hr.)
FAX (404) 981-1786

June 13, 1989

Mr. Randy Curtis
Tennessee Department of
Health and Environment
1733 Sunset Drive
Johnson City, Tennessee 37601

TN-L-442

Subject: Ground-water Sampling at North American Rayon and Thomas Industries Week of June 19, 1989

Dear Mr. Curtis:

Please be advised that Westinghouse HAZTECH, Inc. will mobilize to Johnson City on Monday, June 19, 1989 for purposes of conducting the above referenced sampling. Westinghouse will begin sampling activities at North American Rayon (NARC) in Elizabethton on Tuesday, June 20, 1989, at approximately 8:00 AM. It is expected that 2 days will be required to complete sampling at NARC. Upon completion of NARC, Westinghouse will begin sampling at Thomas Industries in Johnson City. It is currently unknown whether or not Thomas will be started on the same day that NARC is finished, or on the following morning. Most likely, work will not begin at Thomas until the following day (Thursday).

Please call me at (404) 981-9332 if you have questions regarding this work.

Sincerely,

Westinghouse HAZTECH, Inc.

Laura Harris

Laura Harris
Project Scientist

cc: Gary Shockley
Melissa McGuire

DOCKET NO. 000113

COR 000001
T095051207

TENNESSEE DEPARTMENT OF HEALTH AND ENVIRONMENT

OFFICE CORRESPONDENCE

FROM	TO	DATE
RMC	File	06/14/89

DATE: June 14, 1989

TO: File

FROM: Randy M. Curtis

SUBJECT: NARC (TND 09-505-1207) Ground Water Sampling and Analysis

During a CME inspection conducted March 8, 1989 at North American Rayon Company, I noted certain deviations from the facility's Sampling and Analysis Plan. A NOV was issued for not having an upgradient background well and for not following certain requirements of the approved plan. The facility was informed that the Division might have to regard the data generated from this event as flawed.

Subsequent to the issuance of the NOV, Westinghouse Haztech, Inc., the consultants for the facility, responded with an explanatory letter addressing my specific concerns and indicating that a revised Sampling and Analysis Plan would be submitted. Haztech requested that the data be considered valid or adequate for retention.

My primary concerns were for TOC, TOX, coliform bacteria, and nitrate. Haztech's arguments, coupled with my own research and conversations with State and EPA lab personnel, led to the conclusion that the TOC data is viable for consideration for the purposes required by the Hazardous Waste Regulations. Similarly, the coliform bacteria numbers may be used with a fair degree of confidence.

FROM	DATE
RMC	6/16
TO	
TDH	
WEK	

The numbers on TOX and nitrate are of more concern because of possible problems due to sampling or preservation. I told Ms. Laura Harris of Haztech, in a telephone conversation on June 2, 1989, that the Division would defer a final decision on TOX and nitrate until a subsequent event has yielded samples of unquestioned veracity, for comparison. I told her during the same conversation that TOC and coliform bacteria data would be accepted.

There is also a separate question of an analytical nature involving the data generated by the detection monitoring program at NARC. This involves the initial detection of arsenic and selenium at levels above the maximum contaminant levels listed in Appendix .05/B. After two (2) sampling events the analytical method for these constituents was changed and the levels detected dropped dramatically to a point well below the mcl. This was attributed to

interference from calcium or aluminum which affected the inductively coupled plasma spectroscopy, but not the Atomic Absorption Method, which was adopted after the 2nd event.

To be sure that the AA method numbers are an accurate reflection of the situation at NARC;, I intend to split samples with the facility for As, Se,and Ca on the 4th quarter event. I have discussed the situation with Mr. Edward McCrary of the Knoxville Lab and Mr. Craig Edwards of the Nashville Lab. The Knoxville Lab has an ICPS unit if I feel the need to use it as a verification tool.

R. M. C.

RMC/14139166 10-23 97

DOCKET NO: 000114
COR 000002
T095051207

Doyle Javier

TN-L-422

Tennessee Department of Health and Environment
Bureau of Environment
1733 Sunset Drive
Johnson City, Tennessee 37601-3621

RECEIVED
EPA/REGION IV
JUN 22 1 18 PM '89
WASTE
COMPLIANCE SECTION

June 15, 1989

Dr. Lou Raasch, Environmental Services Manager
North American Rayon Corporation
West Elk Avenue
Elizabethton, Tennessee 37643

RE: Extension of Compliance Date for March 19, 1989 NOV
TND 09 505 1207

Dear Dr. Raasch:

Your request for an extension of the compliance date for sampling of the groundwater monitoring system from June 15, 1989 until June 30, 1989 is approved.

It is my understanding that NARC hopes to utilize the upgradient well from the adjacent Bemberg site in lieu of attempting to locate an upgradient background well on NARC property. The Division has received a revised Ground Water Sampling and Analysis Plan and is in the process of reviewing this document. I am enclosing a memo from Division Geologist, Randy Curtis, outlining our position on data generated thus far by your detection monitoring system.

If there are any questions or comments, please do not hesitate to contact Randy Curtis or myself at 928-6487.

Sincerely,

D. Larry Gilliam
Regional Director
Division of Solid Waste Management

DLG/RC/14199166

Enclosure

cc: Ms. Laura Harris, Haztech
Ms. Melissa McGuire, Baker Worthington
Mr. James Scarbrough, EPA, Region IV
DSWM, Nashville 10-23 98
Mr. Randy Curtis, DSWM, Johnson City
Mr. Bill Krispin, DSWM, Nashville
Carter County Health Department

DOCKET NO: 000116

COR 000001
T095051207

RECEIVED
Division of Solid Waste Management
Date 7/10/89 File No.
Received by

NORTH AMERICAN RAYON CORPORATION
AN EMPLOYEE OWNED COMPANY

TN-L-102
039

July 5, 1989

Mr. Darrell Hale
TN Division of Solid Waste Management
1733 Sunset Drive
Johnson City, TN 37601-3621

Dear Mr. Hale:

Ray Holmes, North American Rayon's Manager of Electrical Engineering and General Maintenance has written me a memo concerning the materials removed from the basement. Enclosed is a copy of that memo.

The dumpster which we examined was not material for landfill, but for recycling.

Please contact me if you require any further information.

Sincerely,

Lou R. Raasch

Lou R. Raasch, Manager
Environmental Services

LRR/lbs

Enclosure

DOCKET NO. 000117

WEST ELK AVENUE • ELIZABETHTON, TENNESSEE 37643
EXECUTIVE OFFICES & PLANT (615) 542-2141 • SOUTHERN SALES OFFICE (615) 543-8686
NORTHERN SALES OFFICE • 500 FIFTH AVENUE • NEW YORK, NEW YORK 10110 • (212) 840-2842

COR 000001

T095051207

cc: WCS 7/10/89 lsh

AN EMPLOYEE OWNED COMPANY

INTEROFFICE MEMORANDUM

TO: Dr. Lou Raasch

COPIES: File

FROM: Ray Holmes

DATE: June 30, 1989

SUBJECT: WASTE - BASEMENT

As you are aware, the main basement under textile and the old cafeteria are being cleaned out by the NAR summer employees. The bulk of material being removed is old parts and paper waste. This material, to my knowledge, contains no hazardous waste of any kind.

On June 20, I instructed the employees to clean out an area that contained mostly old plumbing fixtures and electrical controllers. Some of these electrical controllers were obsolete hand compensators that originally contained mineral oil as an insulating medium. Most of the oil had been removed, but some drippings and winding leaching had occurred which rejuvenated some liquid. These controllers were all discarded into the waste dumpster. No PCB or otherwise hazardous material was involved.

The dumpster contents also included some old electrical junction boxes, disconnect switches and fittings.

Should there by any questions, please contact me.

Ray H Holmes

Ray Holmes

RH/lbs

DOCKET NO. 000117

COR 000002

T095051207

10-C 3 113

LDO 8/4

BAKER, WORTHINGTON, CROSSLEY, STANSBERRY & WOOLF
ATTORNEYS AT LAW
NORTHEAST TENNESSEE OFFICE
207 MOCKINGBIRD LANE
POST OFFICE BOX 3038 CRS 58
JOHNSON CITY, TENNESSEE 37602
TELEPHONE 615 928-0181
TELECOPIER 615 928-5694

KNOXVILLE, TENNESSEE 37902
BANK OF EAST TENNESSEE BUILDING
TELEPHONE 615 549-7000
TELECOPIER 615 525-8569

NASHVILLE, TENNESSEE 37219
1700 NASHVILLE CITY CENTER
TELEPHONE 615 726-5600
TELECOPIER 615 726-0464

WASHINGTON, D.C. 20004
1001 PENNSYLVANIA AVENUE, N.W.
TELEPHONE 202 347-4360
TELECOPIER 202 347-4540

HUNTSVILLE, TENNESSEE 37756
COURTHOUSE SQUARE
TELEPHONE 615 663-2321
TELECOPIER 615 663-2111

HENDERSONVILLE, TENNESSEE 37075
MAPLE GLEN OFFICE BUILDING
TELEPHONE 615 822-8822
TELECOPIER 615 824-4684

August 1, 1989

TN-L-420

Mr. Dale Ozier
Tennessee Department of
Health and Environment
Division of Solid Waste Management
701 Broadway, Customs House
Nashville, Tennessee 37219

RE: North American Rayon Closure Plan

Dear Mr. Ozier:

I appreciated your assistance over the telephone today regarding the closure plan for North American Rayon. As you know, our revised closure plan was submitted to the Department of Health and Environment on April 17, 1989. North American Rayon is very interested in performing maintenance on its clarifier to assure its continued efficient operation. In conjunction with this maintenance, North American will want to temporarily use the diversion basin to store nonhazardous wastewater that ordinarily would go directly to the clarifier.

I appreciated the information that North American can proceed with the closure plan, at its own risk. Because North American feels that it is necessary to perform clarifier maintenance as soon as possible to assure that it continues to meet its NPDES permit, the company may be forced to proceed with the closure prior to approval by the Department of Health and Environment. However, we will keep Ron Potts and Rick Whitson apprised of North American's activities.

Again, thank you for your assistance in this matter.

Sincerely,

Melissa McGuire/ssr

Melissa M. McGuire

ssr
cc: Charles Green

DOCKET NO. 000118

COR - 000001
T095051207

10-23 Lori 105

CERTIFIED MAIL #29,610
RETURN RECEIPT REQUESTED

Tennessee Department of Health and Environment
Bureau of Environment
1733 Sunset Drive
Johnson City, Tennessee 37601-3621

August 11, 1989

Dr. Lou Raasch
North American Rayon Corporation
West Elk Avenue
Elizabethton, Tennessee 37643

RE: Treatment of Surface Impoundment Contents

Dear Dr. Raasch:

The Tennessee Division of Water Pollution Control has received the "Plan for Removal and On-Site Treatment of Surface Impoundment Contents for North American Rayon Corporation", and has completed the review of the proposal. The proposal is satisfactory with the following additions:

1. NARC should increase the frequency of BOD_5 and Total Suspended Solids measurements to once per day during the treatment activities. The measurements should be conducted on a composite sample.

2. NARC should increase the frequency of ammonia, as N, measurements to once per day during the treatment activities. The measurements should be conducted on a grab sample.

3. NARC should expand the Watauga River sampling to include BOD_5, Total Suspended Solids, and Ammonia, as N, at upstream and downstream stations.

4. NARC should conduct at least one (1), 96-hour flow through bioassay during the treatment activities. The testing should be done in accordance with Part III of NPDES Permit TN0004421.

5. NARC shall notify this office of the beginning of the treatment activities.

DOCKET NO. 000120
COR 000001
T095051207

Please be advised that this correspondence does not relieve North American Rayon Corporation of its responsibility to comply with NPDES Permit TN0004421 and the Tennessee Water Quality Control Act (TCA 69-3-101 et seq.). Nor does it serve to waive the Division's right to enforce the provisions of the permit and the Act.

Also, please be advised that the closure and disposal activities must be conducted in accordance with the rules and regulations of the Division of Solid Waste Management.

If you have any questions regarding this correspondence, please contact David Saulsbury at 928-6487.

Sincerely,

A. L. Fulkerson, Manager
Johnson City Basin Office
Division of Water Pollution Control

ALF/DKS/13069223

cc: Ms. Melissa M. McGuire
Ms. Laura Harris
Industrial Facilities Section, DWPC, Nashville
Division of Solid Waste Management, Johnson City ✓

DOCKET NO. 000120
COR 000002
T095051207

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

REGION IV

345 COURTLAND STREET, N.E.
ATLANTA, GEORGIA 30365

4WD-SISB

AUG 15 1989

CERTIFIED MAIL
RETURN RECEIPT REQUESTED

Dr. Lou Raasch
North American Rayon Corporation
Highway 321
Elizabethton, TN 37643

RE: North American Rayon Corporation
Elizabethton, TN
TND095051207

Dear Dr. Raasch:

The United States Environmental Protection Agency (EPA), pursuant to the authority and requirements of the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA), 42 U.S.C. 9601 et seq., as amended by the Superfund Amendments and Reauthorization Act (SARA), Public Law 99-499 and Section 3007 of the Resource Conservation and Recovery Act (RCRA), is planning to conduct an investigation of the above referenced site. North American Rayon is located in Elizabethton, Tennessee. EPA has reason to believe that there may be a release or threat of a release of hazardous substances from the site into the surrounding environment. The purpose of this investigation is to determine, as stated in CERCLA (104)(e)(2)(A), the identification, nature, and quantity of materials which have been or are generated, treated, stored or disposed of at a vessel or facility or transported to a vessel or facility.

As per the telephone conversation on August 9, 1989, with Mr. Gary Shockley, EPA was granted permission for access to your property beginning on or about August 21, 1989, and continuing through the completion of the investigation on August 23, 1989. Activities to be conducted during the investigation may include:

1. Inspect, sketch, and photograph the premises;

2. Review records of Solid Waste Management Units (SWMUs) which provide for;

   (i) The location of the unit(s) on the topographic map.

DOCKET NO. 000122
COR - 000001
T095051207

(ii) Designation of type of unit(s).

(iii) General dimensions and structural description (supply any available drawings).

(iv) When the unit was operated.

(v) Specification of all wastes that have been managed at the unit to the extent available.

3. Review of any records of releases of hazardous waste or hazardous constituents from such units.

4. Review records on the size and type of facility, and the manufacturing process to determine past waste handling practices.

The above activities will be conducted by personnel from EPA Region IV's Field Investigation Team (FIT). Mr. Robert Rose of FIT will contact you prior to the actual site visit to make final arrangements and note any changes.

If you have any questions, please contact me at (404) 347-5065.

Your cooperation in this matter is appreciated.

Sincerely,

Charlie Stevens

Charlie Stevens
Environmental Engineer

cc: Robert Rose, NUS Corporation
Wayne Garfinkel, EPA RCRA

DOCKET NO. 000122
COR 000002
T095051207

TN-L-203 Dole

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
OFFICE OF CRIMINAL INVESTIGATIONS

REPORT OF INVESTIGATION

1. TITLE	2. CONTROL NUMBER
North American Rayon Corporation	89-IV-11-001/30T
3. PERIOD COVERED	**4. REPORTING OFFICE**
11/24/88 - 8/15/89	Atlanta Area Office

SYNOPSIS:

CASE OPENING/CLOSING REPORT

Summary of Allegations

North American Rayon Corporation operates a rayon production facility on West Elk Avenue in Elizabethton, Carter County, Tennessee. On November 24, 1988, from approximately 7:45 a.m. until 8:00 a.m., a release of sulfuric acid occurred from a railroad tank car that was being unloaded at the facility. The spill resulted in injury to an employee and a fish kill in the nearby Watauga River. North American's Director of Environmental Services, Dr. Lou Raasch, reported the spill to the Tennessee Emergency Management Agency at 5:07 p.m. on the 24th, and followed up with a letter on November 30, 1988. On December 6, 1988, EPA Region IV notified the company by letter that a report of the release had been received and ordered the company to provide detailed information regarding the release.

In a memorandum to EPA dated December 23, 1988, North American Rayon Environmental Services Manager Raasch reported that the release consisted of approximately 900 gallons (13,500 pounds) of sulfuric acid, of which approximately 225 gallons (3,400 pounds) entered a storm sewer and discharged into the Watauga River. The remaining released acid was intercepted in the area of the limestone-covered railroad bed and subsequently neutralized using soda ash, lime and water.

The Tennessee Wildlife Resources Agency investigated and reported approximately 3,500 fish killed in a 3-mile reach of the Watauga River. The release also resulted in lowering of the river pH to 4.5 and a shutdown for several hours of the water supply intake of nearby Johnson City; however, measurements done the next morning revealed that the river water had a normal pH of 7.1.

Case Status

Inquiries with the Tennessee Emergency Management Agency, the Tennessee Water Management Division, the Tennessee Wildlife Resources Agency and EPA, Region IV, and investigation by OCI, Atlanta Area Office failed to disclose sufficient evidence to warrant criminal prosecution.

Therefore, this case is closed under Result Code 1-DP-IE. DOCKET NO. -- 000121

COR 000001

Property/Evidence in EPA Custody

No property or other evidence is in EPA possession.

T095051207

REPORT MADE BY	DATE
Herbert J. Tatum, Special Agent, EPA, OCI, NEIC, AAO	September 5, 1989
REVIEWING OFFICIAL	**DATE**
Bruce P. Mirkin, SAIC, EPA, OCI, NEIC, Atlanta Area Office	September 5, 1989

This document contains neither recommendations nor conclusions of the EPA. It is the property of the EPA and is loaned to your agency; it and its contents are not to be distributed outside your agency.

EPA Form 2720-9 (Rev. 3-84) U. S. GOVERNMENT PRINTING OFFICE-1984-439-414/7281 ORIGINATING OFFICE

10-23

WCS 109

RECEIVED
Division of Solid Waste Management
Date 9/11/89 File No.
Received by

BAKER, WORTHINGTON, CROSSLEY, STANSBERRY & WOOLF

ATTORNEYS AT LAW

NORTHEAST TENNESSEE OFFICE
207 MOCKINGBIRD LANE
POST OFFICE BOX 3038 CRS
JOHNSON CITY, TENNESSEE 37602
TELEPHONE 615 928-0181
TELECOPIER 615 928-5694

KNOXVILLE, TENNESSEE 37902
BANK OF EAST TENNESSEE BUILDING
TELEPHONE 615 549-7000
TELECOPIER 615 525-8569

NASHVILLE, TENNESSEE 37219
1700 NASHVILLE CITY CENTER
TELEPHONE 615 726-5600
TELECOPIER 615 726-0464

WASHINGTON, D.C. 20004
1001 PENNSYLVANIA AVENUE, N.W.
TELEPHONE 202 347-4360
TELECOPIER 202 347-4540

HUNTSVILLE, TENNESSEE 37756
COURTHOUSE SQUARE
TELEPHONE 615 663-2321
TELECOPIER 615 663-2111

HENDERSONVILLE, TENNESSEE 37075
MAPLE GLEN OFFICE BUILDING
TELEPHONE 615 822-8822
TELECOPIER 615 824-4684

TN-420

NORTH AMERICAN RAYON

September 8, 1989

Mr. Ronny Bowers
Tennessee Department of Health
and Environment
Division of Solid Waste Management
701 Broadway
Customs House
Nashville, Tennessee 37219

Dear Mr. Bowers:

On behalf of North American Rayon, I would like to thank you again for taking the time to meet with us in Johnson City regarding the closure of an onsite surface impoundment. At that meeting, you indicated again that the Department of Health and Environment would have no problem with North American proceeding, at its own risk, to remove the sludge and soil from the surface impoundment. North American may want to pursue this course within the next week or so. We will notify you and Mr. Larry Gilliam prior to commencing work.

One of the issues that we discussed in the meeting was the use of the surface impoundment as a backup to North American's clarifier. We discussed two possible scenarios: (1) North American could perform maintenance on its clarifier prior to the closure and add additional solid waste to the surface impoundment; and (2) North American could remove the sludge and some soil, perform verification testing, and then use the surface impoundment as a backup to the clarifier. You suggested that it would be preferable for North American to add additional non-hazardous wastewater to the surface impoundment, and then to ultimately dispose of the combined non-hazardous and characteristic material in the surface

DOCKET NO. 000124
COR
T095051207

impoundment as part of the closure plan. On the other hand, you indicated that if North American chose to remove the sludge and soil first and then add the solid waste, they would eventually have to dispose of the sludge and that it was not clear whether the disposal would have to be according to the closure plan. We look forward to receiving further clarification from you on these points.

At this point, you were unable to offer any guidance as to the closure standards for the surface impoundment except for lead. You indicated that you should have some risk-based standards for us within the next week or so. If North American elects to proceed with the closure, you suggested that after removal of the sludge and some soil, North American identify the portion of the surface impoundment likely to have the most serious contamination. Once that location has been determined, you propose that North American should take one sample to analyze for the volatile organics and metals listed on Appendix IX of 40 C.F.F. Part 264. It is my understanding that you are interested in an analysis of total metals, not EP toxic metals.

You also suggested that after removal of sludge and soil, North American should develop a plan for verification sampling, including the sides of the surface impoundment. We have not yet identified the constituents of concern. I gather that this determination will be based in part upon the analysis that comes back from the sample taken at the most contaminated point. Once those analyses are available, we will work with you to determine what constituents to analyze for in the verification samples.

Another issue which we discussed is the procedure for locating the background sample acceptable to North American and the State. We are interested in finding such a sample location so that we can determine the background levels of the constituents of concern. It is my understanding that Dr. Raasch should work with Darrell Hale in the Johnson City basin office on this matter. You indicated that once a location is agreed upon, you will want two or three discrete samples and that they should be analyzed for total metals.

Another important issue is the treatment of the sludge at the wastewater treatment plant. We have discussed this aspect of the plan with the local representatives of the Department of

DOCKET NO. 000124
COR - 000002
T095051207

Health and Environment in the past. It was our understanding that because the material in the surface impoundment would have gone to the treatment plant, had it not been diverted, and because it is very similar to the wastewater routinely treated in the plant, it either would not come within the definition of hazardous waste pursuant to Rule 1200-1-11-.02(1)(d)1.(ii) or it would be subject to a permit by rule pursuant to Rule 1200-1-11-.07(1)(c). If this interpretation is incorrect, we need to know as soon as possible.

A final matter addressed at our meeting was the necessity for berm between the surface impoundment and the neighboring lagoon. If the surface impoundment is "clean closed," I do not understand how leaking from the lagoon could cause future problems. On the other hand, if the lagoon is closed with some contamination in place, I can understand that the Department of Health and Environment might want to make a future determination regarding the berm. At the present time, North American has not decided how it will proceed regarding the berm, although they understand that they need to do some sampling in the sides of the lagoon.

I hope that this letter has been an accurate characterization of our discussions. Please let me know if you believe that it contains any inaccuracies. I look forward to hearing from you next week regarding cleanup standards and the use of the treatment plant for treating the contents of the impoundment and any soils. If I am not available, please call Gary Shockley in my office.

Sincerely yours,

Melissa M. McGuire

Melissa M. McGuire

ssr
cc: Larry Gilliam
Charles Green
Lou Raasch
Laura Harris

DOCKET NO. 000124

COR 000003
T095051207

10-23

110

RECEIVED
Division of Solid Waste Management
Date 9/18/89 File No.
Received by JT

TN-L-441

Westinghouse Environmental
and Geotechnical Services, Inc.

Westinghouse HAZTECH, Inc.
5280 Panola Industrial Boulevard
Decatur, Georgia 30035
(404) 981-9332
(800) 358-4135
Fax (404) 981-1786

September 14, 1989

Mr. Randy Curtis
Tennessee Department of Health and Environment
1733 Sunset Dr.
Johnson City, TN 37601-3621

SUBJECT: Proposd changes in sample containers to the Groundwater sampling and analysis plan for North American Rayon Corporation, Tennessee, dated May 14, 1989.

Dear Mr. Curtis:

Westinghouse has been in contact with IEA of Research Triangle Park, North Carolina, regarding the use of their transpaks for ground-water sampling at NARC (Bemberg Well #3). IEA has indicated that the use of transpaks will require some changes to the list of containers in the sampling and analysis plan.

We forward these recommendations for your approvel. The attached table lists the originally planned container and the proposed container for each sampling parameter.

If you approve these proposed container changes, please initial and return the attached table. Should there be any questions concerning this change please do not hesitate to phone.

Thank you for your attention to this matter.

Sincerely:
Westinghouse HAZTECH

Laura

Laura B. Harris
Project Manager

Attachments

RECEIVED
EPA/REGION IV
OCT 10 3 57 PM '89
WASTE
COMPLIANCE SECTION

DOCKET NO. 000125

COR 000001
T095051207

TABLE 1

PROPOSED SAMPLE CONTAINERS

PARAMETERS	ORIGINAL CONTAINER	PROPOSED CONTAINER
Arsenic, Mercury, Selenium	8 oz polyethylene	500 ml plastic *
Fluoride, Chloride, Sulfate	8 oz glass	Fluoride 100 ml plastic Chloride 100 ml plastic/glass Sulfate 500 ml plastic/glass
Nitrate	8 oz glass	100 ml glass
Endrin, Lindane, Methoxychlor, Toxaphene	1 liter glass	1 liter amber w/teflon lid (3 ea) 3 analysis
2,4-D, 2,4,5-TP Silvex	1 liter glass	1 liter amber w/teflon lid (3 ea) 3 analysis
Radium, Gross Alpha, Gross Beta	1 gallon collapsible	1 liter plastic (6 ea) 6 analysis
Coliform	8 oz polyethylene	125 ml plastic
TOC	8 oz amber w/teflon lined cap	40 ml vials (3 ea) 3 analysis
TOX	8 oz amber w/teflon lined cap	500 ml amber w/teflon lid (4 ea) 1 analysis

*NAGLENE plastic bottle (polyethylene)

Changes Approved _____ Date _____

DOCKET NO. 000125

COR 000002
T095051207

NUS CORPORATION
1927 LAKESIDE PARKWAY
SUITE 614
TUCKER, GEORGIA 30084
404-938-7710

RECEIVED
EPA/REGION IV
Oct 5 11 01 AM '89
WASTE
ENGINEERING SECTION

C-586-9-9-227

September 29, 1989

Mr. Doug McCurry
Chief, Waste Engineering Section
U.S. EPA Region IV
345 Courtland Street, N. E.
Atlanta, Georgia 30365

Subject: Environmental Priorities Initiative (EPI) Program
Modified Preliminary Assessment Draft Report
North American Rayon Corporation
Elizabethtown, Carter County, Tennessee
EPA ID No. TND095051207
Revision 0

Dear Mr. McCurry:

Enclosed please find two (2) copies of the subject draft report for your review and comments.

A visual site inspection was conducted at the North American Rayon Corporation by personnel of the FIT 4 staff on August 21, 1989. Twenty-four solid waste management units and five areas of concern were identified during the inspection which are discussed in Section 4.0 of the draft report. Eleven of the Solid Waste Management Units will require further assessment, as well as, five areas of concern.

The designated report comments period before the report is submitted to the EPA in final form is thirty days. Please submit all comments to the attention of Robert Rose, FIT 4, EPI, Section Manager, and to Al Hanke, Site Investigation and Support Branch, Waste Management Division, U.S. EPA.

Very truly yours,

Mitch Cohen, P.E.
Project Manager

Approved:

MC/kw

Enclosures (2)

cc: Al Hanke, Waste Management Division, U.S. EPA

DOCKET NO. 000126

COR-- 000001

T095051207

10-25

Westinghouse Environmental
and Geotechnical Services, Inc.

Westinghouse HAZTECH, Inc.
5280 Panola Industrial Boulevard
Decatur, Georgia 30035
(404) 981-9332
(800) 358-4135
Fax (404) 981-1786

RECEIVED
Division of Solid Waste Management
Date 10/10/89 File No.
Received by

October 3, 1989

TN-L-440

Mr. Randy Curtis
Geologist
Tennessee Department of
Health and Environment
1733 Sunset Drive
Johnson City, Tennessee 37601

Subject: North American Rayon Corp. (NARC)
Revised Sampling and Analysis Plan
Project No. 2322-88-1107

Dear Randy:

On behalf of NARC, I would like to request that the NARC sampling and analysis plan be amended to include the attached Table 1. The attached table is to replace the current Table 1., which outlines sample containers and preservatives.

It has come to my attention that various combinations of appropriate containers exist for a given parameter. The revised table is intended to ensure that all samples are viable. However, the table is written such that it does not inherently limit NARC to an individual laboratory.

Please call me if you have questions or require further information.

Sincerely,

Westinghouse Environmental and
Geotechnical Services, Inc.

Laura Harris

Laura Harris
Project Manager

ENC

DOCKET NO. 000128
COR 000001
T095051207

TABLE 1

SAMPLE CONTAINERS AND PRESERVATIVES

PARAMETERS	PRESERVATIVES	CONTAINER	HOLDING TIME
Arsenic, Mercury, Selenium	HNO_3, pH <2	P, G	6 months
Lead, Manganese, Sodium, Barium, Cadmium, Chromium, Silver	HNO_3, pH <2	P, G	6 months
Fluoride, Chloride, Sulfate	Cool to 4^0 C	P, G	28 days
Nitrate	H_2SO_4, pH <2	P, G	28 days
Endrin, Lindane, Methoxychlor, Toxaphene	Cool to 4^0 C	G (t)	7 days
2,4D, 2,4,5 TP Silvex	Cool to 4^0 C	G (t)	7 days
Radium, Gross Alpha, Gross Beta	HNO_3, pH <2	P, G	6 months
Coliforms	Sterile, cool	P, G	6 hours
TOC	HNO_3, HCl, or H_2SO_4, pH <2 Cool to 4^0 C zero head space	G-A (t)	7 days
TOX	HNO_3, HCl, or H_2SO_4, pH <2 Cool to 4^0 C zero head space	G-A (t)	7 days
Phenols	H_2SO_4, pH <2	G	28 days

P = Polyethylene (Nalgene) or Plastic
G = Glass
A = Amber glass
t = teflon lined caps

The field parameters (pH, Conductivity, and Temperature) will be tested in the field at time of collection by properly calibrated and maintained instruments.

DOCKET NO. 000128
COR 000002
T095051207

TABLE 1

SAMPLE CONTAINERS AND PRESERVATIVES

PARAMETERS	PRESERVATIVES	CONTAINER	HOLDING TIME
Arsenic, Mercury, Selenium	HNO_3, pH <2	P, G	6 months
Lead, Manganese, Sodium, Barium, Cadmium, Chromium, Silver	HNO_3, pH <2	P, G	6 months
Fluoride, Chloride, Sulfate	Cool to 4° C	P, G	28 days
Nitrate	H_2SO_4, pH <2	P, G	28 days
Endrin, Lindane, Methoxychlor, Toxaphene	Cool to 4° C	G (t)	7 days
2,4D, 2,4,5 TP Silvex	Cool to 4° C	G (t)	7 days
Radium, Gross Alpha, Gross Beta	HNO_3, pH <2	P, G	6 months
Coliforms	Sterile, cool	P, G	6 hours
TOC	HNO_3, HCl, or H_2SO_4, pH <2 Cool to 4° C zero head space	G-A (t)	7 days
TOX	HNO_3, HCl, or H_2SO_4, pH <2 Cool to 4° C zero head space	G-A (t)	7 days
Phenols	H_2SO_4, pH <2	G	28 days

P = Polyethylene (Nalgene) or Plastic
G = Glass
A = Amber glass
t = teflon lined caps

The field parameters (pH, Conductivity, and Temperature) will be tested in the field at time of collection by properly calibrated and maintained instruments.

DOCKET NO. -2 000128.
COR 000003
T095051207

TABLE 1

SAMPLE CONTAINERS AND PRESERVATIVES

PARAMETERS	PRESERVATIVES	CONTAINER	HOLDING TIME
Arsenic, Mercury, Selenium	HNO_3, pH <2	P, G	6 months
Lead, Manganese, Sodium, Barium, Cadmium, Chromium, Silver	HNO_3, pH <2	P, G	6 months
Fluoride, Chloride, Sulfate	Cool to 4° C	P, G	28 days
Nitrate	H_2SO_4, pH <2	P, G	28 days
Endrin, Lindane, Methoxychlor, Toxaphene	Cool to 4° C	G (t)	7 days
2,4D, 2,4,5 TP Silvex	Cool to 4° C	G (t)	7 days
Radium, Gross Alpha, Gross Beta	HNO_3, pH <2	P, G	6 months
Coliforms	Sterile, cool	P, G	6 hours
TOC	HNO_3, HCl, or H_2SO_4, pH <2 Cool to 4° C zero head space	G-A (t)	7 days
TOX	HNO_3, HCl, or H_2SO_4, pH <2 Cool to 4° C zero head space	G-A (t)	7 days
Phenols	H_2SO_4, pH <2	G	28 days

P = Polyethylene (Nalgene) or Plastic
G = Glass
A = Amber glass
t = teflon lined caps

The field parameters (pH, Conductivity, and Temperature) will be tested in the field at time of collection by properly calibrated and maintained instruments.

DOCKET NO: 000128
COR 000004
T095051207

TABLE 1

SAMPLE CONTAINERS AND PRESERVATIVES

PARAMETERS	PRESERVATIVES	CONTAINER	HOLDING TIME
Arsenic, Mercury, Selenium	HNO_3, pH <2	P, G	6 months
Lead, Manganese, Sodium, Barium, Cadmium, Chromium, Silver	HNO_3, pH <2	P, G	6 months
Fluoride, Chloride, Sulfate	Cool to 4^0 C	P, G	28 days
Nitrate	H_2SO_4, pH <2	P, G	28 days
Endrin, Lindane, Methoxychlor, Toxaphene	Cool to 4^0 C	G (t)	7 days
2,4D, 2,4,5 TP Silvex	Cool to 4^0 C	G (t)	7 days
Radium, Gross Alpha, Gross Beta	HNO_3, pH <2	P, G	6 months
Coliforms	Sterile, cool	P, G	6 hours
TOC	HNO_3, HCl, or H_2SO_4, pH <2 Cool to 4^0 C zero head space	G-A (t)	7 days
TOX	HNO_3, HCl, or H_2SO_4, pH <2 Cool to 4^0 C zero head space	G-A (t)	7 days
Phenols	H_2SO_4, pH <2	G	28 days

P = Polyethylene (Nalgene) or Plastic
G = Glass
A = Amber glass
t = teflon lined caps

The field parameters (pH, Conductivity, and Temperature) will be tested in the field at time of collection by properly calibrated and maintained instruments.

000128
DOCKET NO.
COR 000005
T095051207

TABLE 1

SAMPLE CONTAINERS AND PRESERVATIVES

PARAMETERS	PRESERVATIVES	CONTAINER	HOLDING TIME
Arsenic, Mercury, Selenium	HNO_3, pH <2	P, G	6 months
Lead, Manganese, Sodium, Barium, Cadmium, Chromium, Silver	HNO_3, pH <2	P, G	6 months
Fluoride, Chloride, Sulfate	Cool to 4^0 C	P, G	28 days
Nitrate	H_2SO_4, pH <2	P, G	28 days
Endrin, Lindane, Methoxychlor, Toxaphene	Cool to 4^0 C	G (t)	7 days
2,4D, 2,4,5 TP Silvex	Cool to 4^0 C	G (t)	7 days
Radium, Gross Alpha, Gross Beta	HNO_3, pH <2	P, G	6 months
Coliforms	Sterile, cool	P, G	6 hours
TOC	HNO_3, HCl, or H_2SO_4, pH <2 Cool to 4^0 C zero head space	G-A (t)	7 days
TOX	HNO_3, HCl, or H_2SO_4, pH <2 Cool to 4^0 C zero head space	G-A (t)	7 days
Phenols	H_2SO_4, pH <2	G	28 days

P = Polyethylene (Nalgene) or Plastic
G = Glass
A = Amber glass
t = teflon lined caps

The field parameters (pH, Conductivity, and Temperature) will be tested in the field at time of collection by properly calibrated and maintained instruments.

DOCKET NO. 2/000128
COR 000006
T095051207

10-23 125

TENNESSEE DEPARTMENT OF HEALTH AND ENVIRONMENT
ENVIRONMENTAL LABORATORIES

ORGANIC ANALYSIS, PURGEABLES
Sample Type
[X]Sediment [ ]Water
Sample Priority
[ ]Emergency [X]Legal [ ]Routine [ ]Ambient
Date Priority Needed:_____

Sample Source NORTH AMERICAN RAYON CORP.
I.D. TND 09-505-1207
County CARTER
Field No. 903-1
Collected-Date,Time,By 03-06-90,0945,FW
Potential Hazard To Lab Personnel:

Laboratory Number 90-03-0058 (K003006)
Received-Date,Time,By 03-08-90,0930,LLR
Sampling Agency:[ ]APC [X]SWM [ ]DOT
[ ]PA/SI [ ]SSF [ ]FUST [ ]SUST [ ]EEP
[ ]WS [ ]GW [ ]WP [ ]DRH [ ]QC
[ ]OTHER_____

CODE	HALOGENATED PURGEABLES	VALUE*
32104	BROMOFORM	ND
32101	BROMODICHLOROMETHANE	ND
34413	BROMOMETHANE	ND
32102	CARBON TETRACHLORIDE	ND
34301	CHLOROBENZENE	ND
34311	CHLOROETHANE	ND
34576	2-CHLOROETHYLVINYL ETHER	ND
32106	CHLOROFORM	ND
34418	CHLOROMETHANE	ND
32105	DIBROMOCHLOROMETHANE	ND
34536	1,2-DICHLOROBENZENE	ND
34566	1,3-DICHLOROBENZENE	ND
34571	1,4-DICHLOROBENZENE	ND
34668	DICHLORODIFLUOROMETHANE	ND
34496	1,1-DICHLOROETHANE	ND
34531	1,2-DICHLOROETHANE	ND
34501	1,1-DICHLOROETHENE	ND
	CIS-1,2-DICHLOROETHENE	ND
34546	TRANS-1,2-DICHLOROETHENE	ND
34541	1,2-DICHLOROPROPANE	ND
34045	CIS-1,3-DICHLOROPROPENE	ND
34699	TRANS-1,3-DICHLOROPROPENE	ND
34423	METHYLENE CHLORIDE	ND
34516	1,1,2,2-TETRACHLOROETHANE	ND
34475	TETRACHLOROETHENE	ND
34506	1,1,1-TRICHLOROETHANE	ND
34511	1,1,2-TRICHLOROETHANE	ND
39180	TRICHLOROETHENE	ND
39488	TRICHLOROFLUOROMETHANE	ND
39715	VINYL CHLORIDE	ND

CODE	AROMATIC PURGEABLES	VALUE*
34030	BENZENE	ND
34301	CHLOROBENZENE	ND
34536	1,2-DICHLOROBENZENE	ND
34566	1,3-DICHLOROBENZENE	ND
34571	1,4-DICHLOROBENZENE	ND
34371	ETHYL BENZENE	ND
34010	TOLUENE	ND
	O-XYLENE	ND
	M-XYLENE & P-XYLENE	ND
	M-XYLENE	
	P-XYLENE	

OTHER PURGEABLES

*Reporting Units, unless otherwise noted:
water, ug/l; sediment, ug/kg

Completed: Date 3-8-90 Time 15:09 By RLH

Unit Supervisor [signature]
Date 3-15-90
Signature of supervisor indicates that the work was performed in accordance with federally approved procedures where available and in compliance with current quality assurance criteria except as qualified.
Comments:_____

PH-3015 LAB (rev 8/89)

STATE OF TENNESSEE
DEPARTMENT OF PUBLIC HEALTH
DIVISION OF SOLID WASTE MANAGEMENT

326 CAPITOL HILL BUILDING
NASHVILLE, TENNESSEE 37219
TELEPHONE (615) 741-3424

HAZARDOUS WASTE GENERATOR NOTIFICATION

PART ONE

PLEASE TYPE OR PRINT LEGIBLY. SEE INSTRUCTIONS FOR FURTHER INFORMATION.

1. ORGANIZATION'S FULL NAME AT SITE: North American Rayon Corporation — IDENTIFICATION CODE: TND 095051207

2. MAILING ADDRESS: West Elk Avenue — CITY: Elizabethton — STATE: TN — ZIP CODE: 37643

3. DOES YOUR FACILITY/OPERATION GENERATE ANY WASTE WHICH IS DETERMINED TO BE HAZARDOUS ACCORDING TO RULE 1200-1-11-.02(1)(E)? YES: X NO:

IF THE ANSWER TO QUESTION 3 IS 'NO', SKIP TO LINE 13 AND RETURN ONLY THIS PAGE TO THE DEPARTMENT.

4. DO YOU REQUEST A PARTIAL EXEMPTION BECAUSE YOU ARE A SMALL GENERATOR OF HAZARDOUS WASTE AS DEFINED IN RULE 1200-1-11-.02(1)(G)? YES: NO: X

5. SITE ADDRESS: See above

6. SITE COUNTY: Carter County

7. OWNER NAME: North American Rayon Corporation — PHONE WITH AREA CODE:

8. MANAGER NAME: H. E. Britt — PHONE WITH AREA CODE: 615-542-2141

9. PRINCIPAL TECHNICAL CONTACT: J. T. McPherson — PHONE WITH AREA CODE: 615-542-2141

10.

NUMBER OF EMPLOYEES	YEARS IN OPERATION	SIC CODES	JOB SHOP
1500	52	2823	No

11. EMERGENCY CONTACTS FOR 24 HOURS/DAY AND 7 DAYS/WEEK.

	NAME	TIME PERIOD COVERED	PHONE WITH AREA CODE
A.	H. E. Britt	8:00-5:00 P.M.	615-542-2141
B.	H. J. Dessauer	A.M. 8:00-5:00 P.M.	615-542-2141
C.	J. T. McPherson	5:00 P.M. to 11:00 P.M.	615-926-7918
D.	Bobby Beam	11:00 P.M. to 8:00 A.M.	615-772-4141

12. CURRENT ENVIRONMENTAL PERMITS (AIR, WATER, SOLID WASTE AND RADIOLOGICAL)
GIVE PERMIT TYPE, SOURCE (FEDERAL, STATE AND LOCAL), PERMIT NUMBER AND EXPIRATION DATE.

NPDES - TN 0004421, Tennessee Air Pollution Control
#10-00002-04-10

EPA Hazardous Waste I.D. # TND 095051207

13. CERTIFICATION: I CERTIFY THAT I HAVE PERSONALLY EXAMINED AND AM FAMILIAR WITH THE INFORMATION SUBMITTED IN THIS AND ALL ATTACHED DOCUMENTS, AND THAT I BELIEVE THE SUBMITTED INFORMATION IS TRUE, ACCURATE, AND COMPLETE.

SIGNATURE (MANAGER OR OWNER)	TITLE	DATE	SHEETS
H. E. Britt	Vice President Manufacturing	1/29/81	

BELOW IS FOR DEPARTMENT USE ONLY.

DATE RECEIVED	DATE DUE	COUNTY CODE	PRIORITY	FOLLOW UP?
FEB 03 1981				

15. COMMENTS

000001 TEC

DOCKET NO. 000019 TND095051207

PH-2019, SWM 10/80

10-23 125

TENNESSEE DEPARTMENT OF HEALTH AND ENVIRONMENT
ENVIRONMENTAL LABORATORIES

ORGANIC ANALYSIS, PURGEABLES
Sample Type
[X]Sediment [ ]Water
Sample Priority
[ ]Emergency [X]Legal [ ]Routine [ ]Ambient
Date Priority Needed:_____

Sample Source NORTH AMERICAN RAYON CORP.
I.D. TND 09-505-1207
County CARTER
Field No. 903-1
Collected-Date,Time,By 03-06-90,0945,FW
Potential Hazard To Lab Personnel:

Laboratory Number 90-03-0058 (K003006)
Received-Date,Time,By 03-08-90,0930,LLR
Sampling Agency:[ ]APC [X]SWM [ ]DOT
[ ]PA/SI [ ]SSF [ ]FUST [ ]SUST [ ]EEP
[ ]WS [ ]GW [ ]WP [ ]DRH [ ]QC
[ ]OTHER_____

CODE	HALOGENATED PURGEABLES	VALUE*
32104	BROMOFORM	ND
32101	BROMODICHLOROMETHANE	ND
34413	BROMOMETHANE	ND
32102	CARBON TETRACHLORIDE	ND
34301	CHLOROBENZENE	ND
34311	CHLOROETHANE	ND
34576	2-CHLOROETHYLVINYL ETHER	ND
32106	CHLOROFORM	ND
34418	CHLOROMETHANE	ND
32105	DIBROMOCHLOROMETHANE	ND
34536	1,2-DICHLOROBENZENE	ND
34566	1,3-DICHLOROBENZENE	ND
34571	1,4-DICHLOROBENZENE	ND
34668	DICHLORODIFLUOROMETHANE	ND
34496	1,1-DICHLOROETHANE	ND
34531	1,2-DICHLOROETHANE	ND
34501	1,1-DICHLOROETHENE	ND
	CIS-1,2-DICHLOROETHENE	ND
34546	TRANS-1,2-DICHLOROETHENE	ND
34541	1,2-DICHLOROPROPANE	ND
34045	CIS-1,3-DICHLOROPROPENE	ND
34699	TRANS-1,3-DICHLOROPROPENE	ND
34423	METHYLENE CHLORIDE	ND
34516	1,1,2,2-TETRACHLOROETHANE	ND
34475	TETRACHLOROETHENE	ND
34506	1,1,1-TRICHLOROETHANE	ND
34511	1,1,2-TRICHLOROETHANE	ND
39180	TRICHLOROETHENE	ND
39488	TRICHLOROFLUOROMETHANE	ND
39715	VINYL CHLORIDE	ND

CODE	AROMATIC PURGEABLES	VALUE*
34030	BENZENE	ND
34301	CHLOROBENZENE	ND
34536	1,2-DICHLOROBENZENE	ND
34566	1,3-DICHLOROBENZENE	ND
34571	1,4-DICHLOROBENZENE	ND
34371	ETHYL BENZENE	ND
34010	TOLUENE	ND
	O-XYLENE	ND
	M-XYLENE & P-XYLENE	ND
	M-XYLENE	
	P-XYLENE	

OTHER PURGEABLES

*Reporting Units, unless otherwise noted:
water, ug/l; sediment, ug/kg

Completed: Date 3-8-90 Time 15:09 By RLH

Unit Supervisor Cynthia Adams
Date 3-15-90
Signature of supervisor indicates that the work was performed in accordance with federally approved procedures where available and in compliance with current quality assurance criteria except as qualified.
Comments:_____

PH-3015 LAB (rev 8/89)

I-10-001

STATE OF TENNESSEE
DEPARTMENT OF PUBLIC HEALTH
DIVISION OF SOLID WASTE MANAGEMENT

326 CAPITOL HILL BUILDING
NASHVILLE, TENNESSEE 37219
TELEPHONE (615) 741-3424

D002

HAZARDOUS WASTE DESCRIPTION

PART TWO

PLEASE TYPE OR PRINT LEGIBLY AND ATTACH TO PART ONE.

1. ORGANIZATION NAME: North American Rayon Corporation	IDENTIFICATION CODE: TND 095051207	PAGE

2. WASTE NAME (BE SPECIFIC. USE STANDARD NAME WHERE APPLICABLE. SEE ALSO RULE 1200-1-11-.04.)
Barium

	YES	NO
3. IS THIS WASTE AMONG THOSE IDENTIFIED AS HAZARDOUS IN THE TENNESSEE HAZARDOUS WASTE MANAGEMENT REGULATIONS, RULE 1200-1-11-.02(1)(B)?	X	
4. DOES THIS WASTE QUALIFY AS HAZARDOUS UNDER THE CRITERIA AS DEFINED IN THE HAZARDOUS WASTE MANAGEMENT REGULATIONS, RULE 1200-1-11-.02(1)(C)?	X	
5. DO YOU REQUEST AN EXEMPTION FOR THIS WASTE BECAUSE YOU HAVE MADE A NON-HAZARDOUS DETERMINATION AND HAVE ATTACHED EVIDENCE AS REQUIRED BY RULE 1200-1-11-.14?		X

6. CRITERIA (CHECK COLUMNS TO RIGHT AS APPROPRIATE. SEE RULE 1200-1-11-.03)

A. IGNITABILITY		C. CORROSIVITY		E. REACTIVITY	
B. LEACHATE TOXICITY	X	D. ACUTE TOXICITY		F. CHRONIC TOXICITY	

7. PHYSICAL FORM AND PERCENT SOLID.
Other solid - 265 ppm of a average 100,000 ppm sludge 0.265%

8. GENERATION RATE: MONTHLY (AVERAGE) KG	MONTHLY (MAXIMUM) KG	ANNUAL (AVERAGE) KG	FREQUENCY OF GENERATION: CONTINUOUS	SEASONAL	VARIOUS
70.22		854.54	X		

	YES	NO
9. DO YOU REQUEST A PARTIAL EXEMPTION FOR THIS WASTE BECAUSE OF RESOURCE RECOVERY OPERATIONS AS DEFINED IN RULE 1200-1-11-.02(1)(H)?		X
10. DO YOU REQUEST A PARTIAL EXEMPTION FOR THIS WASTE BECAUSE IT IS GENERATED BY THE COMBUSTION OF A FOSSIL FUEL AS DEFINED IN RULE 1200-1-11-.02(1)(I)?	X	

11. AMOUNT STORED (KILOGRAM)	DAYS STORED	TRANSPORT MODE (RAIL,WATER,ROAD,AIR,OTHER)
Unsure	365	

DOT SHIPPING NAME	DOT HAZARD CLASS	ID. CODE

TRANSPORTER & OFF-SITE FACILITIES UTILIZED — NAME AND ADDRESS	CHECK APPROPRIATE COLUMNS: TRANS	TREAT	STORE	DISPOSE
A.				
B.				
C.				
D.				

LINES 12-15 ON BACK. BELOW IS FOR DEPARTMENT USE ONLY.

16. WASTE CODE	COMPLETE?	TEST RESULTS?	REASONABLE?	FOLLOW-UP?	HAZ. CLASS	INITIALS
	YES NO	YES NO	YES NO	YES NO		LWG

STATUS: NOT HAZARDOUS (1); DEMONSTRATED NOT HAZARDOUS (2); SMALL GENERATOR (3); RESOURSE RECOVERY (4); FOSSIL FUEL (5); HAZARDOUS(6). STATUS CODE: 6

17. COMMENTS

What does generator intend do with sludge when surface impoundment is full

000002 TEC

DOCKET NO. 1 000019 T095051207

PH-2022, SWM 10/80

12. DESCRIBE GENERATION PROCESS

Investigation has revealed that the barium source is wet scrubber discharge. Barium, per se, is not used in any manner in the production of rayon fiber by the viscose process.

13. CHEMICAL CHARACTERISTICS

PH	FLASH POINT	CONCENTRATION UNITS % VOLUME, % WEIGHT, (PPM)
of sludge > 9.2	-	

MAJOR AND HAZARDOUS COMPOUNDS OR ELEMENTS	LOWER %	UPPER %
A. Barium as determined by leachate analysis (see attachment)	265 ppm	
B.		
C.		
D.		
E.		
F.		
G.		
H.		
I.		
J.		

14. COMMENTS

Some questions have been raised as to the applicability of the leachate toxicity test to our particular sludge. Our understanding is that the leachate toxicity test was designed to simulate conditions found in an actively decomposing municipal landfill, i.e., acidic conditions. Our questions is how can this test accurately represent conditions present in our surface impoundment which are always basic? The sludge pH is always 9.2 or above.

15. CONFIDENTIAL DATA (ATTACH SUBSTANTIATION ADDRESSING QUESTIONS GIVEN IN THE INSTRUCTIONS)

LINE #	ITEM NAME	DURATION	DEPT. USE ONLY - COMMENTS	APPV?

DOCKET NO. 000019

000003 TEC

T095051207

RCRA MAINTENANCE FORM

L Y AUG 29 '83

ID # IND 095 051207 FACILITY NAME N. Amer. Rayon Corp.

F1 Notif. approval
Date notified
Permit app. approved
Date Part A r'cvd #
* Facility name
Notif. confidential
Part A confidential
Closure date

F2 Contact name & title
Contact telephone #
Modif. under const.
Commercial fac. indic.
Non-reg. fac. indic.

F3 Mailing address

F4 Mailing city State Zip

F5 * Facility address
* County name

F6 * Facility city State Zip
* County code #
Drawings # Photos # District code
River basin code Latitude Longitude

F7 SIC NEW SIC

F8 Facility operator name Owner type
Activity codes: Gen Trans TSD # UIC
Transport mode: Air Rail Hwy Water Other
Owner/oper ind. Facility status RCRA permit status
Existance date

F9 Type Permit number Type New permit number

DOCKET NO. 000034

TEC

000001

T095051207

* This data can only be entered through the FINDS System. *

I-10-001

TENNESSEE DIVISION OF SOLID WASTE MANAGEMENT
COMPLIANCE MONITORING AND ENFORCEMENT ACTIVITY REPORT

1. ID NO: TND 09-505-1207 Name: NORTH AMERICAN RAYON CORPORATION

ADDRESS: W. ELK AVE.
ELIZABETHTON, TN. 37643

2. PROGRAM: Hazardous Waste [X] Solid Waste [ ]

3. KEY DATE: (MM-DD-YY) 06-26-86

TYPE OF EVALUATION

4. EVALUATION INSPECTION
06/26/86
(field visits)

A. FULL CHECKLIST
1. HW GEN [1]
2. HW TRANS [2]
3. HW TSDF [3]
4. HW SQ GEN [4]
5. HW NON-NOT [5]
6. SW PROCESSING FACILITY [6]
7. SW LANDFILL [7]
8. PART B INSPECTION [8]

B. OTHER
1. WALK-THROUGH INSP (1)
2. CLOSURE EVAL [2]
3. POST CLOSURE EVAL [3]
4. SPECIAL WASTE EVAL [4]
5. PART A MODIFICATION/WITHDRAWAL EVAL [5]
6. COMPLAINT FOLLOW-UP NOS [6]
7. EMERGENCY RESPONSE [7]
8. OTHER (describe in comments) [8]

5. SAMPLING INSPECTION ___/___/___
1. GENERATED WASTE [1]
2. RECEIVED WASTE [2]
3. SOIL/SEDIMENT [3]
4. SURFACE WATER/LEACHATE [4]
5. GROUND WATER [5]
6. AMBIENT AIR [6]
SAMPLES

6. SPECIAL INSPECTION ___/___/___
1. GROUNDWATER MONITORING [1]
2. OTHER (describe in comments) [2]
3. PRELIMINARY GEOLOGIC EVALUATION [3]

7. RECORDS/REPORT REVIEW ___/___/___
(non-permitting)
(in office)
1. CLOSURE PLANS WITH COST ESTIMATES [1]
2. POST CLOSURE PLANS WITH COST ESTIMATE [2]
3. FINANCIAL INSTRUMENTS [3]
4. OTHER REQUIRED PLANS [4]
5. SPECIAL WASTE REQUEST [5]
6. LANDFILL PLANNING ANNUAL REPORT [6]
7. MANIFEST REPORTS [7]
8. MANIFEST RECORDS [8]
9. GWM DATA [9]
10. GWM PLANS [10]
11. OTHER [11]

8. FOLLOW-UP EVALUATION ___/___/___
1. WITH FIELD OFFICE PERSONNEL ONLY [1]
2. WITH CENTRAL OFFICE PERSONNEL [2]
3. FIELD VISIT [3]
4. RECORD REVIEW [4]

9. INCIDENT PROCESSING ___/___/___
1. ORAL COMPLAINT [1]
2. WRITTEN COMPLAINT [2]
3. EMERGENCY RESPONSE CALL [3]
4. OTHER (describe in comments) [4]

10. MISCELLANEOUS ___/___/___
1. FACILITY STATUS EVALUATION MEETINGS/LETTERS [1]
2. OTHER (describe in comments) [2]
3. ABORTED INSPECTION [3]
4. WARNING LETTER [4]

11. VIOLATION CODES: NONE [ ] 0010

12. ENFORCEMENT ACTIONS:

	DATE ACTION TAKEN	SCHEDULED COMPLIANCE DATE	ACTUAL COMPLIANCE DATE
NOTICE OF VIOLATION	06/30/86	07/15/86	___/___/___
COMPLIANCE REVIEW MEETING	___/___/___	___/___/___	___/___/___
REFERRED TO ENFORCEMENT SECTION	___/___/___		

13. COMMENTS: (continue on reverse if necessary)

KEY OVER [ ]

14. PREPARED BY: Darrell S. Hale | ID CODE: 012 | DATE: 07-03-86 | FIELD OFFICE: 104

TEC

100-05

000001

DOCKET NO. 0 000039 T095051207

1-10-001 file

TENNESSEE DIVISION OF SOLID WASTE MANAGEMENT
COMPLIANCE MONITORING AND ENFORCEMENT ACTIVITY REPORT

1. ID NO: TND 09-505-1207 Name: NARC

ADDRESS:

2. PROGRAM: Hazardous Waste [X] Solid Waste [ ]

3. KEY DATE: (MM-DD-YY) ~~07-09-86~~ 06-26-86

TYPE OF EVALUATION

4. EVALUATION INSPECTION ___/___/___ (field visits)

A. FULL CHECKLIST
1. HW GEN [1]
2. HW TRANS [2]
3. HW TSDF [3]
4. HW SQ GEN [4]
5. HW NON-NOT [5]
6. SW PROCESSING FACILITY [6]
7. SW LANDFILL [7]
8. PART B INSPECTION [8]

B. OTHER
1. WALK-THROUGH INSP [1]
2. CLOSURE EVAL [2]
3. POST CLOSURE EVAL [3]
4. SPECIAL WASTE EVAL [4]
5. PART A MODIFICATION/WITHDRAWAL EVAL [5]
6. COMPLAINT FOLLOW-UP NOS [6]
7. EMERGENCY RESPONSE [7]
8. OTHER (describe in comments) [8]

5. SAMPLING INSPECTION 07/09/86
1. GENERATED WASTE (1)
2. RECEIVED WASTE [2]
3. SOIL/SEDIMENT [3]
4. SURFACE WATER/LEACHATE [4]
5. GROUND WATER [5]
6. AMBIENT AIR [6]
SAMPLES 0

6. SPECIAL INSPECTION ___/___/___
1. GROUNDWATER MONITORING [1]
2. OTHER (describe in comments) [2]
3. PRELIMINARY GEOLOGIC EVALUATION [3]

7. RECORDS/REPORT REVIEW ___/___/___ (non-permitting) (in office)
1. CLOSURE PLANS WITH COST ESTIMATES [1]
2. POST CLOSURE PLANS WITH COST ESTIMATE [2]
3. FINANCIAL INSTRUMENTS [3]
4. OTHER REQUIRED PLANS [4]
5. SPECIAL WASTE REQUEST [5]
6. LANDFILL PLANNING ANNUAL REPORT [6]
7. MANIFEST REPORTS [7]
8. MANIFEST RECORDS [8]
9. GWM DATA [9]
10. GWM PLANS [10]
11. OTHER [11]

8. FOLLOW-UP EVALUATION ___/___/___
1. WITH FIELD OFFICE PERSONNEL ONLY [1]
2. WITH CENTRAL OFFICE PERSONNEL [2]
3. FIELD VISIT [3]
4. RECORD REVIEW [4]

9. INCIDENT PROCESSING ___/___/___
1. ORAL COMPLAINT [1]
2. WRITTEN COMPLAINT [2]
3. EMERGENCY RESPONSE CALL [3]
4. OTHER (describe in comments) [4]

10. MISCELLANEOUS ___/___/___
1. FACILITY STATUS EVALUATION MEETINGS/LETTERS [1]
2. OTHER (describe in comments) [2]
3. ABORTED INSPECTION [3]
4. WARNING LETTER [4]

11. VIOLATION CODES: NONE [ ]

12. ENFORCEMENT ACTIONS:	DATE ACTION TAKEN	SCHEDULED COMPLIANCE DATE	ACTUAL COMPLIANCE DATE
NOTICE OF VIOLATION	06/30/86	08/01/86	___/___/___
COMPLIANCE REVIEW MEETING	___/___/___	___/___/___	___/___/___
REFERRED TO ENFORCEMENT SECTION	___/___/___		

13. COMMENTS: (continue on reverse if necessary)
SAMPLES NOT TAKEN BECAUSE WASTE STREAMS WERE NOT PROPERLY SEGREGATED
COMPLIANCE DATE EXTENDED TO 08-01-86

KEY OVER [ ]

14. PREPARED BY: Darrell L. Hale | ID CODE: 072 | DATE: 07-09-86 | FIELD OFFICE: 104

TEC

0 000002

DOCKET NO: 0 000039 T095051207

I-40-OUP file

TENNESSEE DIVISION OF SOLID WASTE MANAGEMENT
COMPLIANCE MONITORING AND ENFORCEMENT ACTIVITY REPORT

PH 2430
Rev. 9/85

1. ID NO: TND 09 505 1207 Name: NARC

ADDRESS:

2. PROGRAM: Hazardous Waste [X] Solid Waste [ ]

3. KEY DATE: (MM-DD-YY) 06-26-86

TYPE OF EVALUATION

4. EVALUATION INSPECTION ___/___/___ (field visits)

A. FULL CHECKLIST
1. HW GEN [1]
2. HW TRANS [2]
3. HW TSDF [3]
4. HW SQ GEN [4]
5. HW NON-NOT [5]
6. SW PROCESSING FACILITY [6]
7. SW LANDFILL [7]
8. PART B INSPECTION [8]

B. OTHER
1. WALK-THROUGH INSP [1]
2. CLOSURE EVAL [2]
3. POST CLOSURE EVAL [3]
4. SPECIAL WASTE EVAL [4]
5. PART A MODIFICATION/WITHDRAWAL EVAL [5]
6. COMPLAINT FOLLOW-UP NOS [6]
7. EMERGENCY RESPONSE [7]
8. OTHER (describe in comments) [8]

5. SAMPLING INSPECTION 07/29/86

1. GENERATED WASTE (1)
2. RECEIVED WASTE [2]
3. SOIL/SEDIMENT [3]
4. SURFACE WATER/LEACHATE [4]
5. GROUND WATER [5]
6. AMBIENT AIR [6]

SAMPLES 5

6. SPECIAL INSPECTION ___/___/___

1. GROUNDWATER MONITORING [1]
2. OTHER (describe in comments) [2]
3. PRELIMINARY GEOLOGIC EVALUATION [3]
4. FINAL GEOLOGIC EVALUATION [4]

7. RECORDS/REPORT REVIEW ___/___/___ (non-permitting) (in office)

1. CLOSURE PLANS WITH COST ESTIMATES [1]
2. POST CLOSURE PLANS WITH COST ESTIMATE [2]
3. FINANCIAL INSTRUMENTS [3]
4. OTHER REQUIRED PLANS [4]
5. SPECIAL WASTE REQUEST [5]
6. LANDFILL PLANNING ANNUAL REPORT [6]
7. MANIFEST REPORTS [7]
8. MANIFEST RECORDS [8]
9. GWM DATA [9]
10. GWM PLANS [10]
11. OTHER [11]

8. FOLLOW-UP EVALUATION 07/29/86

1. WITH FIELD OFFICE PERSONNEL ONLY (1)
2. WITH CENTRAL OFFICE PERSONNEL [2]
3. FIELD VISIT (3)
4. RECORD REVIEW [4]

9. INCIDENT PROCESSING ___/___/___

1. ORAL COMPLAINT [1]
2. WRITTEN COMPLAINT [2]
3. EMERGENCY RESPONSE CALL [3]
4. OTHER (describe in comments) [4]

10. MISCELLANEOUS ___/___/___

1. FACILITY STATUS EVALUATION MEETINGS/LETTERS [1]
2. OTHER (describe in comments) [2]
3. ABORTED INSPECTION [3]
4. WARNING LETTER [4]

11. VIOLATION CODES: NONE [ ]

12. ENFORCEMENT ACTIONS:

	DATE ACTION TAKEN	SCHEDULED COMPLIANCE DATE	ACTUAL COMPLIANCE DATE
NOTICE OF VIOLATION	___/___/___	___/___/___	07/29/86
COMPLIANCE REVIEW MEETING	___/___/___	___/___/___	___/___/___
REFERRED TO ENFORCEMENT SECTION	___/___/___		

13. COMMENTS: (continue on reverse if necessary)

TEC

DOCKET NO. 000039000003

KEY OVER [ ]

14. PREPARED BY: Danell S. Hale | ID CODE: 012 | DATE: 08-11-86 | FIELD OFFICE: 104

T095051207

TENNESSEE DIVISION OF SOLID WASTE MANAGEMENT
ENFORCEMENT ACTIVITY REPORT

1. ID NO: TND095051207 | Name: NORTH AMERICAN RAYON CORP.

ADDRESS: WEST ELK AVE. ELIZABETHTON, TN. 37643

2. PROGRAM: Hazardous Waste [X] Solid Waste [ ]

3. KEY DATE: (MM-DD-YY) 11/18/87

VIOLATION: CLASS I [X] CLASS II [ ] | AREA OF VIOLATION (GW,CP,FIN,PLD,etc) OTHER

TYPE OF ACTION

SHOW CAUSE HEARING	DATE:	COMPLIANCE DATES: SCHEDULED -	ACTUAL -
DIRECTOR'S ORDERS	DATE: 06/14/88	COMPLIANCE DATES: SCHEDULED - 7/18/88	ACTUAL - 6/27/88
COMMISSIONER'S ORDERS	DATE:	COMPLIANCE DATES: SCHEDULED -	ACTUAL -
PENALTY	ASSESSED: $4,000.00 COLLECTED: $4,000.00		
CIVIL ACTION	DATE:		
CRIMINAL ACTION	DATE:		
OTHER			

WHAT DATE DID THIS FACILITY RETURN TO COMPLIANCE BY CORRECTING THE VIOLATION?

13. COMMENTS: (continue on reverse if necessary)

DOCKET NO. U 000075

[TEC] 000001

TND095051207

KEY OVER [ ]

14. PREPARED BY:	ID CODE:	DATE:	FIELD OFFICE:
WAYNE HARBIN	326	6/27/88	CENTRAL

#100-32

Prepared/Updated to November 1, 1988
Last Update Revised Sxns _____

FACILITY MANAGEMENT PLAN

I. Facility Name: North American Rayon Corporation

Location: Elizabethton, Tennessee

I. D. No.: TND 095051207

II. Environmental Significance: A surface impoundment and a waste pile has been operated at this facility without interim status or a permit.

III. "Regulated" Units (Non-SWMU): (Number by Type)

____	S01	____	D79	____	T01
____	S02	____	D80	____	T02
X	S03	____	D81	____	T03
X	S04	____	D83	____	T04 _____

IV. Status of Current Efforts

A. Ground Water Mon. ("Regulate" Units):

Applicable? X YES ____ NO

1. X Interim Status Detection Monitoring

____ Interim Status GW Quality Assessment

____ Permitted Detection Monitoring

____ Permitted Compliance Monitoring

2. Has CME been completed? ____ YES X NO

If so, give date of last CME Report: _____

DOCKET NO. 000087

TEC 000001

T095051207

3. Status/Adequacy of Monitoring Well System:

The Division approved the proposed Ground Water Monitoring System on May 23, 1988. Well installation was completed on August 29, 1988. Wells were sampled September 12, 1988.

4. Status/Adequacy of Sampling and Analysis Program:

Division approved the program on May 23, 1988.

5. Evaluation of Data: No data available as of October 31, 1988. Phone conversation with Haztech 10-27-88, indicates data is in final compilation and will soon be forwarded.

6. Next Action(s) Due: Next sampling December 12, 1988. Assess data from September 12, 1988, sampling event.

B. Permitting/Closure

1. Operating Permit: Applicable? _____YES __X_NO

_____Already Issued. Unit(s):_____

_____In Process. Unit(s):_____

_____Major Mod. in Process. Purpose: _____

Status:

Next Action(s) Due:

DOCKET NO. 000087
TEC 000002
T095051207

2. Post-Closure Permit: Applicable? ____YES ____NO

__X__MAYBE

_____Already Issued. Unit(s)_____

_____In Process. Unit(s)_____

_____Major Mod. in Process. Purpose:_____

Status:

Next Action(s) Due:

3. Interim Status Closure Plan Processing

_____Not Currently Applicable

__X__In Process

Type:__X__Final_____Partial/Units:_____

Target:__X__Clean_____Dirty_____Don't Know

_____Major Mod. in Process. Purpose:_____

Status: Facility submitted revised Closure Plans on November 27, 1988.

Next Action(s) Due: Division to approve or modify and approve the Closure Plans.

4. Performance of Closure

__X__Not Currently Applicable

_____Interim Status Closure in Process or Pending

Is Plan Approved? _____YES _____NO

Type:_____Final_____Partial/Unit(s):_____

Target:_____Clean_____Dirty_____ Don't Know

_____Permitted Closure in Process or Pending

Type:_____Final_____Partial/Unit(s):_____

Target:_____Clean_____Dirty

Status:

Next Action(s) Due:

5. RCRA Facility Assessment (RFA)

_____Not Needed

__X__Need as Yet Unknown

_____Completed and Approved by EPA

Findings:

_____In Process or Pending

Status:

Next Action(s) Due:

6. RCRA Facility Investigation (RFI) Plan Processing

_____Not Needed

__X__Need as Yet Unknown

_____Already Approved

_____In Process or Pending

Required via _____

Status:

Next Action(s) Due:

7. Performance of RFI

DOCKET NO. 1000087
TEC 000004
T095051207

_____Not Needed

__X__Need as Yet Unknown

_____Already Completed

Findings:

_____In Process or Pending

Status:

Next Action(s) Due:

8. Interim Corrective Measures

_____Not Needed

__X__Need as Yet Unknown

_____In Process or Pending

Required via _____

Status:

Next Action(s) Due:

C. RCRA Enforcement

1. Relevant State Orders

__X__Not Currently Applicable

_____Remain Unresolved

Violation(s):

Status:

DOCKET NO. 000087
TEC 000005
T095051207

Next Action(s) Due:

_____Are Pending

Violation(s):

Status:

Next Action(s) Due:

2. Relevant Federal Orders

__X__Not Currently Applicable

_____Remain Unresolved

Violation(s):

Status:

Next Action(s) Due:

DOCKET NO. 11 000087

TEC 000006

T095051207

TENNESSEE DIVISION OF SOLID WASTE MANAGEMENT

ENFORCEMENT ACTIVITY REPORT

1. ID NO: TND095051207 | Name: NORTH AMERICAN RAYON CORP.

ADDRESS: WEST ELK AVE. ELIZABETHTON, TN. 37643

2. PROGRAM: Hazardous Waste [X] Solid Waste [ ]

3. KEY DATE: (MM-DD-YY) 11/18/87

VIOLATION: CLASS I [X] CLASS II [ ] | AREA OF VIOLATION: (GW,CP,TIN,PLD, etc) OTHER

TYPE OF ACTION

SHOW CAUSE HEARING	DATE:	COMPLIANCE DATES: SCHEDULED -	ACTUAL -
DIRECTOR'S ORDERS	DATE: 06/14/88	COMPLIANCE DATES: SCHEDULED - 7/18/88	ACTUAL - 6/27/88
COMMISSIONER'S ORDERS	DATE:	COMPLIANCE DATES: SCHEDULED -	ACTUAL -
PENALTY	ASSESSED: $4,000.00 COLLECTED: $4,000.00		
CIVIL ACTION	DATE:		
CRIMINAL ACTION	DATE:		
OTHER			

WHAT DATE DID THIS FACILITY RETURN TO COMPLIANCE BY CORRECTING THE VIOLATION?

13. COMMENTS: (continue on reverse if necessary)

DOCKET NO. 000075

[TEC] 000001

TND095051207

KEY OVER [ ]

14. PREPARED BY:	ID CODE:	DATE:	FIELD OFFICE:
WAYNE HARBIN	326	6/27/88	CENTRAL

#100-32

Prepared/Updated to November 1, 1988
Last Update Revised Sxns _____

FACILITY MANAGEMENT PLAN

I. Facility Name: North American Rayon Corporation

Location: Elizabethton, Tennessee

I. D. No.: TND 095051207

II. Environmental Significance: A surface impoundment and a waste pile has been operated at this facility without interim status or a permit.

III. "Regulated" Units (Non-SWMU): (Number by Type)

____	S01	____	D79	____	T01
____	S02	____	D80	____	T02
X	S03	____	D81	____	T03
X	S04	____	D83	____	T04 _____

IV. Status of Current Efforts

A. Ground Water Mon. ("Regulate" Units):

Applicable? X YES ____ NO

1. X Interim Status Detection Monitoring

____ Interim Status GW Quality Assessment

____ Permitted Detection Monitoring

____ Permitted Compliance Monitoring

2. Has CME been completed? ____ YES X NO

If so, give date of last CME Report: _____

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3. Status/Adequacy of Monitoring Well System:

The Division approved the proposed Ground Water Monitoring System on May 23, 1988. Well installation was completed on August 29, 1988. Wells were sampled September 12, 1988.

4. Status/Adequacy of Sampling and Analysis Program:

Division approved the program on May 23, 1988.

5. Evaluation of Data: No data available as of October 31, 1988. Phone conversation with Haztech 10-27-88, indicates data is in final compilation and will soon be forwarded.

6. Next Action(s) Due: Next sampling December 12, 1988. Assess data from September 12, 1988, sampling event.

B. Permitting/Closure

1. Operating Permit: Applicable? _____YES __X_NO

_____Already Issued. Unit(s):_____

_____In Process. Unit(s):_____

_____Major Mod. in Process. Purpose: _____

Status:

Next Action(s) Due:

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2. Post-Closure Permit: Applicable? ____YES ____NO

__X__MAYBE

_____Already Issued. Unit(s)_____

_____In Process. Unit(s)_____

_____Major Mod. in Process. Purpose:_____

Status:

Next Action(s) Due:

3. Interim Status Closure Plan Processing

_____Not Currently Applicable

__X__In Process

Type:__X__Final_____Partial/Units:_____

Target:__X__Clean_____Dirty_____Don't Know

_____Major Mod. in Process. Purpose:_____

Status: Facility submitted revised Closure Plans on November 27, 1988.

Next Action(s) Due: Division to approve or modify and approve the Closure Plans.

4. Performance of Closure

__X__Not Currently Applicable

_____Interim Status Closure in Process or Pending

Is Plan Approved? _____YES _____NO

Type:_____Final_____Partial/Unit(s):_____

Target:_____Clean_____Dirty_____ Don't Know

_____Permitted Closure in Process or Pending

Type:_____Final_____Partial/Unit(s):_____

Target:_____Clean_____Dirty

Status:

Next Action(s) Due:

5. RCRA Facility Assessment (RFA)

_____Not Needed

__X__Need as Yet Unknown

_____Completed and Approved by EPA

Findings:

_____In Process or Pending

Status:

Next Action(s) Due:

6. RCRA Facility Investigation (RFI) Plan Processing

_____Not Needed

__X__Need as Yet Unknown

_____Already Approved

_____In Process or Pending

Required via _____

Status:

Next Action(s) Due:

7. Performance of RFI

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TEC 000004
T095051207

_____Not Needed

__X__Need as Yet Unknown

_____Already Completed

Findings:

_____In Process or Pending

Status:

Next Action(s) Due:

8. Interim Corrective Measures

_____Not Needed

__X__Need as Yet Unknown

_____In Process or Pending

Required via _____

Status:

Next Action(s) Due:

C. RCRA Enforcement

1. Relevant State Orders

__X__Not Currently Applicable

_____Remain Unresolved

Violation(s):

Status:

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Next Action(s) Due:

_____Are Pending

Violation(s):

Status:

Next Action(s) Due:

2. Relevant Federal Orders

__X__Not Currently Applicable

_____Remain Unresolved

Violation(s):

Status:

Next Action(s) Due:

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TEC 000006

T095051207

V. Unresolved Problems Needing Further Actions:

1. Determine if ground water has been contaminated by the operation of the surface impoundment.

2. Close the surface impoundment and waste pile.

VI. Planned Remedies:

Prob. No.	Action	Lead Agency	Target Date
1.	Evaluate ground water data.	DSWM	11/15/88
2.	Division to issue Public Notice.		11/14/88
3.	Division to review the revised Closure Plan and approve or modify and approve.		12/16/88

VII. Comments:

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T095051207

_____Are Pending

Violation(s):

Status:

Next Action(s) Due:

D. Superfund Actions

1. State Superfund: Currently Applicable?

_____YES __X__NO

Status:

Next Action(s) Due:

2. CERCLA: Currently Applicable? _____YES __X__NO

Status:

Next Action(s) Due:

E. Other Actions: Currently Applicable?____YES __X_NO

1. Action/Authority:

2. Status:

3. Next Action(s) Due:

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TEC 000007
T095051207

10-23 105

TENNESSEE DEPARTMENT OF HEALTH AND ENVIRONMENT
ENVIRONMENTAL LABORATORIES

Inorganic Analysis, Liquids

Laboratory Number KSW 1658
Received: Date 890626 Time 0845 by S.M.C.
Sampling Agency: ☐ APC ☒ SWM ☐ WM ☐ Other TWE
If SWM: ☒ SW ☐ SS ☐ SIU ☐ Other
If WM: ☐ GW ☐ WP ☐ WS ☐ Other
Send Report to Ronald M. Curtis, DCFO

Sample Source Monitor Well Water
I.D. NARC 2 (from MW 1)
Stream Mile Depth
County Carter Field No. NARC 2
Collected: Date 06/20/89 Time 10:55 by RMC
Potential Hazard ph, metals
Signature of Sampler Ronald M. Curtis

Sample Priority
☐ Emergency ☒ Legal ☒ Routine ☐ Ambient

Date priority needed 08/07/89

Code	✓*	Field Determinations	Units	Value
00095		conductivity	µmho	
00300		dissolved oxygen	mg/L	
00061		flow	CFS	
00400		pH	Units	
00545		residue, settleable	mg/L	
00077		Secchi disc	M	
00010		temperature	°C	
		Microbiology		
01616		coliform, fecal	# /100 mL	
31501		coliform, total	# /100 mL	
31679		streptococci, fecal	# /100 mL	
		Physical Characteristics		
00081		color, apparent	PtCoU	
00080		color, true	PtCoU	
		flash point	°C	
00403		pH, lab	Units	
00515		residue, dissolved	mg/L	
00545		residue, settleable	ml/L	
00530		residue, suspended	mg/L	
00500		residue, total	mg/L	
00095		specific cond. 25°C	µmho	
00070		turbidity	NTU	
		Organics		
00310		BOD, 5-day, 20°C	mg/L	
00335		COD (low)	mg/L	
00340		COD (high)	mg/L	
		Hydrocarbons	mg/L	

Code	✓	Organics	Units	Value
		formaldehyde, air impinger	µg	
38260		MBAS	mg/L	
00550		oil and grease	mg/L	
32730		phenols	µg/L	
00690		TOC	mg/L	
		Non-metallic Inorganics		
00437		acidity	mg/L	
00410		alkalinity, total	mg/L	
00415		alkalinity, phenolphthalein	mg/L	
01022		boron	ug/L	
00940		chloride	mg/L	
50060		chlorine, residual total	mg/L	
00720		cyanide	mg/L	
00290		dissolved oxygen	mg/L	
00950		fluoride	mg/L	
00900		hardness, total	mg/L	
82395		hardness, calcium	mg/L	
00635		nitrogen, total kjeldahl	mg/L	
00610		nitrogen, ammonia	mg/L	
00605		nitrogen, total organic	mg/L	
00630		nitrogen, NO3 & NO2	mg/L	
00615		nitrogen, nitrite (NO2)	mg/L	
00620		nitrogen, nitrate (NO3)	mg/L	
70507		orthophosphate, total	mg/L	
00666		phosphate, dissolved	mg/L	
00665		phosphate, total	mg/L	
00955		silica	mg/L	
00945		sulfate	mg/L	
00745		sulfide, total	mg/L	
00746		sulfide, dissolved	mg/L	

Code	✓	Metals	Units	Value
01105	✓	aluminum, Al	µg/L	13900
01097		antimony, Sb	µg/L	
01002	✓	arsenic, As	µg/L	<2
01007		barium, Ba	µg/L	
01012		beryllium, Be	µg/L	
01027		cadmium, Cd	µg/L	
00910	✓	calcium, Ca	mg/L	90.52
01034		chromium, Cr, total	µg/L	
01032		chromium, Cr, hex.	µg/L	
01037		cobalt, Co	µg/L	
01042		copper, Cu	µg/L	
01045		iron, Fe	µg/L	
01051		lead, Pb	µg/L	
00927		magnesium, Mg	mg/L	
01055		manganese, Mn	µg/L	
71900		mercury, Hg	µg/L	
01067		nickel, Ni	µg/L	
00937		potassium, K	mg/L	
01147	✓	selenium, Se	µg/L	<2
01077		silver, Ag	µg/L	
00929		sodium, Na	mg/L	
01059		thallium, Tl	µg/L	
01102		tin, Sn	µg/L	
01152		titanium, Ti	µg/L	
01092	✓	zinc, Zn	µg/L	48
		Other		

* please designate desired analyses by placing a check mark before the appropriate parameter.

Signature of Unit Supervisor: Edward McCrary Date AUG 07 1989
Signature of supervisor indicates that the work was performed in accordance with federally approved procedures where available and in compliance with current quality assurance criteria except as qualified below.
Comments:

DOCKET NO. 000119

000001 T095051207 TEC

TENNESSEE DEPARTMENT OF HEALTH AND ENVIRONMENT
ENVIRONMENTAL LABORATORIES
Inorganic Analysis, Liquids

Sample Source: Monitor well water
I.D.: ~~MW#2~~ NARC 2
Stream Mile: _____ Depth: _____
County: Carter Field No.: NARC 2
Collected: Date 06/20/89 Time 12:20 by RMC
Potential Hazard: ph, metals
Signature of Sampler: Randy M. Curtis

Laboratory Number: KSW 1659
Received: Date 890626 Time 0845 by SMC
Sampling Agency: ☐ APC ☑ SWM ☐ WM ☐ Other TEC
If SWM: ☑ SW ☐ SS ☐ SIU ☐ Other
If WM: ☐ GW ☐ WP ☐ WS ☐ Other
Send Report to: Randy M. Curtis, TCFO

Sample Priority: ☐ Emergency ☑ Legal ☑ Routine ☐ Ambient
Date priority needed: 08/07/89

Code	✓*	Field Determinations	Units	Value
00095		conductivity	µmho	
00300		dissolved oxygen	mg/L	
[illegible]061		flow	CFS	
[illegible]400		pH	Units	
00545		residue, settleable	mg/L	
00077		Secchi disc	M	
00010		temperature	°C	
		Microbiology		
01616		coliform, fecal	# /100 mL	
31501		coliform, total	# /100 mL	
31679		streptococci, fecal	# /100 mL	
		Physical Characteristics		
00081		color, apparent	PtCoU	
00080		color, true	PtCoU	
[illegible]		flash point	°C	
[illegible]403		pH, lab	Units	
[illegible]515		residue, dissolved	mg/L	
00545		residue, settleable	ml/L	
00530		residue, suspended	mg/L	
00500		residue, total	mg/L	
00095		specific cond. 25°C	µmho	
00070		turbidity	NTU	
		Organics		
00310		BOD, 5-day, 20°C	mg/L	
00335		COD (low)	mg/L	
00340		COD (high)	mg/L	
		Hydrocarbons	mg/L	

Code	✓	Organics	Units	Value
		formaldehyde, air impinger	µg	
38260		MBAS	mg/L	
00550		oil and grease	mg/L	
32730		phenols	µg/L	
00690		TOC	mg/L	
		Non-metallic Inorganics		
00437		acidity	mg/L	
00410		alkalinity, total	mg/L	
00415		alkalinity, phenolphthalein	mg/L	
01022		boron	ug/L	
00940		chloride	mg/L	
50060		chlorine, residual total	mg/L	
00720		cyanide	mg/L	
00290		dissolved oxygen	mg/L	
00950		fluoride	mg/L	
00900		hardness, total	mg/L	
82395		hardness, calcium	mg/L	
00635		nitrogen, total kjeldahl	mg/L	
00610		nitrogen, ammonia	mg/L	
00605		nitrogen, total organic	mg/L	
00630		nitrogen, NO3 & NO2	mg/L	
00615		nitrogen, nitrite (NO2)	mg/L	
00620		nitrogen, nitrate (NO3)	mg/L	
70507		orthophosphate, total	mg/L	
00666		phosphate, dissolved	mg/L	
00665		phosphate, total	mg/L	
00955		silica	mg/L	
00945		sulfate	mg/L	
00745		sulfide, total	mg/L	
00746		sulfide, dissolved	mg/L	

Code	✓	Metals	Units	Value
01105	✓	aluminum, Al	µg/L	490
01097		antimony, Sb	µg/L	
01002	✓	arsenic, As	µg/L	<2
01007		barium, Ba	µg/L	
01012		beryllium, Be	µg/L	
01027		cadmium, Cd	µg/L	
00910	✓	calcium, Ca	mg/L	125.22
01034		chromium, Cr, total	µg/L	
01032		chromium, Cr, hex.	µg/L	
01037		cobalt, Co	µg/L	
01042		copper, Cu	µg/L	
01045		iron, Fe	µg/L	
01051		lead, Pb	µg/L	
00927		magnesium, Mg	mg/L	
01055		manganese, Mn	µg/L	
71900		mercury, Hg	µg/L	
01067		nickel, Ni	µg/L	
00937		potassium, K	mg/L	
01147	✓	selenium, Se	µg/L	<2
01077		silver, Ag	µg/L	
00929		sodium, Na	mg/L	
01059		thallium, Tl	µg/L	
01102		tin, Sn	µg/L	
01152		titanium, Ti	µg/L	
01092	✓	zinc, Zn	µg/L	106
		Other		

* please designate desired analyses by placing a check mark before the appropriate parameter.

TEC

Signature of Unit Supervisor: Edward McCrary Date AUG 07 1989
Signature of supervisor indicates that the work was performed in accordance with federally approved procedures where available and in compliance with current quality assurance criteria except as qualified below
Comments:

DOCKET NO 000119 95051207

Mailing address
Lori Raasch, Ph.D.
Environmental Services Manager
North American Rayon Corp.
West Elk Avenue
Elizabethton, TN 37643

North American Rayon Corp.
EOI RFA
Conducted 21-22 Aug 89.
Final rpt dated 6 Dec 89

DRAFT

West Elk Avenue
Elizabethton, TN 37643

SWMU Identification Summary

SWMU	Type of unit	Years in operation	Waste Managed	Pollutant Migration Pathways (GW,SW,S,A,SS)	Evidence of Release	Exposure Potential	Need for Interim Measures	RFI	Recommendation No Further Action	Further Assessment	My comments ~~References~~
#1	Alkyl cellulose waste bins	62 (active)	Alkly cellulose gelling, shredding, cement breakdown, floor cleanings	None (inside building)	None	None	No		✓		Agree
#2	Roll-on Roll-off Dumpster, 40-yd³ container	Unknown (active)	Waste paper & scrap metals	None (inside building)	None	None	No		✓		Agree
#3 (AOC)	Raw Material Storage Building	62 (active)	Electric motors, finishing oil	None (concrete building)	None	None	No			Construct raised area or access doorway to prevent potential spills from entering storm drainage system	Disagree. This is a compliance recommendation. Change Table 4-1 on p. 11 and recommendation on p. 24 to read "No further action"
Eliminate from report (no wastes)											
#4 (AOC)	Caustic Spill	2 (existing)	5 gal of NaOH from a break in the circulation system	None (inside building)	None of release outside building	None	No			Clean up spill.	Disagree. Compliance recommendation since there has been no release to environment, change Table 4-1, page 12 and recommendation page 25 to read: "No further action"
NaOH has crystallized on concrete floor, and has not been cleaned up. A center drain near spill flows to alkaline sewer.											
#5	Roll-on Roll-off Dumpster, 42-yd³ container	Unknown (active)	General trash, 4 gal. Freon gas	SSW In gas but on concrete	None	Low	No		✓		Agree
#6	Joint Blast Gas House Dust Bin (5 yd³ roll-on bin)	42 (active)	Sand blast material used to clean aluminum lacquer coated spool & pressure vacuum washtanks	None (outside building) but on concrete under a shelter)	None	Low	No		✓		Agree

TEC 000001

DOCKET NO. 000112

T095051207

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SWMU Identification Summary

SWMU	Type of unit	Years in operation	Waste Managed	Pollutant Migration Pathways (GW,SW,S,A,SS)	Evidence of Release	Exposure Potential	Need for Interim Measures	RFI	Recommendation No Further Action	Further Assessment	Reference
#7	Scrap metal Bin	5 (active)	Ferrous & non-ferrous scrap metal	None (inside building)	None	None	No		✓		Agree
20-yd³ bin											
#8	Drum Storage Area & Drum Crusher	~~Empty~~ 3 (active)	Empty drums which had contained waste oil, waste lubricating oil, purge water from monitoring wells, & degreaser	None	None	None	No			Improve housekeeping practices	Disagree. This is a compliance matter. Change Table 4-1, page 13 recommendation on page 29 to "No Further Action"
30'x30' concrete pad w/ dike & overhead shelter and 250-gal sump ↑ 6"x6"											
#9	Underground Storage Tank & Soil	32 (inactive)	Soil contaminated w/ released No. 5 fuel oil	S, SW, GW	260 tons of contaminated soil are on a polyethylene liner	High	No			Remove all contaminated soil & GW and dispose of at HW disp. fac. Implement GW monitoring program after closure	Disagree. Change Table 4-1, page 13 and recommendation on page 32 to conduct characterization RFI at this SWMU
Tank & 260 tons of excavated (contaminated) soil sitting on polyethylene liner awaiting final disposition											
#10	Lead Scrap Yard	13 years (inactive)	Lead dross, lead pipes & equipment parts	S, SW (GW)	None	Medium	No			Low-priority oversight of CO approval & implementation to ensure certified closure	Okay to leave as is. SWMU has a closure plan which is currently under public notice, and closure has already begun. In RFA letter, list under section of units covered by closure plan
Stored on unbermed, uncovered asphalt pad.											
#11 (AOC)	Scrap Yard	62 (active)	Scrap lumber, steel, aluminum & iron	S, SW	None	Low	No		✓		Agree
Only open ground, uncontained and uncovered.											

TEC

000002

000112-3 T095051207

DOCKET

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SWMU Identification Summary

SWMU	Type of unit	Years in operation	Waste Managed	Pollutant Migration Pathways (GW,SW,S,A,SS)	Evidence of Release	Exposure Potential	Need for Interim Measures	RFI	Recommendation No Further Action	Further Assessment	Reference
#12	Landfill 18.3 acres Unlined	61 (still holds wastes)	Fly ash, Fly ash sludge, WWTP holding basin sludge	S, GW	None	Low	No		~~[illegible]~~	Low-priority oversight of closure certification review by state & acceptable GW sample C&A	Disagree. ~~not RCRA was~~ Change Table 4 on page 14 and recommend on page 37 to "No Further Act. vi covered under closure plan
				Non-hazardous waste landfill which was closed. See 1st paragraph of Section 2.5 on page 4 of EFI, where it says analysis indicated wastes are not RCRA wastes							
#13	Holding Basin	62 (Being closed)	Reactive sulfides from low-pH wastewaters	S, GW	None but likely	High	No			Low-priority oversight & ensurance of approval & certification of CP & closure by State	Okay to leave as is. In RFI letter, list under section of units covered by closure plan
	This is the spill diversion basin covered in the March 16, 1990 CP which is under public notice. Became a RCRA unit after receiving H_2SO_4 w/o pH of 1.9										
#14	Sludge Drying Lagoons (3)	17 (active)	Fly ash, zinc hydroxide, calcium sulfate	S, GW (but sludge is not hazardous)	None	Low	No		✓		Agree
	Received sludges from wastewater treatment plant Unlined lagoons, but bottom of all lagoons is clay			Never received hazardous or characteristic wastes							
#15	Wastewater Treatment Plant	17 (active)	Alkaline & acidic wastewaters, & scrubber water from powerhouse emission stacks	None (enclosed treatment plant)	None	Very low	No			Low priority oversight of state certification of clean closure of SWMU #13. Also capacity of WWTP is in question because of prior acid release being bypassed into river	Disagree. Change Table 4-1 on p. 15 and recommendation on page 42 to: "No further action

DOCKET NO. 000112 (3)

TEC 000003

T095051207

DRAFT

AOU Identification Summary

SWMU	Type of unit	Years in operation	Waste Managed	Pollutant Migration Pathways (GW,SW,S,A,SS)	Evidence of Release	Exposure Potential	Need for Interim Measures	RFI	Recommendation No Further Action	Recommendation Further Assessment	Reference
#16	Bar Grit Dumpster	17 (active)	Bar grit (cellulose fiber & lime) Cardboard & paper	S, SW.	None	Low	No		✓		Agree
20-yd³ dumpster at WWTP											
#17	Carbon disulfide storage pond	38 (active)	Water & product carbon disulfide &	S, SW, A	Approx. 4.5×10^6 lb/yr into air	Low	No		✓		Agree
125'×40' concrete holding basin w/10 tanks submerged in 10 ft of water. Transfer of carbon disulfide is by displacement, w/ water pumped in to remove clean product						Product only. Eliminate from report					
#18	Sodium Hydroxide Storage Tanks (2)	62 (active)	Sodium Hydroxide solution (product)	None (inside building)	None	None	No			✓ Repair water seal leak	Disagree. Change recommend. on p. 45 to "No further acti
2 horizontal tanks inside a concrete building approx 5 ft below grade w/ drainage directly to wastewater treatment plant						Product only. Eliminate from report					
#19	Storage Tank Farm	62 (active)	Product sulfuric acid, ammonium sulfide & dimethyl amine	S, SW, GW	1975 release of 20,000 gal of H_2SO_4 which bypassed WWTP & entered Watauga River	High	No		Integrity of decking appears good.		Disagree. What was written was a comment not recommendation. Change Table 4-1, page 16 and the recommendation on page 46 to read "Preliminary RFI of tank farm & drainage trench"
Ten 20,000-gal steel tanks on a concrete deck surrounded by a 6" × 8" retention wall. Tank releases would flow via a trench to the acid building sump (25,000 gal) & then to WWTP						Although product only, there has been a release, so include as AOC.					
#20 (AOC)	Asbestos insulated steam line system	62 (active)	Asbestos insulation	S, SW, A	None	Medium	No		Insufficient concentration of asbestos in exposed insulation & inaccessible exposed areas		Disagree. No a RCRA issue. Change Table 4-1, page 16 and recommendation on p. 47 to read "No Further Actio
Exposed friable asbestos insulation observed. Most elbow joints on steam lines in H_2SO_4 storage tank farm area were exposed & peeling						Not RCRA-regulated so eliminate from report					

DOCKET NO 000112 (4) [TEC] 000004 T095051207

DRAFT

SWMU Identification Summary

SWMU	Type of unit	Years in operation	Waste Managed	Pollutant Migration Pathways (GW,SW,S,A,SS)	Evidence of Release	Exposure Potential	Need for Interim Measures	RFI	Recommendation No Further Action	Further Assessment	Reference
#21	Roll-on/Roll-off Dumpster	Unknown (active)	Rayon, plastic, rubber + misc. trash	S, SW	None	Low	No		✓		Agree
40-yd³ trash dumpster Non-hazardous waste											
#22	NaOH Storage Tanks	62 (active)	Raw NaOH	S, SW	None	Low	No			Recommendation made concerning improving housekeeping practices	Disagree. This is totally inappropriate. Change Table 4-1 on page 17 and the recommendation on page 49 to "No further action"
62 20,000-gal vertical steel storage tanks w/ spills flowing to alkaline sewer trench & from here to WWTP.				Product only. Eliminate from report.							
#23	Dumpster	62 (active)	misc. non-haz trash	S, SW	None	Low	No		✓		Agree
#24	Fly Ash Silo	34 (active)	Coal Fly Ash	S, SW	Fly ash seen on ground around silo	High	No			Improve housekeeping practices	Disagree. Change Table 4-1 on page 18 and the recommendation on p. 51 to "No further action."
Designated as non-hazardous by TN Rule 1200-1-11-0.02(4)											
#25	Fuel Oil Storage Tanks	38 (active)	Raw Boiler Fuel Oil	S, SW	None	Low	No			Direct release valve to sewer system rather than to storm drainage system	Disagree. Inappropriate recommendation. Besides, raw fuel oil tanks aren't SWMUs. Just leave SWMU in but change Table 4-1 on page 18 and recommendation on page 52 to "No further action"
Four steel tanks w/concrete diking				Product only. Eliminate from report.							

DOCKET NO. 000112 (5)

TEC 000005

T095051207

DRAFT

SWMU Identification Summary

SWMU	Type of unit	Years in operation	Waste Managed	Pollutant Migration Pathways (GW,SW,S,A,SS)	Evidence of Release	Exposure Potential	Need for Interim Measures	RFI	Recommendation No Further Action	Further Assessment	Reference
#26 (AOC)	Carbon Disulfide Recovery Column	51 (active)	Carbon disulfide & oil	S, SW	15'x8' release on ground 100' from river; oil stains around base of column	High	No			Clean up oil release	Disagree. Change Table 4-1 on p.18 and the recommendation on p.53 to "Conduct prelim RFI out around unit, & specifically at area of oil release, to verify presence & absence of haz waste or haz constituents."
#27	Wastewater Lift Station		alkaline wastewater (mainly waste NaOH)	S, SW, GW	6000-gal wastewater release in 1987	Low	No			Ensure that overflow is sealed IAW State order issued after a compliance inspection	Disagree. This is a compliance recommendation. Change Table 4-1 on page 19 and the recommendation on p.54 to "No further action"
5'x15'x25' open-top concrete tank (10,000 gal) receiving WW from alkaline sewer & pumping it to the WWTP.											
#28	Sulfuric Acid Tanks (5)	62 (active)	Raw H_2SO_4	None (inside acid building)	None outside building	None	No		✓ Bit	Improve housekeeping	Disagree. Ludicrous. Change ~~[illegible]~~ recommendation on p.55 to eliminate reference to housekeeping.
Tanks supported on steel structures set on floor of acid brick, w/ releases contained in a zinc sump adjacent to acid building.						Product only. Eliminate from report					
#29	Waste Bins	Unknown (active)	alkali cellulose & cellulose xanthate	S, SW	None	Low	No		✓		Agree.
Two steel bins, each w/ capacity of 10-12 yd³											

TEC 000006

DOCKET NO. 000112

(6)

T095051207

North American Kayon
TND09 5051207
Ground Water Monitoring
James Scarbrough

MAR SAMPLING RESULTS PARAMETER		EPA Drinking Wat.Std.	det.lim	blank	Sample	dupl	repl 2	repl 3	repl 4
FIELD TESTS				10-17-99 Bem.	#3				
pH	s.u.				7.1				
Conductivity	umhos/cm				270				
depth	feet				48.00				
casing	el. ft.								
ground	el. ft.								
bottom	depth								
G'water elevation									
Gross Alpha	pCi/L	15			0.0+-4.3				
Gross Beta	pCi/L	4 mREM/yr			0.0+-4.2				
Radium-226	pCi/L	5			0.3+-0.1				
Radium-228	pCi/L				5.8+-1.1				
Fluoride	mg/L	1.4-2.4		<0.1	0.16	0.14			
Chloride	mg/L			<1.0	5.1	5.2			
Nitrate	mg/L	10		<0.1	2.1	1.9			
Sulfate	mg/L			<2.0	27	27			
TOX	mg/L			0.45	0.73	0.68	0.72	1.2	1.1
TOC	mg/L			0.86	22	8.3	20	1	15
Phenols	mg/L			<0.005	<0.005	<0.005			
Arsenic	mg/L	0.05		<0.005	<0.005	<0.005			
Silver	mg/L	0.05		<0.5	<0.5	<0.5			
Barium	mg/L	1		<0.10	<0.10	<0.10			
Cadmium	mg/L	0.01		<0.01	<0.01	<0.01			
Chromium	mg/L	0.05		<0.03	<0.03	<0.03			
Mercury	mg/L	0.0002		<0.0005	<0.0005	<0.0005			
Lead	mg/L	0.05		<0.005	<0.005	<0.005			
Selenium	mg/L	0.01		<0.01	<0.01	<0.01			
Iron	mg/L			<0.03	2.3	1.9			
Manganese	mg/L			<0.01	0.07	0.03			
Sodium	mg/L			0.43	3.3	2.9			
T-coliform	count				<1/100		<1/100	<1/100	
alpha-BHC		ug/L	(0.05)		N.D.				
beta-BHC		ug/L	(0.05)		N.D.				
delta-BHC		ug/L	(0.05)		N.D.				
gamma-BHC(lindane)		ug/L	(0.05)		N.D.				
Heptachlor		ug/L	(0.05)		N.D.				
Aldrin		ug/L	(0.05)		N.D.				
Heptachlor epoxide		ug/L	(0.05)		N.D.				
Endosulfan I		ug/L	(0.05)		N.D.				
Dieldrin		ug/L	(0.10)		N.D.				
4,4'-DDE		ug/L	(0.10)		N.D.				
Endrin		ug/L	(0.10)		N.D.				
Endosulfan II		ug/L	(0.10)		N.D.				
4,4'-DDT		ug/L	(0.10)		N.D.				
Methoxychlor		ug/L	(0.50)		N.D.				
Toxaphene		ug/L	(1.00)		N.D.				
Arochlor 1016		ug/L	(0.50)		N.D.				
Arochlor 1221		ug/L	(0.50)		N.D.				
Arochlor 1232		ug/L	(0.50)		N.D.				
Arochlor 1242		ug/L	(0.50)		N.D.				
Arochlor 1248		ug/L	(0.50)		N.D.				
Arochlor 1254		ug/L	(1.0)		N.D.				

MAR 1 _ 1999

TEC 000001

DOCKET NO. 000129 T095051207

MAR SAMPLING RESULTS

PARAMETER	EPA Drinking Wat.Std.		blank	Sample	dupl	repl 2	repl 3	repl 4
		det.lim						
Arochlor 1260	ug/L	(1.0)		N.D.				
Chlordane (tech)	ug/L	(0.50)		N.D.				
Endrin aldehyde	ug/L	(0.10)		N.D.				
Endrin ketone	ug/L	(0.10)		N.D.				
alpha-chlordane	ug/L	(0.50)		N.D.				
gamma-chlordane	ug/L	(0.50)		N.D.				
2,4-D	ug/L	(0.002)		N.D.				
2,4,5-TP	ug/L	(0.0004)		N.D.				

MAR 1 1990

DOCKET NO. 000129

TEC 000002

T095051207

MAR SAMPLING RESULTS		EPA Drinking Wat.Std.	det.lim	blank	Sample	dupl	repl 2	repl 3	repl 4
PARAMETER									
FIELD TESTS				11-16-89	Bem #3				
pH	s.u.				7.1				
Conductivity	umhos/cm				330				
Depth	feet				48.50				
casing	el. ft.								
ground	el. ft.								
bottom	depth								
G'water elevation									
Gross Alpha	pCi/L	15			0.0+-3.4				
Gross Beta	pCi/L	4	mREM/yr		2.0+-3.8				
Radium, tot	pCi/L	5			1.5+-1.5				
Fluoride	mg/L	1.4-2.4		<0.10	0.16	0.14			
Chloride	mg/L			<1.0	6.2	6.3			
Nitrate	mg/L	10		<0.10	2.2	2.5			
Sulfate	mg/L			2.3	22	20			
TOX	mg/L			<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
TOC	mg/L			1.1	3.1	24	25	19	18
Phenols	mg/L			<0.005	<0.005	<0.005			
Arsenic	mg/L	0.05		<0.005	<0.005	<0.005			
Silver	mg/L	0.05		<0.05	<0.05	<0.05			
Barium	mg/L	1		<0.10	<0.10	<0.10			
Cadmium	mg/L	0.01		<0.01	<0.01	<0.01			
Chromium	mg/L	0.05		<0.03	<0.03	<0.03			
Mercury	mg/L	0.0002		<0.0005	<0.0005	<0.0005			
Lead	mg/L	0.05		<0.005	<0.005	<0.005			
Selenium	mg/L	0.01		<0.01	<0.01	<0.01			
Iron	mg/L			<0.03	1.7	1.7			
Manganese	mg/L			<0.01	0.056	0.054			
Sodium	mg/L			0.43	2.8	2.7			
T-coliform	count				<1/100		<1/100	<1/100	
alpha-BHC		ug/L	(0.05)		N.D.				
beta-BHC		ug/L	(0.05)		N.D.				
delta-BHC		ug/L	(0.05)		N.D.				
gamma-BHC(lindane)		ug/L	(0.05)		N.D.				
Heptachlor		ug/L	(0.05)		N.D.				
Aldrin		ug/L	(0.05)		N.D.				
Heptachlor epoxide		ug/L	(0.05)		N.D.				
Endosulfan I		ug/L	(0.05)		N.D.				
Dieldrin		ug/L	(0.10)		N.D.				
4,4'-DDE		ug/L	(0.10)		N.D.				
Endrin		ug/L	(0.10)		N.D.				
Endosulfan II		ug/L	(0.10)		N.D.				
4,4'-DDT		ug/L	(0.10)		N.D.				
Methoxychlor		ug/L	(0.50)		N.D.				
Toxaphene		ug/L	(1.00)		N.D.				
Aroclor 1016		ug/L	(0.50)		N.D.				
Aroclor 1221		ug/L	(0.50)		N.D.				
Aroclor 1232		ug/L	(0.50)		N.D.				
Aroclor 1242		ug/L	(0.50)		N.D.				
Aroclor 1248		ug/L	(0.50)		N.D.				
Aroclor 1254		ug/L	(1.0)		N.D.				
Aroclor 1260		ug/L	(1.0)		N.D.				

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TEC - 000003

000129

095051207

MAR SAMPLING RESULTS	EPA Drinking Wat.Std.		blank	Sample	dupl	repl 2	repl 3	repl 4
PARAMETER		det.lim						
Chlordane (tech)	ug/L	(0.50)		N.D.				
Endrin aldehyde	ug/L	(0.10)		N.D.				
Endrin ketone	ug/L	(0.10)		N.D.				
alpha-chlordane	ug/L	(0.50)		N.D.				
gamma-chlordane	ug/L	(0.50)		N.D.				
2,4-D	ug/L	(0.002)		N.D.				
2,4,5-TP	ug/L	(0.0004)		N.D.				

DOCKET NO. 000129
TEC 000004
T095051207

MAR SAMPLING RESULTS		EPA Drinking Wat.Std.	det.lim	blank	Sample	dupl	repl 2	repl 3	repl 4
PARAMETER									
FIELD TESTS				12-06-89	Bem #3				
pH	s.u.				7.2				
Conductivity	umhos/cm				330				
depth	feet				49.00				
casing	el. ft.								
ground	el. ft.								
bottom	depth								
G'water elevation									
Gross Alpha	pCi/L	15			0.7+-2.2				
Gross Beta	pCi/L	4	mREM/yr		0.0+-3.6				
Radium, tot	pCi/L	5			0.7+-0.3				
Fluoride	mg/L	1.4-2.4		<0.1	0.11	0.13			
Chloride	mg/L			<1.0	5.5	5.1			
Nitrate	mg/L	10		<0.10	2	2			
Sulfate	mg/L			<2.0	26	25			
TOX	mg/L			1.3	3.6	2.6	2.4	2.6	3.6
TOC	mg/L			0.79	2.3	2.5	1.3	1.1	2
Phenols	mg/L			<0.005	<0.005	<0.005			
Arsenic	mg/L	0.05		<0.005	<0.005	<0.005			
Silver	mg/L	0.05		<0.05	<0.05	<0.05			
Barium	mg/L	1		<0.1	<0.1	<0.1			
Cadmium	mg/L	0.01		<0.01	<0.01	<0.01			
Chromium	mg/L	0.05		<0.03	<0.03	<0.03			
Mercury	mg/L	0.0002		<0.0005	<0.0005	<0.0005			
Lead	mg/L	0.05		<0.005	<0.005	<0.005			
Selenium	mg/L	0.01		<0.01	<0.01	<0.01			
Iron	mg/L			<0.03	1	1			
Manganese	mg/L			<0.01	0.04	0.04			
Sodium	mg/L			0.37	2.7	2.8			
2,4-D	ug/L		(0.002)		N.D.				
Endrin	ug/L		(0.10)		N.D.				
Lindane	ug/L		(0.10)		N.D.				
Methoxychlor	ug/L		(0.50)		N.D.				
Toxaphene	ug/L		(4.00)		N.D.				
T-coliform	count				<1/100		<1/100	<1/100	

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TEC

000005

T095051207

DOCKET NO 000129

NAP SAMPLING RESULTS		EPA Drinking		blank	Sample	dupl	repl 2	repl 3	repl 4
PARAMETER		Wat.Std.	det.lim						
FIELD TESTS				12-18-89	Bem #2				
pH	s.u.				7.2				
Conductivityumhos/cm					360				
depth	feet				48.75				
casing	el. ft.								
ground	el. ft.								
bottom	depth								
G'water elevation									
Gross Alpha	pCi/L	15			<1.0				
Gross Beta	pCi/L	4	mREM/yr		<1.0				
Radium, tot	pCi/L	5			<1.0				
Fluoride	mg/L	1.4-2.4		<0.1	0.11	0.12			
Chloride	mg/L			<1.0	5.2	5.3			
Nitrate	mg/L	10		<0.10	1.9	1.9			
Sulfate	mg/L			<2.0	27	22			
TOX	mg/L			0.49	0.33	0.79	0.45	0.52	0.47
TOC	mg/L			0.64	3.4	3.5	12	3.4	11
Phenols	mg/L			<0.005	<0.005	<0.005			
Arsenic	mg/L	0.05		<0.005	<0.005	<0.005			
Silver	mg/L	0.05		<0.05	<0.05	<0.05			
Barium	mg/L	1		<0.1	<0.1	<0.1			
Cadmium	mg/L	0.01		<0.01	<0.01	<0.01			
Chromium	mg/L	0.05		<0.03	<0.03	<0.03			
Mercury	mg/L	0.0002		<0.0005	<0.0005	<0.0005			
Lead	mg/L	0.05		<0.005	<0.005	<0.005			
Selenium	mg/L	0.01		<0.01	<0.01	<0.01			
Iron	mg/L			<0.03	0.21	0.21			
Manganese	mg/L			<0.01	0.02	0.02			
Sodium	mg/L			0.08	3	3.1			
T-coliform	count				<1/100		<1/100	<1/100	
alpha-BHC		ug/L	(0.05)		N.D.				
beta-BHC		ug/L	(0.05)		N.D.				
delta-BHC		ug/L	(0.05)		N.D.				
gamma-BHC(lindane)		ug/L	(0.05)		N.D.				
Heptachlor		ug/L	(0.05)		N.D.				
Aldrin		ug/L	(0.05)		N.D.				
Heptachlor epoxide		ug/L	(0.05)		N.D.				
Endosulfan I		ug/L	(0.05)		N.D.				
Dieldrin		ug/L	(0.10)		N.D.				
4,4'-DDE		ug/L	(0.10)		N.D.				
Endrin		ug/L	(0.10)		N.D.				
Endosulfan II		ug/L	(0.10)		N.D.				
4,4'-DDT		ug/L	(0.10)		N.D.				
Methoxychlor		ug/L	(0.50)		N.D.				
Toxaphene		ug/L	(1.00)		N.D.				
Arochlor 1016		ug/L	(0.50)		N.D.				
Arochlor 1221		ug/L	(0.50)		N.D.				
Arochlor 1232		ug/L	(0.50)		N.D.				
Arochlor 1242		ug/L	(0.50)		N.D.				
Arochlor 1248		ug/L	(0.50)		N.D.				
Arochlor 1254		ug/L	(1.0)		N.D.				
Arochlor 1260		ug/L	(1.0)		N.D.				

MAR 1 _ 1990

TEC 000006

000129

T095051207

VAR SAMPLING RESULTS	EPA Drinking		blank	Sample	dupl	repl 2	repl 3	repl 4
PARAMETER	Wat.Std.	det.lim						
Chlordane (tech)	ug/L	(0.50)		N.D.				
Endrin aldehyde	ug/L	(0.10)		N.D.				
Endrin ketone	ug/L	(0.10)		N.D.				
alpha-chlordane	ug/L	(0.50)		N.D.				
gamma-chlordane	ug/L	(0.50)		N.D.				
2,4-D	ug/L	(0.002)		N.D.				
2,4,5-TP	ug/L	(0.0004)		N.D.				

MAR 1 1990

TEC 000007

000129

DOCKET NO T095051207

MAR SAMPLING RESULTS		EPA Drinking Wat.Std.	det.lim	blank	Sample	dupl	repl 2	repl 3	repl 4
PARAMETER									
FIELD TESTS				12-28-89	Bem #3				
pH	s.u.				7.82				
Conductivity	umhos/cm				376				
Temperature	deg C				15.1				
depth	feet				48.75				
casing	el. ft.								
ground	el. ft.								
bottom	feet								
GWater elevation									
TOX	ug/L				5.3		N.D.	9.2	N.D.
TOC	mg/L				1.44		0.82	0.8	0.89

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TEC 000008

11 000129

DOCKET NO. T09505120/

5

MAR SAMPLING RESULTS		EPA Drinking Wat.Std.	det.lim	blank	Sample	dupl	repl 2	repl 3	repl 4
PARAMETER									
FIELD TESTS				12-29-89	MW #1				
pH	s.u.				7.4				
Conductivity	umhos/cm				779				
Temperature	deg C				15.8				
depth	feet				26.25				
casing	el. ft.				1490.2				
ground	el. ft.				1487.18				
bottom	feet				60				
G'water elevation					1463.95				
TOX	ug/L				N.D.		N.D.	N.D.	N.D.
TOC	mg/L				1.11		1.01	1.00	0.99

MAR 1 1990

TEC 000009

IDR 000129

DOCKET NO. T095051207

MAR SAMPLING RESULTS		EPA Drinking Wat.Std.	det.lim	blank	Sample	dupl	repl 2	repl 3	repl 4
PARAMETER									
FIELD TESTS				10-28-89 MW #2					
pH	s.u.				6.86				
Conductivity	umhos/cm				2720				
Temperature	deg C				15.9				
depth	feet				34.17				
casing	el. ft.				1500.97				
ground	el. ft.				1499.42				
bottom	feet				58.5				
gl water elevation					1466.8				
TOX	ug/L				N.D.	11	N.D.	N.D.	N.D.
				TOX		N.D.			
TOC	mg/L				3.36	3.78	3.29	3.56	3.12
				TOC		3.54			
				TOC		3.83			

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000010

[TEC]

DOCKET NO. 000129 T09505 1207

MAR SAMPLING RESULTS		EPA Drinking Wat.Std.	det.lim	blank	Sample	dupl	repl 2	repl 3	repl 4
PARAMETER									
FIELD TESTS				12-23-89	MW #3				
pH	s.u.				7.27				
Conductivity	umhos/cm				3180				
Temperature	deg C				19.1				
Depth	feet				23.83				
Casing	el. ft.				1503.35				
Ground	el. ft.				1500.68				
Bottom	feet				33.5				
Pilwater elevation					1479.82				
TOX	ug/L				26		32	26	32
TOC	mg/L				3.74		3.74	3.83	3.49

000011

TEC

000129 T095051207

MAR SAMPLING RESULTS		EPA Drinking Wat.Std.	det.lim	blank	Sample	dupl	repl 2	repl 3	repl 4
PARAMETER									
FIELD TESTS				12-28-89	MW #4				
pH	s.u.				7.31				
Conductivity	umhos/cm				977				
Temperature	deg C				16.5				
depth	feet				33.75				
casing	el. ft.				1500.65				
ground	el. ft.				1498.12				
bottom	feet				59.2				
GW water elevation					1466.9				
TOX	ug/L				22		15	15	16
TOC	mg/L				2.73		2.46	1.85	1.93

DOCKET NO. 1 000129

TEC 000012

T095051207

NAR SAMPLING RESULTS		EPA Drinking		blank	Sample	dupl	repl 2	repl 3	repl 4
PARAMETER		Wat.Std.	det.lim						
FIELD TESTS				12-28-89	MW #5				
pH	s.u.				7.06				
Conductivityumhos/cm					240				
Temperature	deg C				15.7				
depth	feet				32.33				
casing	el. ft.				1493.24				
ground	el. ft.				1490.84				
bottom	feet				58.5				
Q'water elevation					1460.91				
TOC	mg/L				0.79	0.77	0.69		
TKN	mg/L				28.6	43.8			
Chloride	mg/L				6.03	5.33			
Nitrate	mg/L	10			0.41	0.41			
Chromium	mg/L	0.05			0.007	0.008			
Lead	mg/L	0.05			<0.025	<0.025			
Phenol	mg/L				<0.01	<0.01			

Vinyl chloride	DL=1 ug/L	N.D.
1,1-Dichloroethylene	DL=1 ug/L	N.D.
Methylene chloride	DL=1 ug/L	N.D.
t-1,2-dichloroethylene	DL=1 ug/L	N.D.
1,1-dichloroethane	DL=1 ug/L	N.D.
Chloroform	DL=1 ug/L	N.D.
1,1,1-trichloroethane	DL=1 ug/L	N.D.
Carbon tetrachloride	DL=1 ug/L	N.D.
1,2-dichloroethane	DL=1 ug/L	N.D.
Trichloroethylene	DL=1 ug/L	N.D.
1,2-dichloropropane	DL=1 ug/L	N.D.
Bromodichloromethane	DL=1 ug/L	N.D.
t-1,3-dichloropropene	DL=1 ug/L	N.D.
c-1,2-dichloropropene	DL=1 ug/L	N.D.
1,1,2-trichloroethane	DL=1 ug/L	N.D.
1,1,2,2-tetrachloroethylene	DL=1 ug/L	N.D.
Dibromochloromethane	DL=1 ug/L	N.D.
Chlorobenzene	DL=1 ug/L	N.D.
Bromoform	DL=1 ug/L	N.D.
1,1,2,2-tetrachloroethane	DL=1 ug/L	N.D.
1,3-dichlorobenzene	DL=1 ug/L	N.D.
1,4-dichlorobenzene	DL=1 ug/L	N.D.
1,2-dichlorobenzene	DL=1 ug/L	N.D.
Benzene	DL=1 ug/L	N.D.
Toluene	DL=1 ug/L	N.D.
Ethyl benzene	DL=1 ug/L	N.D.
m,p-xylene	DL=1 ug/L	N.D.
o-xylene	DL=1 ug/L	N.D.

MAR 1 - 1990

DOCKET NO. 00012930

TEC 000013

095051207

MAR SAMPLING RESULTS PARAMETER		EPA Drinking Wat.Std.	det.lim	blank	Sample	dupl	repl 2	repl 3	repl 4
FIELD TESTS				12-28-89 MW #6					
pH	s.u.				6.71				
Conductivity	umhos/cm				3290				
Temperature	deg C				14.9				
depth	feet				32.59				
casing	el. ft.				1496.93				
ground	el. ft.				1493.33				
bottom	feet				46.5				
G'water elevation					1464.25				
TOC					19.7				
TKN	mg/L				55.8				
Chloride	mg/L				37.2				
Nitrate	mg/L	10			0.25				
Chromium	mg/L	0.05			<0.005				
Lead	mg/L	0.05			0.142				
Phenol	mg/L				<0.01				
Vinyl chloride			DL=1 ug/L		N.D.				
1,1-Dichloroethylene			DL=1 ug/L		N.D.				
Methylene chloride			DL=1 ug/L		N.D.				
t-1,2-dichloroethylene			DL=1 ug/L		N.D.				
1,1-dichloroethane			DL=1 ug/L		N.D.				
Chloroform			DL=1 ug/L		N.D.				
1,1,1-trichloroethane			DL=1 ug/L		N.D.				
Carbon tetrachloride			DL=1 ug/L		N.D.				
1,2-dichloroethane			DL=1 ug/L		N.D.				
Trichloroethylene			DL=1 ug/L		N.D.				
1,2-dichloropropane			DL=1 ug/L		N.D.				
Bromodichloromethane			DL=1 ug/L		N.D.				
t-1,3-dichloropropene			DL=1 ug/L		N.D.				
c-1,2-dichloropropene			DL=1 ug/L		N.D.				
1,1,2-trichloroethane			DL=1 ug/L		N.D.				
1,1,2,2-tetrachloroethylene			DL=1 ug/L		N.D.				
Dibromochloromethane			DL=1 ug/L		N.D.				
Chlorobenzene			DL=1 ug/L		N.D.				
Bromoform			DL=1 ug/L		N.D.				
1,1,2,2-tetrachloroethane			DL=1 ug/L		N.D.				
1,3-dichlorobenzene			DL=1 ug/L		N.D.				
1,4-dichlorobenzene			DL=1 ug/L		N.D.				
1,2-dichlorobenzene			DL=1 ug/L		N.D.				
Benzene			DL=1 ug/L		N.D.				
Toluene			DL=1 ug/L		N.D.				
Ethyl benzene			DL=1 ug/L		N.D.				
m,p-xylene			DL=1 ug/L		N.D.				
o-xylene			DL=1 ug/L		N.D.				

MAR 1 _ 1990

DOCKET NO. 11 000122

TEC 000014

T09505 1207

MAR SAMPLING RESULTS		EPA Drinking Wat.Std.	det.lim	blank	Sample	dupl	repl 2	repl 3	repl 4
PARAMETER									
FIELD TESTS				10-23-89 MW #7					
pH	s.u.				6.72				
Conductivity	umhos/cm				3420				
Temperature	deg C				15.4				
depth	feet				35.50				
casing	el. ft.				1500.83				
ground	el. ft.				1497.58				
bottom	feet				49.5				
G'water elevation					1465.33				
TOC					21.33				
TKN	mg/L				95.3				
Chloride	mg/L				39.1				
Nitrate	mg/L	10			0.27				
Chromium	mg/L	0.05			<0.005				
Lead	mg/L	0.05			0.157				
Phenol	mg/L				<0.01				
Vinyl chloride			DL=1 ug/L		N.D.				
1,1-Dichloroethylene			DL=1 ug/L		N.D.				
Methylene chloride			DL=1 ug/L		N.D.				
t-1,2-dichloroethylene			DL=1 ug/L		N.D.				
1,1-dichloroethane			DL=1 ug/L		N.D.				
Chloroform			DL=1 ug/L		N.D.				
1,1,1-trichloroethane			DL=1 ug/L		N.D.				
Carbon tetrachloride			DL=1 ug/L		N.D.				
1,2-dichloroethane			DL=1 ug/L		N.D.				
Trichloroethylene			DL=1 ug/L		N.D.				
1,2-dichloropropane			DL=1 ug/L		N.D.				
Bromodichloromethane			DL=1 ug/L		N.D.				
t-1,3-dichloropropene			DL=1 ug/L		N.D.				
c-1,2-dichloropropene			DL=1 ug/L		N.D.				
1,1,2-trichloroethane			DL=1 ug/L		N.D.				
1,1,2,2-tetrachloroethylene			DL=1 ug/L		N.D.				
Dibromochloromethane			DL=1 ug/L		N.D.				
Chlorobenzene			DL=1 ug/L		N.D.				
Bromoform			DL=1 ug/L		N.D.				
1,1,2,2-tetrachloroethane			DL=1 ug/L		N.D.				
1,3-dichlorobenzene			DL=1 ug/L		N.D.				
1,4-dichlorobenzene			DL=1 ug/L		N.D.				
1,2-dichlorobenzene			DL=1 ug/L		N.D.				
Benzene			DL=1 ug/L		N.D.				
Toluene			DL=1 ug/L		N.D.				
Ethyl benzene			DL=1 ug/L		N.D.				
m,p-xylene			DL=1 ug/L		N.D.				
o-xylene			DL=1 ug/L		N.D.				

DOCKET NO. 000129 1990

TEC 000015

T095051207

MAR SAMPLING RESULTS PARAMETER	EPA Drinking Wat.Std.	det.lim	blank	Sample	dupl	repl 2	repl 3	repl 4

Piezometer Report

	PZ #1	PZ #2	PZ #3	PZ #4	PZ #5	PZ #6
	12-28-89	12-28-89	12-28-89	12-28-89	12-28-89	12-28-89
depth, ft	35.00	33.00	27.75	34.67	14.58	32.00
el. ft.	1499.58	1494.2	1501.98	1502.24	1479.27	1500.48
G'water elv.	1464.58	1461.2	1474.23	1467.57	1464.69	1468.48

MAR 1 1990

TN-100

10-25

Division of Solid Waste Management

TENNESSEE DEPARTMENT OF HEALTH AND ENVIRONMENT
ENVIRONMENTAL LABORATORIES

Inorganic Analysis, Solids

Date 4/18/90 File No.

Laboratory Received by 900306

Received: Date 900306 Time 1500 by LAB

Sampling Agency: ☐ APC ☒ SWM ☐ DOT ☐ FSF ☐ SSF ☐ FUST ☐ SUST ☐ EEP ☐ WS ☐ GW ☐ WP ☐ DRH ☐ Other

Sample Source North American Rayon Corp.

I.D. TND 09-305-1207

Stream Mile 51 Depth Composite

County Carter Field No. 903-2

Collected: Date 3-6-90 Time 9:45 By JW

Contact Hazard none

Signature of Sampler Fred Willington

Sample type: ☒ Sediment ☐ Tissue ☐ Air ☐ Other

Sample Priority: ☐ Emergency ☒ Legal ☐ Routine ☐ Ambient

Requested priority date

Send Report to J.C. Field office & Rowie Bowers & Central office

code	✓*	Sediment	Unit	value
01108		aluminum, Al	mg/kg	23200
01003		arsenic, As	mg/kg	24
01008		barium, Ba	mg/kg	171
01023		boron, B	mg/kg	~~525~~ Can
01028		cadmium, Cd	mg/kg	4.5
00917		calcium, Ca	mg/kg	2820
01029		chromium, Cr	mg/kg	23800
01038		cobalt, Co	mg/kg	14
01043		copper, Cu	mg/kg	40.8
01170		iron, Fe	mg/kg	2.3
01052		lead, Pb	mg/kg	129
00924		magnesium, Mg	mg/kg	2205
01053		manganese, Mn	mg/kg	497
71921		mercury, Hg	mg/kg	*
01068		nickel, Ni	mg/kg	25
00938		potassium, K	mg/kg	2860
01148		selenium, Se	mg/kg	1.2
01078		silver, Ag	mg/kg	<1
00934		sodium, Na	mg/kg	461
01093		zinc, Zn	mg/kg	9830
00721		cyanide, CN	mg/kg	<1
		nitrogen, ammonia	mg/kg	
00633		nitrogen, NO2 & NO3	mg/kg	
		nitrogen, total kjeldahl	mg/kg	
		oil and grease	mg/g	
		hydrocarbons, total	mg/g	
		percent solids	%	67.4
32731		phenols	mg/kg	
00668		phosphate, total	mg/kg	

code	✓	Tissue	Unit	value
81666		aluminum, Al	mg/kg	
01004		arsenic, As	mg/kg	
81658		barium, Ba	mg/kg	
81657		boron, B	mg/kg	
71940		cadmium, Cd	mg/kg	
71939		chromium, Cr	mg/kg	
81659		cobalt, Co	mg/Kg	
71937		copper, Cu	mg/kg	
81660		iron, Fe	mg/kg	
71936		lead, Pb	mg/kg	
81741		manganese, Mn	mg/kg	
71930		mercury, Hg	mg/kg	
01069		nickel, Ni	mg/kg	
01149		selenium, Se	mg/kg	
81742		silver, Ag	mg/kg	
71938		zinc, Zn	mg/kg	
34326		cyanide, CN	mg/kg	
34468		phenols	mg/kg	
		Coal		
		ash	%	
		heat content	BTU	
		Moisture	%	
		sulfur	%	

code	✓	EP Toxicity	Unit	value
01000		arsenic, As	µg/L	
01005		barium, Ba	µg/L	
01025		cadmium, Cd	µg/L	
01030		chromium, total Cr	µg/L	
01049		lead, Pb	µg/L	
71890		mercury, Hg	µg/L	
01065		nickel, Ni	µg/L	
01145		selenium, Se	µg/L	
01075		silver, Ag	µg/L	
00723		cyanide, CN	µg/L	

		Other		
01023		boron, B		≤ 25

DOCKET NO. 000141

TEC 000001

T09505 1207 Can

Signature of Unit Supervisor: Edward McCrary Date APR 18 1990

Signature of Unit Supervisor: Date

Signature of supervisor indicates that the work was performed in accordance with federally approved procedures where available and in compliance with current quality assurance criteria except as qualified below.

Comments:

* please designate desired analyses by placing a check mark before the appropriate parameter. * not to analysis per RB 4/12/90

PH-3011 LAB (rev. 8/89)

TENNESSEE DEPARTMENT OF HEALTH AND ENVIRONMENT
ENVIRONMENTAL LABORATORIES

90-03-0058

Laboratory Number K003006
Received: Date 900306 Time 1500 by LAB
Sampling Agency: ☐ APC ☒ SWM ☐ DOT
☐ FSF ☐ SSF ☐ FUST ☐ SUST ☐ EEP
☐ WS ☐ GW ☐ WP ☐ DRH ☐
☐ Other

Sample Source North American Rayon Corp.
I.D. TND 09-505-1207
Stream Mile 51 Depth Composite
County Carter Field No. 903-1
Collected: Date 3-6-90 Time 9:45 By JW
Contact Hazard none
Signature of Sampler Fred Willington

Field Form, Volatile Organics

Sample Type
☒ Sediment ☐ Water ☐ Other

Sample Priority
☐ Emergency ☒ Legal ☐ Routine ☐ Ambient
Requested priority date

Send Report to J.C. Field Office & Ronnie Bowers & Central office

APR 16 1990

Code	*	Halogenated purgeables
32104	✓	bromoform
32101	✓	bromodichloromethane
34413	✓	bromomethane
32102	✓	carbon tetrachloride
34301	✓	chlorobenzene
34311	✓	chloroethane
34576	✓	2-chloroethylvinyl ether
32106	✓	chloroform
34418	✓	chloromethane
32105	✓	dibromochloromethane
34536	✓	1,2-dichlorobenzene
34566	✓	1,3-dichlorobenzene
34571	✓	1,4-dichlorobenzene
34668	✓	dichlorodifluoromethane
34496	✓	1,1-dichloroethane
34531	✓	1,2-dichloroethane
34501	✓	1,1-dichloroethene
	✓	cis-1,2-dichloroethene
34546	✓	trans-1,2-dichloroethene
34541	✓	1,2-dichloropropane
34045	✓	cis-1,3-dichloropropene
34699	✓	trans-1,3-dichloropropene
34423	✓	methylene chloride
34516	✓	1,1,2,2-tetrachloroethane
34475	✓	tetrachloroethene
34506	✓	1,1,1-trichloroethane
34511	✓	1,1,2-trichloroethane
39180	✓	trichloroethene
39488	✓	trichlorofluoromethane
39715	✓	vinyl chloride

Code	*	Aromatic purgeables
34030	✓	benzene
34301	✓	chlorobenzene
34536	✓	1,2-dichlorobenzene
34566	✓	1,3-dichlorobenzene
34571	✓	1,4-dichlorobenzene
34371	✓	ethylbenzene
34010	✓	toluene
	✓	o-xylene
	✓	m-xylene
	✓	p-xylene

		Other purgeables

Analyst (APS) Complained of an effect when processing sample — DAN

DOCKET N: 000141

TEC

000002

T095051207

PH-3013 LAB (rev 8/89)

* please designate desired analyses by placing a check mark before the appropriate parameter.

0

DOCKET NO. 1 000141

TEC 000003

T095051207

TENNESSEE DEPARTMENT OF HEALTH AND ENVIRONMENT
ENVIRONMENTAL LABORATORIES

ORGANIC ANALYSIS, PURGEABLES
Sample Type
[X]Sediment [ ]Water
Sample Priority
[ ]Emergency [X]Legal [ ]Routine [ ]Ambient
Date Priority Needed:_____

Sample Source NORTH AMERICAN RAYON CORP.
I.D. TND 09-505-1207
County CARTER
Field No. 903-1
Collected-Date,Time,By 03-06-90,0945,FW
Potential Hazard To Lab Personnel:

Laboratory Number 90-03-0058 (K003006)
Received-Date,Time,By 03-08-90,0930,LLR
Sampling Agency:[ ]APC [X]SWM [ ]DOT
[ ]PA/SI [ ]SSF [ ]FUST [ ]SUST [ ]EEP
[ ]WS [ ]GW [ ]WP [ ]DRH [ ]QC
[ ]OTHER_____

CODE	HALOGENATED PURGEABLES	VALUE*
32104	BROMOFORM	ND
32101	BROMODICHLOROMETHANE	ND
34413	BROMOMETHANE	ND
32102	CARBON TETRACHLORIDE	ND
34301	CHLOROBENZENE	ND
34311	CHLOROETHANE	ND
34576	2-CHLOROETHYLVINYL ETHER	ND
32106	CHLOROFORM	ND
34418	CHLOROMETHANE	ND
32105	DIBROMOCHLOROMETHANE	ND
34536	1,2-DICHLOROBENZENE	ND
34566	1,3-DICHLOROBENZENE	ND
34571	1,4-DICHLOROBENZENE	ND
34668	DICHLORODIFLUOROMETHANE	ND
34496	1,1-DICHLOROETHANE	ND
34531	1,2-DICHLOROETHANE	ND
34501	1,1-DICHLOROETHENE	ND
	CIS-1,2-DICHLOROETHENE	ND
34546	TRANS-1,2-DICHLOROETHENE	ND
34541	1,2-DICHLOROPROPANE	ND
34045	CIS-1,3-DICHLOROPROPENE	ND
34699	TRANS-1,3-DICHLOROPROPENE	ND
34423	METHYLENE CHLORIDE	ND
34516	1,1,2,2-TETRACHLOROETHANE	ND
34475	TETRACHLOROETHENE	ND
34506	1,1,1-TRICHLOROETHANE	ND
34511	1,1,2-TRICHLOROETHANE	ND
39180	TRICHLOROETHENE	ND
39488	TRICHLOROFLUOROMETHANE	ND
39715	VINYL CHLORIDE	ND

*Reporting Units, unless otherwise noted:
water, ug/l; sediment, ug/kg

CODE	AROMATIC PURGEABLES	VALUE*
34030	BENZENE	ND
34301	CHLOROBENZENE	ND
34536	1,2-DICHLOROBENZENE	ND
34566	1,3-DICHLOROBENZENE	ND
34571	1,4-DICHLOROBENZENE	ND
34371	ETHYL BENZENE	ND
34010	TOLUENE	ND
	O-XYLENE	ND
	M-XYLENE & P-XYLENE	ND
	M-XYLENE	
	P-XYLENE	

OTHER PURGEABLES

Completed: Date 3-8-90 Time 15:09 By RLH

Unit Supervisor [signature]
Date 3-15-90
Signature of supervisor indicates that the work was performed in accordance with federally approved procedures where available and in compliance with current quality assurance criteria except as qualified.
Comments:_____

PH-3015 LAB (rev 8/89)

10-23

RECEIVED APR 25 1990 131

APR 21 '90

RECEIVED

Division of Solid Waste Management

Date 4-25-90 File No.

Received by CO

TN-100

TENNESSEE DEPARTMENT OF HEALTH AND ENVIRONMENT
ENVIRONMENTAL LABORATORIES

ORGANIC ANALYSIS, EXTRACTABLES
Sample Type
[X] Sediment [ ]Water [ ]Tissue [ ]Air
Sample Priority
[ ]Emergency [X]Legal [ ]Routine [ ]Ambient
Date Priority Needed:

Sample Source: NORTH AMERICAN RAYON CORP.
I.D. IND 09-505-1207
County CARTER
Field No. 903-3
Collected-Date,Time,By 03-06-90,0945,FW

Laboratory Number 90-03-0058 (K003006)
Received-Date,Time,By 03-08-90,0930,LLR
Sampling Agency:[ ]APC [X]SWM [ ]DOT
[ ]PA/SI [ ]SSF [ ]FUST [ ]SUST [ ]EEP
[ ]WS [ ]GW [ ]WP [ ]DRH [ ]QC
[ ]OTHER

CODE	BASE\NEUTRAL EXTACTABLES	VALUE*
4292	BUTYLBENZYL PHTHALATE	ND
9100	BIS(2-ETHYLHEXYL)PHTHALATE	ND
9110	DI-N-BUTYL PHTHALATE	ND
4596	DI-N-OCTYL PHTHALATE	ND
4336	DIETHYL PHTHALATE	ND
4341	DIMETHYL PHTHALATE	ND
4438	N-NITROSODIMETHYLAMINE	ND
4433	N-NITROSODIPHENYLAMINE	ND
4428	N-NITROSO DI-N-PROPYLAMINE	ND
4408	ISOPHORONE	ND
4447	NITROBENZENE	ND
4611	2,4 DINITROTOLUENE	ND
4626	2,6 DINITROTOLUENE	ND
4205	ACENAPHTHENE	ND
4200	ACENAPHTHYLENE	ND
4220	ANTHRACENE	ND
4526	BENZO(A)ANTHRACENE	NA-INT
4247	BENZO(A)PYRENE	ND
4230	BENZO(B)FLUORANTHENE	ND
4521	BENZO(GHI)PERYLENE	ND
4242	BENZO(K)FLUORANTHENE	ND
4556	DIBENZO(A,H)ANTHRACENE	ND
4376	FLUORANTHENE	ND
4381	FLUORENE	ND
4403	INDENO(1,2,3-CD)PYRENE	ND
4696	NAPHTHALENE	ND
4461	PHENANTHRENE	ND
4469	PYRENE	ND
4320	CHRYSENE	NA-INT
4273	BIS(2-CHLOROETHYL)ETHER	ND
1278	BIS(2-CHLOROETHOXY)METHANE	ND
4283	BIS(2-CHLOROISOPROPYL)ETHER	ND

CODE	BASE\NEUTRAL EXTRACTABLES	VALUE*
34636	4-BROMOPHENYLPHENYL ETHER	ND
34641	4-CHLOROPHENYLPHENYL ETHER	ND
34386	HEXACHLOROCYCLOPENTADIENE	ND
34391	HEXACHLOROBUTADIENE	ND
39700	HEXACHLOROBENZENE	ND
34396	HEXACHLOROETHANE	PI<330
34536	1,2,4 TRICHLOROBENZENE	ND
34581	2-CHLORONAPHTHALENE	ND
39330	ALDRIN	ND
39337	ALPHA BHC	ND
39338	BETA BHC	ND
34259	DELTA BHC	ND
39340	GAMMA BHC	ND
39350	CHLORDANE	ND
38310	4,4 DDD	ND
39320	4,4 DDE	ND
39300	4,4 DDT	ND
39380	DIELDRIN	ND
34361	ENDOSULFAN I	ND
34242	ENDOSULFAN II	ND
34351	ENDOSULFAN SULFATE	ND
39390	ENDRIN	ND
34366	ENDRIN ALDEHYDE	ND
39410	HEPTACHLOR	ND
39420	HEPTACHLOR EPOXIDE	ND
39400	TOXAPHENE	ND
39480.	METHOXYCHLOR	ND
	PCB 1016\1242	ND
39488	PCB 1221	ND

CODE	BASE\NEUTRAL EXTRACTABLES	VALUE*
39492	PCB 1232	ND
39500	PCB 1248	ND
39504	PCB 1254	ND
39508	PCB 1260	ND
81649	PCB 1262	ND

CODE	ACID EXTRACTABLES	VALUE*
34552	4-CHLORO-3-METHYL PHENOL	ND
34586	2-CHLOROPHENOL	ND
34601	2,4 DICHLOROPHENOL	ND
34606	2,4 DIMETHYLPHENOL	ND
24616	2,4 DINITROPHENOL	ND
34657	2-METHYL-4,6-DINITROPHENOL	ND
34591	2-NITROPHENOL	ND
34646	4-NITROPHENOL	ND
39032	PENTACHLOROPHENOL	ND
34694	PHENOL	ND
34681	2,4,6 TRICHLOROPHENOL	ND

OTHER

Completed: Date 4-16-90 Time 2:45PM By SHW

Unit Supervisor Cathy L. Stecher
Date 4-18-90

Signature of supervisor indicates that the work was performed in accordance with federally approved procedures where available and in compliance with current quality assurance criteria except as qualified.

Comments:

Reporting Units, unless otherwise noted:
water, ug/l; sediment, ug/kg
tissue, mg/kg; air, ug.
H-3015 LAB (rev 5/89)

DOCKET NO. 000143

TEC 000001

T095051207

D I HAZARDOUS WASTE PERMITTING UN
GUIDE FOR PROCESSING DOCUMENTS RECEIVED

TN-440

Date Received by DSWM: 5/15/90

Generated by: ✓ Applicant/Permittee ___ EPA ___ DSWM Field Office ___ Other

To Be Filed At: (Company Name) North American Rayon

(Field Office) Johnson City

___	General	___	Corrective Action
___	Part A/I.S. Mod.	✓	Ground Water Monitoring
___	Part B	___	Closure
___	Permit	___	Other ___
___	RFA		
___	RFI		

Send Copies To:

___	Commissioner (to ___)	___	Memphis F.O. (to ___)
___	Bureau (to ___)	___	Jackson F.O. (to ___)
___	Tiesler/Apple	___	Nashville F.O. (to ___)
___	ELC	___	Cookeville F.O. (to ___)
___	TDH/___	___	Chattanooga F.O. (to ___)
___	BWM/___	___	Knoxville F.O. (to ___)
___	Central Files	✓	Johnson City F.O. (to Gillian)
___	___	✓	EPA (to Scarbrough)
___	___	___	OGC-E (to ___)

Date Copies Sent ___/___/___ Return Original to WEK

HWPU Routing:

CEB

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___

___

___

Remarks:

Send this copy/original to:

Remarks:

DOCKET NO. 000146 TEC

000001

T095051207

GARRETT CONSULTING INC.
2734 BLACK ACRE TRAIL
DALLAS, GA 30132
OFFICE: (404) 974-2643
LAB: (404) 548-5040

May 10, 1990

Ms. Barbara Donoho
Division of Soil Waste Management
Tennessee Department of Health & Environment
Customs House 4th Floor
701 Broadway
Nashville, TN 37219-3530

Dear Ms. Donoho:

Subject: North American Rayon Corporation
1989 Annual Groundwater Report

Please find enclosed the report referenced above. This report has been prepared in accordance with TDHE Rule 1200-1-11-.05(5)(f) and (6)(e). This report includes a tabulation of the 1989 groundwater, a statistical comparison of these data, and a potentiometric surface map indicating direction of groundwater flow.

If you require additional information, please call me.

Sincerely,

Bob Garrett

Robert A. Garrett
President

RAG/cmd

cc: L. Raasch
G. Tidwell
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North American Rayon Corporation
1989 Annual Groundwater Report

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Project Manager

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1.0 Introduction

This report includes an annual groundwater evaluation of North American Rayon Corporation (NARC), Elizabethton, Tennessee, for the calendar year 1989. This report has been developed in accordance with TDHE Rule 1200-1-11-.05(5)(f) and (6)(e). NARC is currently conducting routine groundwater monitoring utilizing the following monitor wells and piezometers:

Monitor Wells	Piezometers
MW-1	P1
MW-2	P2
MW-3	P3
MW-4	P4
MW-5	P5
MW-6	P6
MW-7	
Bemburg Well#3 (upgradient)	

These wells and piezometers were sampled during March, June, October (Bemburg Well#3 only), and December 1989. The results of the 1989 monitoring, including water elevation and direction of flow, are included in the following sections of this report. Also included are data collected in 1988 which have been used for a statistical baseline to compare subsequent data with.

2.0 Data Tabulation

The analytical data for the 1989 sampling events have been tabulated and are included in Table 1. These data indicate various levels of metals and radiation. However, none of the Interim Primary Drinking Water Standards were exceeded. Secondary Drinking Water Standards were exceeded for iron and manganese. However, these standards were developed based on a threshold for staining of clothes.

3.0 Statistical Analyses

Statistical analyses (student t-test) were performed on all wells for 1989, and compared to baseline data collected in 1988. Parameters tested included:

- pH
- Specific Conductance
- TOC
- TOX

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TABLE 1. North American Rayon Corporation 1989 Groundwater Data Report

PARAMETER	DATE	WELLS MW1	MW2	MW3	MW4
Drinking Water (ppm)	MAR 1989				
Arsenic (As)		----	----	----	----
Barium (Ba)		----	----	----	----
Cadmium (Cd)		----	----	----	----
Chromium (Cr)		----	----	----	----
Lead (Pb)		----	----	----	----
Mercury (Hg)		----	----	----	----
Selenium (Se)		----	----	----	----
Silver (Ag)		----	----	----	----
Nitrate (NO3)		----	----	----	----
Fluoride (F-)		----	----	----	----
Endrin		ND	ND	ND	ND
Lindane		ND	ND	ND	ND
Methoxychlor		ND	ND	ND	ND
Toxaphene		ND	ND	ND	ND
2,4D		ND	ND	ND	ND
2,4,5-TP Silvex		ND	ND	ND	ND
Radium (pCi/l)		<0.1	0.2	<0.1	<0.1
Gross Alpha (pCi/l)		4	7	<5	7
Gross Beta (pCi/l)		6	8	14	47
Coliform Bacteria (no/100ml)		----	----	----	----
Groundwater Quality (ppm)					
Chloride (Cl-)		----	----	----	----
Iron (Fe)		----	----	----	----
Manganese (Mn)		----	----	----	----
Phenols		ND	ND	ND	ND
Sodium (Na)		----	----	----	----
Sulfate (SO4)		----	----	----	----
Indicators					
pH (s.u.)		7.38	8.08	8.38	7.16
Specific Conductance (umhos/cm)		220	225	198	282
TOC (ppm)		0.54	1.78	5.26	1.55
TOX (ppb)		ND	17.25	34.25	11.35

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TABLE 1. North American Rayon Corporation 1989 Groundwater Data Report

PARAMETER		DATE	WELLS MW1	MW2	MW3	MW4	BEMBERG #3
Drinking Water (ppm)		JUNE 1989					
Arsenic	(As)		<0.0004	<0.0004	----	<0.0004	<0.0004
Barium	(Ba)		0.07	0.02	0.05	0.01	0.07
Cadmium	(Cd)		ND	ND	ND	ND	ND
Chromium	(Cr)		ND	ND	ND	ND	ND
Lead	(Pb)		ND	ND	0.057	ND	ND
Mercury	(Hg)		<0.0008	<0.0008	----	<0.0008	<0.0008
Selenium	(Se)		<0.0008	<0.0008	----	<0.0008	<0.0008
Silver	(Ag)		ND	ND	ND	ND	ND
Nitrate	(NO3)		ND				
Fluoride	(F-)		0.85	<0.05	<0.05	4.7	0.059
Endrin			ND	ND	ND	ND	ND
Lindane			ND	ND	ND	ND	ND
Methoxychlor			ND	ND	ND	ND	ND
Toxaphene			ND	ND	ND	ND	ND
2,4D			ND	ND	ND	ND	ND
2,4,5-TP Silvex			ND	ND	ND	ND	ND
Radium (pCi/l)			<0.1	<0.1	0.1+0.1	0.1+0.1	<0.1
Gross Alpha (pCi/l)			4+-3	<5	<3	3+-3	<2
Gross Beta (pCi/l)			5+-2	7+-5	12+-3	36+-4	<2
Coliform Bacteria (no/100ml)			----	----	----	----	----
Groundwater Quality (ppm)							
Chloride	(Cl-)		8.377	20.414	24.730	8.79	9.357
Iron	(Fe)		0.399	0.067	1.30	0.923	1.30
Manganese	(Mn)		20.16	26.33	23.39	9.87	19.22
Phenols			ND	ND	ND	ND	ND
Sodium	(Na)		----	----	----	----	----
Sulfate	(SO4)		335.75	1567.81	1169.74	436.93	23.98
TKN			----	----	----	----	30
Indicators							
pH (s.u.)			7.38	8.08	8.38	7.16	7.16
Specific Conductance (umhos/cm)			220	225	198	282	391
TOC (ppm)			6.65	25.38	59.42	21.82	10.30
TOX (ppb)			ND	ND	20.25	ND	ND

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TABLE 1. North American Rayon Corporation 1989 Groundwater Data Report

PARAMETER		DATE	WELLS MW1	MW2	MW3	MW4	BEMBERG #3
Drinking Water (ppm)		SEPT-OCT 1989					
Arsenic	(As)		----	----	----	----	<0.005
Barium	(Ba)		----	----	----	----	<0.10
Cadmium	(Cd)		----	----	----	----	<0.01
Chromium	(Cr)		----	----	----	----	<0.03
Lead	(Pb)		----	----	----	----	<0.005
Mercury	(Hg)		----	----	----	----	<0.0005
Selenium	(Se)		----	----	----	----	<0.01
Silver	(Ag)		----	----	----	----	<0.05
Nitrate	(NO3)		----	----	----	----	2.2
Fluoride	(F-)		----	----	----	----	0.16
Endrin			----	----	----	----	ND
Lindane			----	----	----	----	ND
Methoxychlor			----	----	----	----	ND
Toxaphene			----	----	----	----	ND
2,4D			----	----	----	----	ND
2,4,5-TP Silvex			----	----	----	----	ND
Radium (pCi/l)			----	----	----	----	0.3+-0.1
Gross Alpha (pCi/l)			----	----	----	----	0.0+-4.3
Gross Beta (pCi/l)			----	----	----	----	0.0+-4.2
Coliform Bacteria (no/100ml)			< 1/100	< 1/100	< 1/100	----	----
Groundwater Quality (ppm)							
Chloride	(Cl-)		----	----	----	----	5.65
Iron	(Fe)		----	----	----	----	2.0
Manganese	(Mn)		----	----	----	----	0.07
Phenols			----	----	----	----	<0.005
Sodium	(Na)		----	----	----	----	3.05
Sulfate	(SO4)		----	----	----	----	27
Indicators							
pH (s.u.)			----	----	----	----	----
Specific Conductance (umhos/cm)			----	----	----	----	----
TOC (ppm)			----	----	----	----	14.50
TOX (ppb)			----	----	----	----	0.94

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TABLE 1. North American Rayon Corporation 1989 Groundwater Data Report

PARAMETER	DATE	WELLS MW1	MW2	MW3	MW4	BEMBERG #3
Drinking Water (ppm)	DEC 1989					
Arsenic (As)		----	----	----	----	----
Barium (Ba)		----	----	----	----	----
Cadmium (Cd)		----	----	----	----	----
Chromium (Cr)		----	----	----	----	----
Lead (Pb)		----	----	----	----	----
Mercury (Hg)		----	----	----	----	----
Selenium (Se)		----	----	----	----	----
Silver (Ag)		----	----	----	----	----
Fluoride (F-)		----	----	----	----	----
Nitrate (NO3)		----	----	----	----	----
Endrin		----	----	----	----	----
Lindane		----	----	----	----	----
Methoxychlor		----	----	----	----	----
Toxaphene		----	----	----	----	----
2,4D		----	----	----	----	----
2,4,5-TP Silvex		----	----	----	----	----
Radium (pCi/l)		----	----	----	----	----
Gross Alpha (pCi/l)		----	----	----	----	----
Gross Beta (pCi/l)		----	----	----	----	----
Coliform Bacteria (no/100ml)		< 1/100	< 1/100	< 1/100	----	----
Groundwater Quality (ppm)						
Chloride (Cl-)		----	----	----	----	----
Iron (Fe)		----	----	----	----	----
Manganese (Mn)		----	----	----	----	----
Phenols		----	----	----	----	----
Sodium (Na)		----	----	----	----	----
Sulfate (SO4)		----	----	----	----	----
TKN		----	----	----	----	----
Indicators						
pH (s.u.)		7.38	6.85	7.27	7.29	----
Specific Conductance (umhos/cm)		220	225	198	282	391
TOC (ppm)		1.03	3.46	8.97	2.24	1.01
TOX (ppb)		ND	ND	31.5	17.00	ND

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Statistical analyses for the 1989 sampling events are presented in Table 2. A summary of each event presented below indicates whether each well failed or passed the statistical t-test. The regulations require that data must be collected from the upgradient well (Bemburg #3) and composited for statistical background purposes. These data include analyses for indicator parameters from Bemburg Well #3 for the year 1988. Subsequently, each well is statistically compared with the baseline data to determine if significant concentration differences exist. If there is a significant difference, the well "fails" for a specific parameter. If there is no statistically significant difference, the well "passes". It should be noted that the Bemburg well is located on a State Superfund site and serves to monitor water quality for that site. Therefore, this well does not provide true background data needed to develop a valid statistical comparison for NARC downgradient wells.

March 1989

The monitor wells passed for all parameters with the following exceptions: well MW-2 and MW-3 failed for conductivity; MW-4 failed for pH and conductivity.

June 1989

The wells passed for all parameters with the following exceptions: MW-3 failed for conductivity and TOC; MW-4 failed for pH and conductivity.

December 1989

The wells passed for all parameters with the following exceptions: MW-2, MW-3, and MW-4 failed for conductivity.

4.0 Groundwater Flow

Water elevations were measured in each well during each sampling event to the nearest 0.01 ft. These data were then converted to feet-mean sea level (ft-msl) and plotted on individual site maps to produce potentiometric-surface maps. Baseline groundwater flow data for 1988 was also plotted. These data are illustrated in Figures 1-5. The general direction of flow is radial with a groundwater high occurring around MW-3. The gradient is approximately 0.02 ft/ft. However, since there have been no pumping or slug tests conducted at the site, groundwater flow rates cannot be determined.

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TABLE 2

North American Rayon Corp.
Elizabethton, TN

SUMMARY STATISTICS AND RESULTS OF AR t-TEST
DETECTION MONITORING

September 1988

EVENT	WELL	PARAMETER	MEAN	VARIANCE	STD. DEV.	COEFF. VAR.	AR t-Test t CALC	t TABLE	PASS/FAIL
1988-3	01	pH	7.80	0.012	0.108	1.2	2.730	7.285	pass
		CONDUCT.	553	33.5	5.79	1.0	4.68	6.534	pass
		TOC	10.49	0.161	0.401	3.8	- 0.360	6.534	pass
		TOX	3.4	13.9	3.7	109	- 0.423	6.534	pass
1988-3	02	pH	6.57	0.0005	0.022	0.3	- 3.060	7.285	pass
		CONDUCT.	2592	225	15	0.6	43.65	6.534	fail
		TOC	55.66	6.27	2.50	4.5	9.74	6.534	fail
		TOX	6.8	64	8	118	- 0.416	6.534	pass
1988-3	03	pH	7.48	0.0025	0.050	0.7	1.224	7.285	pass
		CONDUCT.	2832	2558	50.6	1.8	48.24	6.534	fail
		TOC	153.31	213.35	14.61	9.5	31.58	6.534	fail
		TOX	37.2	0.92	0.96	2.6	- 0.364	6.534	pass
1988-3	04	pH	7.35	0.0108	0.104	1.4	0.612	7.285	pass
		CONDUCT.	1258	1876	43.3	3.4	18.156	6.534	fail
		TOC	67.48	28.35	5.32	7.9	12.383	6.534	fail
		TOX	7.9	6.18	2.5	32	- 0.412	6.534	pass

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TABLE 2

North American Rayon Corp.
Elizabethton, TN

SUMMARY STATISTICS AND RESULTS OF AR t-TEST
DETECTION MONITORING

December 1988

EVENT	WELL	PARAMETER	MEAN	VARIANCE	STD. DEV.	COEFF. VAR.	AR t-Test t CALC	t TABLE	PASS/FAIL
1988-4	01	pH	7.8	0.00	0.00	0.00	2.730	7.285	pass
		CONDUCT.	520	0.00	0.00	0.00	4.052	6.534	pass
		TOC	0.66	0.0024	0.050	7.6	- 2.558	6.534	pass
		TOX	10.05	0.543	0.737	7.3	- 0.411	6.534	pass
1988-4	02	pH	6.80	NA*	NA	NA	- 1.977	7.285	pass
		CONDUCT.	2400	NA	NA	NA	39.98	6.534	fail
		TOC	2.54	0.0457	0.21	8.3	- 2.138	6.534	pass
		TOX	16.6	32.19	5.67	34	- 0.400	6.534	pass
1988-4	03	pH	7.60	NA	NA	NA	1.789	7.285	pass
		CONDUCT.	2450	NA	NA	NA	40.94	6.534	fail
		TOC	8.18	1.85	1.36	17	- 0.876	6.534	pass
		TOX	45	16	4	8.9	- 0.350	6.534	pass
1988-4	04	pH	9.4	NA	NA	NA	10.26	7.285	fail
		CONDUCT.	950	NA	NA	NA	12.27	6.534	fail
		TOC	2.70	0.024	0.15	5.6	- 2.102	6.534	pass
		TOX	22	24	4.9	22	- 0.390	6.534	pass

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TABLE 2

North American Rayon Corp.
Elizabethton, TN

SUMMARY STATISTICS AND RESULTS OF AR t-TEST
DETECTION MONITORING

March 1989

EVENT	WELL	PARAMETER	MEAN	VARIANCE	STD. DEV.	COEFF. VAR.	AR t-Test t CALC	AR t-Test t TABLE	AR t-Test PASS/FAIL
1989-1	01	pH	7.50	0.00073	0.027	0.4	1.318	7.285	pass
		CONDUCT.	636	19	4.4	0.7	6.269	6.534	pass
		TOC	0.54	0.0015	0.039	0.3	- 2.585	6.534	pass
		TOX	5.0	0.00	0.0000	0.00	- 0.420	6.534	pass
1989-1	02	pH	6.52	0.01	0.1	1.5	- 3.295	7.285	pass
		CONDUCT.	2088	625	25	1.2	34.02	6.534	fail
		TOC	1.78	0.0015	0.038	2.1	- 2.308	6.534	pass
		TOX	17	9	3	18	- 0.399	6.534	pass
1989-1	03	pH	7.29	0.0016	0.041	0.5	0.330	7.285	pass
		CONDUCT.	2255	50	7	0.3	37.21	6.534	fail
		TOC	5.26	0.017	0.13	2.5	- 1.529	6.534	pass
		TOX	34	50	7	20	- 0.370	6.534	pass
1989-1	04	pH	9.74	0.0045	0.067	0.7	11.86	7.285	fail
		CONDUCT.	938	209	14	1.5	11.85	6.534	fail
		TOC	1.54	0.0045	0.067	4.4	- 2.361	6.534	pass
		TOX	11.4	17.8	4.2	37	- 0.408	6.534	pass

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TABLE 2

North American Rayon Corp.
Elizabethton, TN

SUMMARY STATISTICS AND RESULTS OF AR t-TEST
DETECTION MONITORING

June 1989

EVENT	WELL	PARAMETER	MEAN	VARIANCE	STD. DEV.	COEFF. VAR.	AR t-Test t CALC	t TABLE	PASS/FAIL
1989-2	01	pH	7.85	0.000067	0.0082	0.1	- 2.966	7.285	pass
		CONDUCT.	510	0.00	0.0000	0.00	3.860	6.534	pass
		TOC	6.64	0.20	0.45	7	- 0.104	6.534	pass
		TOX	5.0	0.00	0.0000	0.00	- 0.420	6.534	pass
1989-2	02	pH	6.83	0.0001	0.01	0.1	- 1.836	7.285	pass
		CONDUCT.	2100	0.00	0.0000	0.00	34.25	6.534	fail
		TOC	25.4	0.198	0.446	1.8	2.974	6.534	pass
		TOX	5.08	0.414	0.64	12	- 0.419	6.534	pass
1989-2	03	pH	7.59	0.00037	0.019	0.2	1.742	7.285	pass
		CONDUCT.	2175	2500	50	2.3	35.68	6.534	fail
		TOC	59.4	1.44	1.2	2	10.58	6.534	fail
		TOX	20	35	5.9	30	- 0.352	6.534	pass
1989-2	04	pH	9.17	0.0001	0.01	0.1	9.180	7.285	fail
		CONDUCT.	880	0.00	0.000	0.00	10.93	6.534	fail
		TOC	21.8	1.15	1.07	5	2.169	6.534	pass
		TOX	5.62	1.56	1.25	22	- 0.418	6.534	pass
1989-2	BEMBURG #3	pH	7.50	0.000067	0.0082	0.1	1.318	7.285	pass
		CONDUCT.	270	0.00	0.00	0.00	- 0.726	6.534	pass
		TOC	10.3	3.272	1.81	18	- 0.402	6.534	pass
		TOX	6.6	6.36	2.52	33	- 0.417	6.534	pass

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TABLE 2

North American Rayon Corp.
Elizabethton, TN

SUMMARY STATISTICS AND RESULTS OF AR t-TEST
DETECTION MONITORING

December 1989

EVENT	WELL	PARAMETER	MEAN	VARIANCE	STD. DEV.	COEFF. VAR.	AR t-Test t CALC	t TABLE	PASS/FAIL
1989-4	01	pH	7.38	0.0015	0.039	0.5	0.753	7.285	pass
		CONDUCT.	771	34	5.8	0.8	8.849	6.534	fail
		TOC	1.03	0.0031	0.056	5.4	- 2.475	6.534	pass
		TOX	5.0	0.00	0.0000	0.00	- 0.420	6.534	pass
1989-4	02	pH	6.85	0.0001	0.01	0.1	- 1.742	7.285	pass
		CONDUCT.	2708	92	9.6	0.4	45.87	6.534	fail
		TOC	3.46	0.106	0.326	9.4	- 1.932	6.534	pass
		TOX	5.0	0.00	0.0000	0.00	0.420	6.534	pass
1989-4	03	pH	7.26	0.000067	0.0082	0.1	0.188	7.285	pass
		CONDUCT.	3170	67	8.2	0.2	54.70	6.534	fail
		TOC	8.96	0.128	0.357	4	- 0.702	6.534	pass
		TOX	31.5	17	4.1	13	- 0.374	6.534	pass
1989-4	04	pH	7.29	0.0005	0.022	0.3	0.330	7.285	pass
		CONDUCT.	974	14	3.8	0.4	12.73	6.534	fail
		TOC	2.24	0.179	0.423	19	- 2.205	6.534	pass
		TOX	17	11	3.37	19.8	- 0.399	6.534	pass
1989-4	BEMBURG #3	pH	7.85	0.00077	0.028	0.4	2.966	7.285	pass
		CONDUCT.	376	0.33	0.58	0.2	1.300	6.534	pass
		TOC	1.01	0.0838	0.29	29	- 2.480	6.534	pass
		TOX	4.79	13.15	3.63	76	- 0.420	6.534	pass

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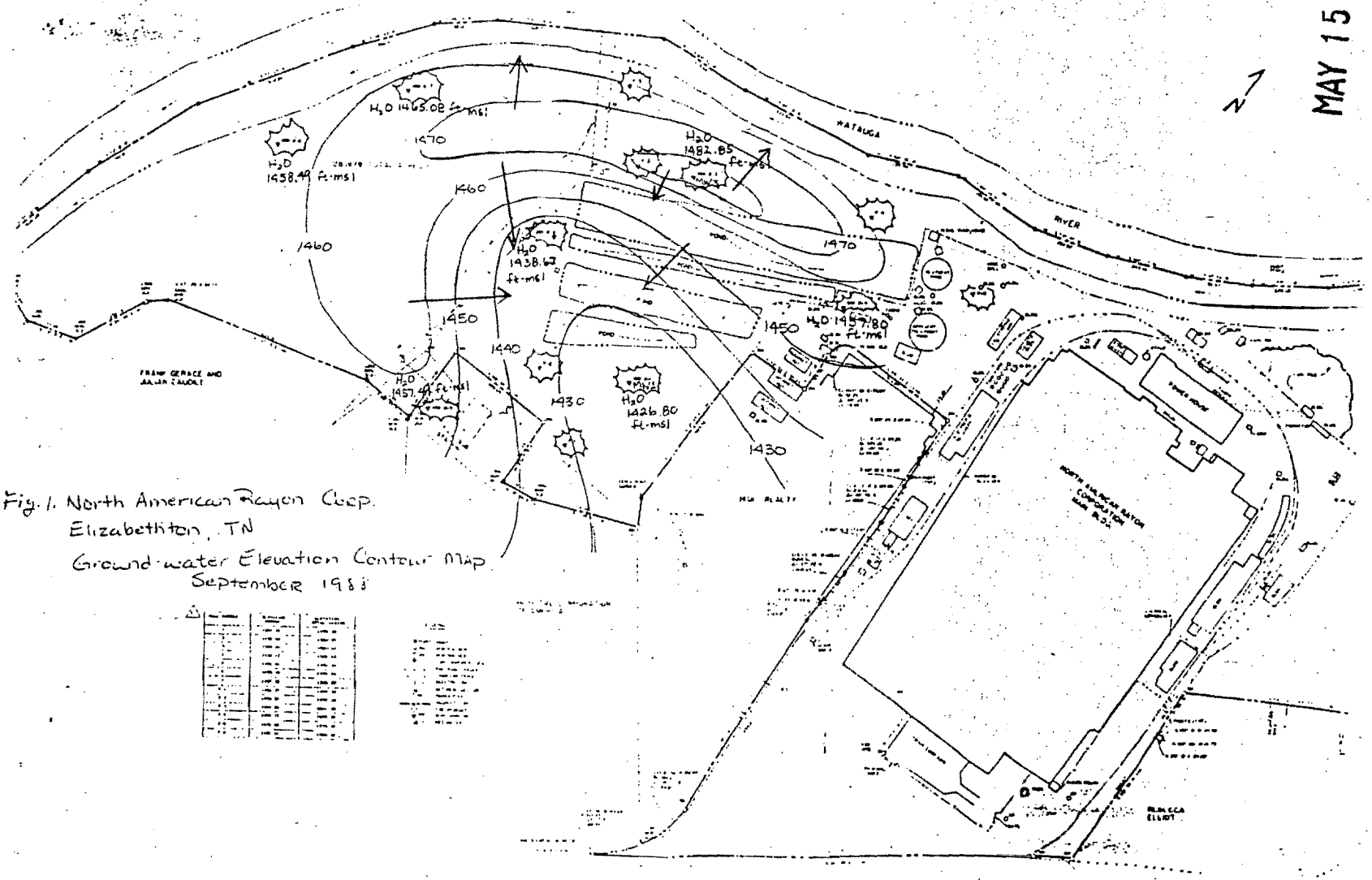

Fig. 1. North American Rayon Corp.
Elizabethton, TN
Ground-water Elevation Contour Map
September 1988

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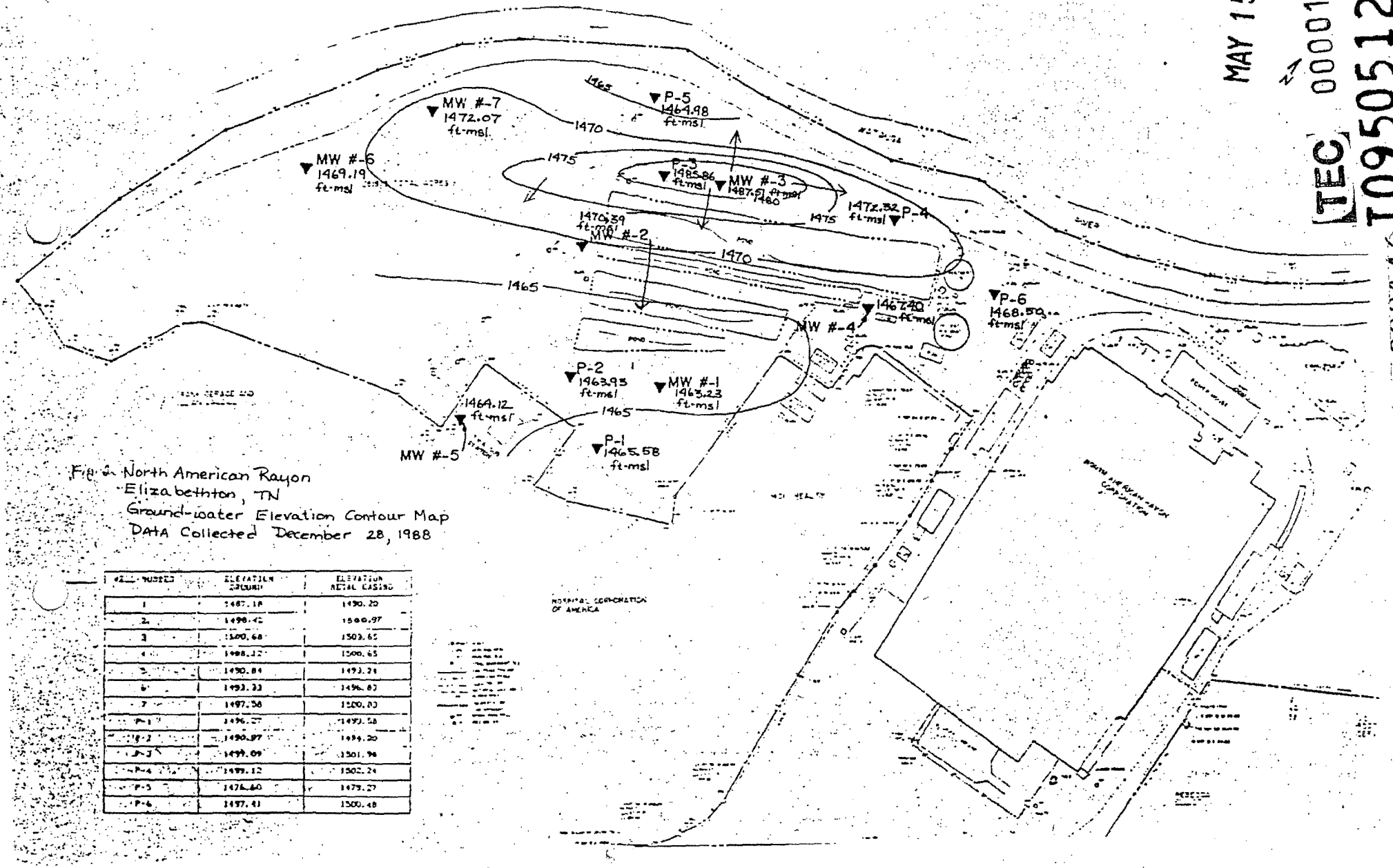
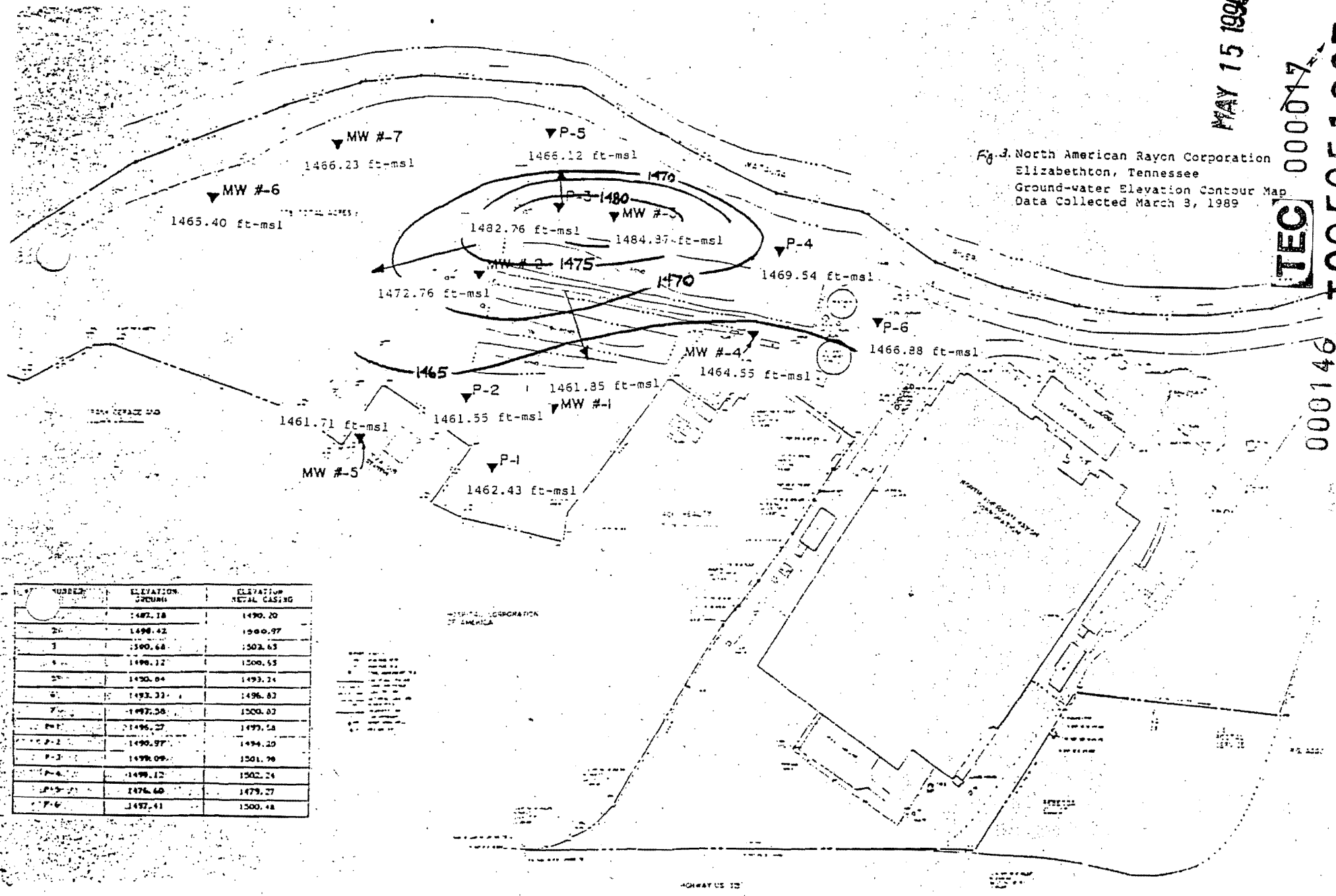


Fig. 2 North American Rayon
Elizabethton, TN
Ground-water Elevation Contour Map
DATA Collected December 28, 1988

WELL NUMBER	ELEVATION GROUND	ELEVATION METAL CASING
1	1487.18	1490.20
2	1498.42	1500.97
3	1500.68	1503.65
4	1498.12	1500.65
5	1490.84	1493.24
6	1493.33	1496.83
7	1497.58	1500.83
P-1	1496.27	1499.58
P-2	1490.97	1494.20
P-3	1499.09	1501.96
P-4	1499.12	1502.24
P-5	1476.60	1479.27
P-6	1497.41	1500.48



NUMBER	ELEVATION GROUND	ELEVATION METAL CASING
	1487.18	1490.20
2	1498.42	1500.97
3	1500.68	1503.63
4	1498.12	1500.55
5	1490.84	1493.24
6	1493.32	1496.83
7	1497.58	1500.03
P-1	1496.27	1497.58
P-2	1490.97	1494.20
P-3	1498.09	1501.98
P-4	1499.12	1502.24
P-5	1476.60	1479.27
P-6	1497.41	1500.48

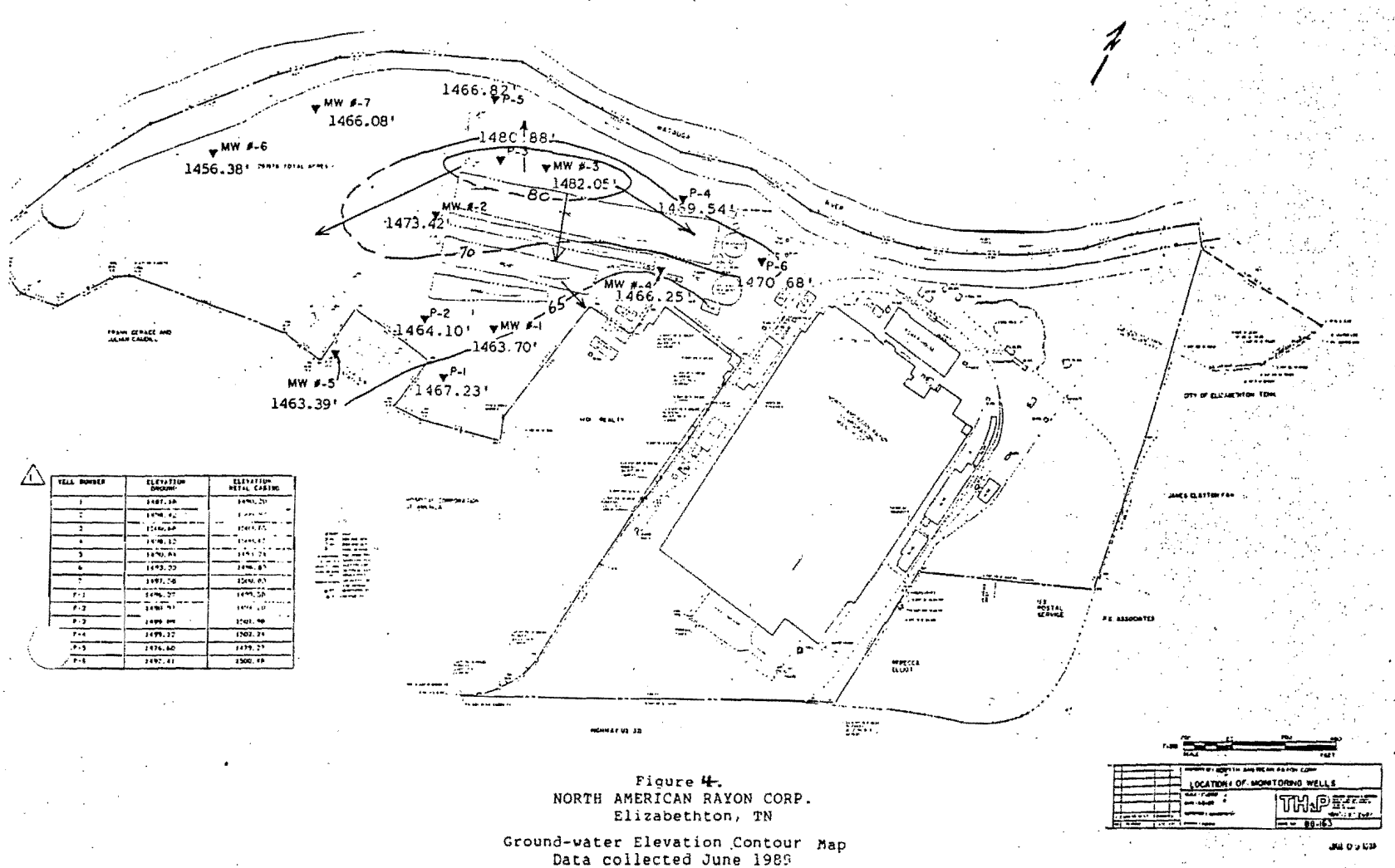
Fig. 3. North American Rayon Corporation
Elizabethton, Tennessee
Ground-water Elevation Contour Map
Data Collected March 3, 1989

MAY 15 1990

TEC 000017

T09505 1207

DOCKET NO. 000146



Ground-water Elevations	
June 1989	ft/msl
MW-1	1463.70
MW-2	1473.42
MW-3	1482.05
MW-4	1466.25
MW-5	1463.39
MW-6	1465.38
MW-7	1466.08
P-1	1467.23
P-2	1464.10
P-3	1480.88
P-4	1469.54
P-5	1466.82
P-6	1470.68

Figure 4.
NORTH AMERICAN RAYON CORP.
Elizabethton, TN

Ground-water Elevation Contour Map
Data collected June 1989

MAY 15 1990
TEC
000018
T095051207
000146
DOCKET NO

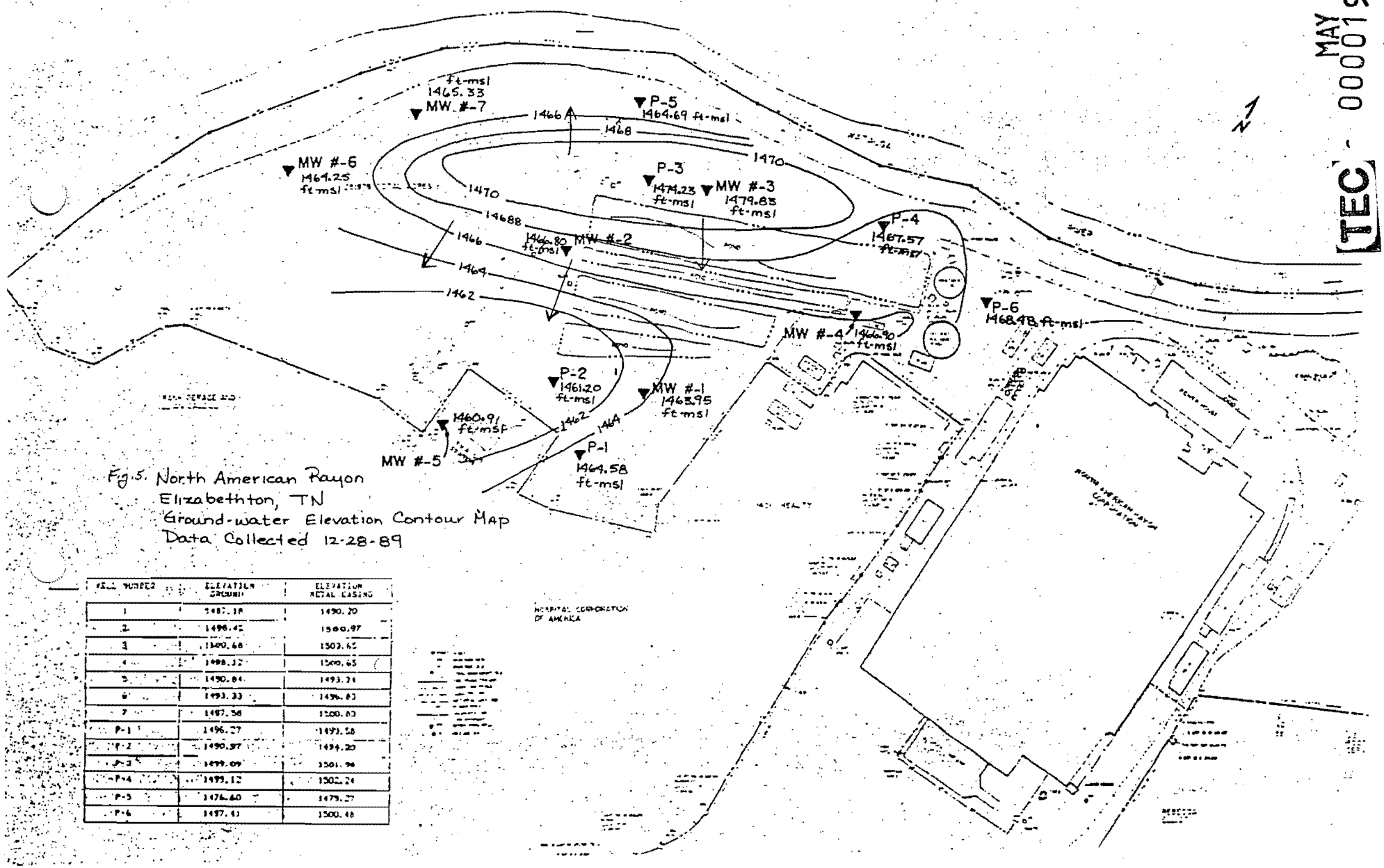


Fig. 5. North American Rayon
Elizabethton, TN
Ground-water Elevation Contour Map
Data Collected 12-28-89

WELL NUMBER	ELEVATION GROUND	ELEVATION METAL CASING
1	1487.18	1490.20
2	1496.42	1500.97
3	1499.68	1503.65
4	1498.32	1500.65
5	1490.84	1493.34
6	1493.33	1496.83
7	1497.58	1500.83
P-1	1496.27	1493.58
P-2	1490.97	1494.20
P-3	1499.09	1501.96
P-4	1499.12	1502.24
P-5	1476.60	1479.27
P-6	1497.41	1500.48

TEC - 000019 MAY 15 1990
DOCKET NO. 000146 T09505 1207

RECEIVED
EPA/REGION IV
AUG 26 11 05 AM
WASTE
COMPLIANCE SECTI

ENVIRONMENTAL ASSISTANCE CENTER
TENNESSEE DEPARTMENT OF ENVIRONMENT AND CONSERVATION
2305 SILVERDALE ROAD
JOHNSON CITY, TENNESSEE 37601-2162
(423) 854-5400 STATEWIDE 1-888-891-8332 FAX (423) 854-5401

August 20, 1998

Mr. Robert Smalling, Operations Manager
North American Fibers, Inc.
1001 West Elk Avenue
Elizabethton, Tennessee 37643

RE: Hazardous Waste Inspection
TND 09-505-1207

Dear Mr. Smalling:

This letter confirms the observations and recommendations which were made during the Hazardous Waste Walk Through Inspection conducted at North American Fibers, Inc. on August 19, 1998. The attached inspection report verifies that no violations were identified during the inspection.

If you have any questions or comments concerning this letter or any part of the inspection report, do not hesitate to contact me at 854-5435.

Sincerely,

Fred Willingham

Fred Willingham
Division of Solid Waste Management

FW/13048233 CONFIRM

Attachment

cc: Ms. Kristin Lippert, EPA, Region IV, Atlanta
DSWM, Nashville
DSWM, JCEAC File #10-23 222

HAZARDOUS WASTE INSPECTION REPORT

SITE/PHYSICAL LOCATION:

North American Fibers Corporation
TND 09-505-1207
1001 West Elk Avenue
Elizabethton, Tennessee
Carter County

PRIMARY CONTACT(S):

Robert Smalling, Operations Manager
North American Fibers Corporation
1001 West Elk Avenue
Elizabethton, Tennessee 37643
423/547-5402

DATE/TIME OF INSPECTION:

August 19, 1998 starting at 13:15

INSPECTION PARTICIPANTS:

Mr. Robert Smalling, Operations Manager, NAFC
Dr. Lou Raasch, Environmental Services Manager, NAFC
John Webb, DSWM
Fred Willingham, DSWM

REPORT PREPARED BY:

Fred Willingham
Division of Solid Waste Management
2305 Silverdale Road
Johnson City, Tennessee 37601
423/854-5435

PURPOSE OF INSPECTION:

This inspection was conducted to evaluate North American Fibers Corporation's compliance with the applicable requirements of the Rules and Regulations promulgate pursuant to the Hazardous Waste Management Act, T.C.A. 68-212-101 et seq. and Hazardous Waste Reduction Act, T.C.A. 68-212-301 et seq.

FACILITY DESCRIPTION:

North American Fibers Corporation formerly manufactured rayon yarn by the viscose process. Standard Industrial Classification Code: 2823.

INSPECTION FINDINGS:

Based on the information provided to the Division, North American Fibers Corporation is a Non-Generator of hazardous waste. A detailed description of the processes and wastes generated is as follows:

Presently, the only active process is the latex coating of industrial yarns for rubber hose reinforcement. All yarns are now purchased from other suppliers. Waste generated is solidified latex which is managed as a special waste.

Process equipment used in the production of carbonizable yarn used for the lining of the space shuttle rocket motors has been mothballed in anticipation of another contract with NASA. There are twenty-eight (28) 55 gallon drums of lauryl pyridinium chloride stored on-site for use in this process.

Hazardous waste determinations are presently being conducted on the following:
Four (4) 55 gallon drums of lead dross
Three (3) 55 gallon drums of unknown
One (1) 18 gallon drum of unknown
One (1) 40 gallon drum of unknown
One (1) 30 gallon drum of unknown

All other processes have ceased and equipment has been sold to other companies or reclaimed by Elizabethton Herb and Metal.

Closure:

The Division approved Certification of Closure on May 20, 1991 of an emergency spill diversion basin.

Groundwater:

The Division approved Certification of Closure on January 19, 1994.

VIOLATIONS:

No violations were identified during this walk through inspection.

SIGNED: Fred Williams DATE: 8-21-98

REVIEWED: Bethanie Glynn DATE: 8-21-98

FW/13058233 HWIR 10-23 222

SEND TO: J. W. DARDEN

DIVISION OF SOLID WASTE MANAGEMENT
INSPECTION & COMPLIANCE (I&C) SHEET

FOR OFFICE USE: RCRIS DATE | COMPLY DATE | INSP SEQ

INSPECTION STATUS
- ( ) LQG
- ( ) SQG
- (X) CESQG
- ( ) NON GEN
- ( ) TRANSPORT
- ( ) TSD
- ( ) NNF
- ( ) STATUS CHANGE

- 00 NCO
- 01 JACK
- 02 NASH
- 03 KNOX
- (X) 04 JCITY
- 05 CHATT
- 06 MEMP
- 12 COOK

EPA INSTALLATION ID NUMBER:

PERMIT NUMBER:

FIELD OFFICE FILE NUMBER: 10-23

FACILITY OR SITE: NORTH AMERICAN Fibers CORP.

ADDRESS: 1001 West Elk Ave.

CITY: Elizabethton | STATE: TN | ZIP CODE: 37643 | COUNTY: Carter

KEY DATE	INSP DATE	INSP TYPE (FROM TABLE)	NOV DATE	NOV #	SUBMITTED BY	STAFF ID#	DATE SUBMITTED
08-19-98	08-19-98	402			Fred Williams	098	8-20-98
		501					

CEI 4
- 401 LQG
- 402 SQG
- 403 TRANSPORTER
- 404 TSDR w/GW
- 405 TSDR noGW
- 406 TSDRw/CME
- 407 TSDRw/O&M
- 408 LDR
- 409 NNF

- 190 UO GENERATOR
- 250 UO TNSPTR/TNSFR
- 800 UO PROCESSOR
- 810 UO MARKETER
- 820 UO BURNER
- 830 UO RE-REFINER
- 840 UO COLLECTION CTR
- 850 UO DO-IT YOURSELFER

OTH 5
- 501 WALK THROUGH

- 502 CLOSURE EVAL
- 503 POST CLOSURE
- 504 SPEC WASTE
- 505 CMPLAINT F/U
- 506 EMER RESPONSE
- 507 OTHER
- 508 BIF
- 509 INCINERATOR
- 510 COC/TRAIL BURN

SPL 6
- 601 GENERATED WASTE
- 602 RECEIVED WASTE
- 603 SOIL/SEDIMENT
- 604 SURFACE WATER LEACHATE
- 605 GROUNDWATER

#SAMPLES_____

NRR 7

- 705 MNFST REPORTS
- 706 MNFST RECDS
- 707 GWM DATA
- 708 GWM PLANS
- 709 LATE ANN RPT
- 710 OTHER

CSE 8
- 801 F/U VISIT
- 802 F/U REC REVW

INC 9
- 901 ORAL CMPLNT
- 902 WRITTEN CMPLNT
- 903 EMER RESP
- 904 OTHER

OTH 10
- 101 FAC MEETG/LTR
- 102 OTHER

DATE RECEIVED

SUBSTITUTE: Y___N___ COMMITTMENT: Y___N___ SHARED: Y___N___

	RCRIS SEQ #	RULE CITED	VIOLATION RELATES TO?	CLASS	COMPLIANCE DUE DATE	DATE RESOLVED
1		1200-1-11-		A B C R		
2		1200-1-11-		A B C R		
3		1200-1-11-		A B C R		
4		1200-1-11-		A B C R		
5		1200-1-11-		A B C R		
6		1200-1-11-		A B C R		
7		1200-1-11-		A B C R		
8		1200-1-11-		A B C R		
9		1200-1-11-		A B C R		
10		1200-1-11-		A B C R		
11		1200-1-11-		A B C R		
12		1200-1-11-		A B C R		

NOTES

(X) NO VIOLATIONS

RECEIVED
EPA/REGION IV
FEB 10 1 53 PM '95
COMPL/WASTE
ENFORCE SECTION

STATE OF TENNESSEE
DEPARTMENT OF ENVIRONMENT AND CONSERVATION
JOHNSON CITY ENVIRONMENTAL FIELD OFFICE
2305 SILVERDALE ROAD
JOHNSON CITY, TENNESSEE 37601-2162
(615) 854-5400 FAX (615) 854-5401

February 6, 1995

Dr. Lou Raasch
North American Rayon Corporation
West Elk Avenue
Elizabethton, Tennessee 37643

RE: Hazardous Waste Follow Up Inspection
TND 09-505-1207

Dear Dr. Raasch:

This letter confirms the observations and recommendations which were made during the Hazardous Waste Follow Up Inspection conducted at North American Rayon Corporation on February 6, 1995. The attached inspection report verifies that no violations were identified during the inspection.

If you have any questions or comments concerning this letter or any part of the inspection report, do not hesitate to contact me at 854-5435.

Sincerely,

Fred Willingham
Division of Solid Waste Management

FW/14065037 CONFIRM

Attachment

cc: Ms. Kristen Lippert, EPA, Region IV
Mr. D. Larry Gilliam, DSWM, Johnson City
DSWM, Nashville 10-23 217

Hazardous Waste Inspection Report

Site/Operation Inspected:

North American Rayon Corporation
West Elk Avenue
Elizabethton, Tennessee

Facility Status:

Small Quantity Generator
TND 09-505-1207

Owner/Operator/Primary Contact:

Dr. Lou Raasch, Environmental Services Manager
North American Rayon Corporation
West Elk Avenue
Elizabethton, Tennessee 37643
615-547-5251

Date and Time of Inspection:

February 6, 1995 - Starting at 9:25

Other Inspection Participants:

Dr. Lou Raasch, NARC

Report Prepared By:

Fred Willingham
Division of Solid Waste Management
2305 Silverdale Road
Johnson City, Tennessee 37601
615/854-5435

Purpose of Inspection:

This inspection was conducted to evaluate progress made by North American Rayon Corporation toward correction of previously identified violations of "Tennessee's Hazardous Waste Management Regulations":

Facility Description:

North American Rayon Corporation manufactures rayon yarn by the viscose process. A description of the process is as described in my Notice of Violation dated January 25, 1995.

Inspection Findings:

No violations of "Tennessee's Hazardous Waste Management Regulations" were identified during the inspection.

Signed: Fred Willington Date: 2-6-95

FW/14075037

CERTIFIED MAIL #30,740
RETURN RECEIPT REQUESTED

RECEIVED
EPA REGION IV
FEB 2 9 09 AM '95
WASTE MANAGEMENT SECTION

→ Generation Rate
→ How many waste streams
Review docs from 6/23/95

STATE OF TENNESSEE
DEPARTMENT OF ENVIRONMENT AND CONSERVATION
JOHNSON CITY ENVIRONMENTAL FIELD OFFICE
2305 SILVERDALE ROAD
JOHNSON CITY, TENNESSEE 37601-2162
(615) 854-5400 FAX (615) 854-5401

January 25, 1995

Dr. Lou R. Raasch
North American Rayon Corporation
West Elk Avenue
Elizabethton, Tennessee 37643

RE: Hazardous Waste Inspection Report
TND 09-505-1207

NOTICE OF VIOLATION
Tennessee Hazardous Waste Management Act

Dear Dr. Raasch:

This letter confirms the observations which were made during the hazardous waste inspection conducted at North American Rayon Corporation (TND 09-505-1207) on January 23, 1995. Specifically, the standards for hazardous waste small quantity generators were addressed. This inspection was conducted in accordance with the requirements and provisions of Tennessee Code Annotated, Section 68-212-101 et seq., the "Tennessee Hazardous Waste Management Act".

The attached inspection report details the violations identified. A follow-up inspection will be conducted after February 6, 1995 to ensure that the appropriate corrective actions have been taken at North American Rayon Corporation.

Failure to correct the violations noted may lead to formal enforcement action being initiated by the Division.

If you have any questions or comments on the accuracy of this correspondence, do not hesitate to contact me at 854-5435.

Sincerely,

Fred Willingham

Fred Willingham
Division of Solid Waste Management

FW/14015025 NOV

Attachment

cc: Ms. Kristen Lippert, EPA, Region IV
DSWM, Johnson City
DSWM, Nashville 10-23 216

Hazardous Waste Inspection Report

Site/Operation Inspected:

North American Rayon Corporation
West Elk Avenue
Elizabethton, Tennessee 37643

Facility Status:

Generator/TSDR (Non-Permitted)
TND 09-505-1207

Owner/Operator/Primary Contact:

Dr. Lou R. Raasch, Environmental Services Manager
North American Rayon Corporation
West Elk Avenue
Elizabethton, Tennessee 37643
615/542-2141

Date and Time of Inspection:

January 23, 1995 - Starting at 9:00

Other Inspection Participants:

Dr. Lou Raasch, NARC
Bethanie Glynn, DSWM

Report Prepared By:

Fred Willingham
Division of Solid Waste Management
2305 Silverdale Road
Johnson City, Tennessee 37601
615/854-5435

Purpose of Inspection:

This inspection was conducted to evaluate North American Rayon Corporation's compliance with the applicable requirements of "Tennessee's Hazardous Waste Management Regulations".

Facility Description:

North American Rayon Corporation manufactures rayon yarn by the viscose process. Four types of rayon are produced:

1. Industrial yarn for rubber hose reinforcement;

2. Textile yarn for apparel or furnishings;

3. Carbonizable yarn for the lining of the space shuttle rocket motor of nose cones of missiles; and

4. Tow (mini-fibers) yarn for paper reinforcement.

A description of the processes and wastes generated is as follows:

Stock cellulose pulp sheets are placed in presses containing a 18% NaOH solution. The pulp sheets are allowed to soak for 45 minutes. The press is activated and all excess caustic solution is removed. The excess caustic is recovered by dialyzers by the removal of hemicelluloses. The alkali cellulose is dropped through a chute into a shredder. Spillage in the shredder area (alkali cellulose) is managed as a special waste at the Carter County Sanitary Landfill.

The shredded alkali cellulose is aged for 12 hours in a vat and then transferred to a rotating vacuum drum where carbon disulfide is added to produce yellow colored cellulose xanthate. The xanthate that sticks to the drum cannot be used and is removed and managed as a special waste at the local landfill.

After a retention time of 1.5 to 2 hours, the xanthate is transferred to a mixer and dissolved in a dilute caustic solution. Titanium dioxide is added to part of the viscose to make an opaque colored rayon. The solution is drained from the mixer to a tank and pumped through a three state filtration process to remove suspended fibers. The polypropylene cloth leaves of the filter presses are cleaned in an on-site laundry. Wastewaters from the viscose preparation areas are drained via a trench (alkaline sewer) to the on-site wastewater treatment plant.

The viscose solution is vacuum deaerated for 8 to 11 hours and transferred by a metering pump to a spinning room. The viscose is injected through the openings of spinnerettes into a solution containing sulfuric acid, sodium sulfate, and zinc sulfate. Cellulose is generated and the fibers are spun onto spools. This process bath is drained by a trench (acid sewer) to the WWTP.

At the Acid Recovery building, the sulfuric acid solution from the spinning area is regenerated by evaporation. Sodium sulfate is removed by crystallization. This slurry is dried in a kiln and bagged for commercial use in dyes and detergents. Fresh sulfuric acid is added to the recovered acid for reuse in the spinning process. The evaporated

water in acid recovery is condensed for use as scrubber water in the air emission control equipment.

Zinc is removed by an ion-exchange column from the zinc laden wastewater. The effluent from the column drains to the acid sewer. The recovered zinc is reused in the spin bath solution.

The spools of rayon are placed in a vacuum wash tank and rinsed with cold and warm water to remove any residual carbon disulfide. The CS_2 is recovered in a distillation column. The yarn is then washed in a sodium carbonate and ammonium hydroxide/sulfide solution, rinsed and dried. A finish solution of 1% mineral oil and water is applied to the yarn. Waste yarns are sold as fiber stock (filler material and paper reinforcement).

In a fabric coating process, plastisol (polyvinyl chloride and plasticizer) is applied to release paper by a perforated rotary screen. The paper is laminated by heat to a fabric to form vinyl coated fabric. Scrap fabric is managed as a special waste. Two (2) tanks of mineral spirits are used for process line cleaning. These mineral spirits are reused and fresh solvent is added for make-up. Small quantities of titanium dioxide and carbonate are recovered from the tanks for reuse.

Latex is applied to industrial yarn for adhesion in rubber hoses. Solidified latex, removed from the application equipment is managed as a special waste.

Yarn is twisted and spun onto cones or beams for shipment.

Parts washers containing varsol or mineral spirits are located in the following areas:

1. Millwright Shop
2. Metering Pump Shop
3. Unit 1 Spinning Maintenance Shop
4. Unit 2 Spinning Maintenance Shop
5. Machine Shop

} Alternatives?

Waste solvents are managed as hazardous waste by Safety Kleen Corporation.

Other shops are as follows:

1. Riggers Shop
2. Lead Shop
3. Viscose Maintenance Shop
4. Car Shop
5. Sheet Metal Shop
6. Carpenter Shop
7. Pipe Shop
8. Paint Shop → Lacquer shop

small quantity generator

* At the Lead Shop, lead is melted for the repair of the glass spinning equipment. Scrap lead is remelted for use. When the lead becomes contaminated and can no longer be used it is managed in a satellite accumulation area.

check to see if POTW permit is OKay

Pipe cleaning generates rags containing acetone. Rags ae laundered on site and reused.

* At the Paint Shop, machine parts are painted in two (2) water curtain spray booths. When the booths are cleaned, paint solids are generated, the waste is managed as a special waste. Waste lacquer thinner, generated during cleaning of spray equipment, is either put in a 55 gallon drum in a satellite accumulation area or added to the paint to be used the following day. At the time of the inspection, the drum was marked as containing hazardous waste but the bung was off and a funnel was in the bung hole.

* The metal spools from the spinning operation are sand blasted to remove paint. The spools are dipped in lacquer and then baked. Waste sandblast dust is collected in a baghouse and managed as a special waste. The lacquer dip tank process generates a waste (heresite-alcohol) solution. This waste is managed as a hazardous waste in a satellite accumulation area. where which shop

Two (2) caustic dip tanks are used to clean metal parts. Waste solutions are drained for treatment at the on-site WWTP.

The facility's powerhouse generates flyash from the coal fired boilers. At the present all flyash is transported to Bolton Block Company for the manufacture of 'cinder' blocks.

The wastewater treatment plant receives liquid wastes from the alkaline sewer, acid sewer and the boiler scrubbers. The acid wastewater flows into a basin and mixes with the flow from the alkaline sewer and wastewater from the boiler scrubbers. The mixed flow is pH adjusted to 9.5 by the addition of lime. Peroxide is added to reduce sulfides. The wastewaters are clarified by settling of solids. The effluent from the clarifier is passed through a sand filter and discharged into the Watauga River. NARC has a NPDES permit for this discharge. The sludge is dewatered in a filter press, accumulated in a 20 yard roll-off container, and managed as a special waste.

NARC's process water is obtained from the Watauga River, a spring and wells. Before use, the river water is treated with alum to remove solids. This sludge is managed as a special waste.

Waste oil is shipped to Necessary Oil for reclamation. Scrap metals are sold to Elizabethton Herb and Metal.

NARC maintains a Waste Reduction Plan, a Contingency Plan, Employee Training and an Inspection Log for the accumulation area. At the time of the inspection there was

no hazardous waste in the area. All waste oil drums were marked as containing used oil.

Review of manifests on site indicated 24 shipments of hazardous waste to Safety Kleen Corporation. The amount of each waste shipment varied from 60 kilograms to 210 kilograms.

Proper Landban notification accompanied each shipment.

Closure:

An emergency spill diversion basin (surface impoundment) was formerly operated to receive the acid sewer flow. The basin was clean closed as a hazardous waste unit by removal of contaminated soil. A waste pile containing lead dross was also clean closed as a hazardous waste unit by shipment of the dross to a reclaimer and removal of contaminated soil.

The Division approved the Certification of Closure on May 20, 1991.

Groundwater:

Analytical results of the August 27, 1992 sampling event did not reveal the presence of .06/D list hazardous waste constituents in the groundwater. The analytical results of the second quarter assessment sampling conducted December 22, 1992 were equivalent and sampling was suspended. NARC received Certification of Closure on January 19, 1994.

Inspection Findings:

The following violation was identified during the inspection:

4040: 40 CFR 265.173(a) incorporated by Reference at Rule 1200-1-11-.03(4)(e)6(ii) allows a small quantity generator to accumulate hazardous waste on-site for 180 days or less without a permit or without interim status under Rule 1200-1-11-.07 provided that the generator, if the waste is stored in containers, ensures that containers holding hazardous waste are always kept closed during storage, except when it is necessary to add or remove waste.

Signed: Fred Willingham Date: 1-26-95

FW/14025025 10-23 216

CERTIFIED MAIL #29,232
RETURN RECEIPT REQUESTED

Tennessee Department of Health and Environment
Bureau of Environment
1733 Sunset Drive
Johnson City, Tennessee 37601-3621

March 18, 1989

Dr. Lou Raasch, Environmental Services Manager
North American Rayon Corporation
West Elk Avenue
Elizabethton, Tennessee 37643

RE: Groundwater Compliance Evaluation Inspection
TND 09-505-1207

Notice of Violation

Dear Dr. Raasch:

This letter is written in regard to the Groundwater Compliance Evaluation Inspection conducted at North American Rayon Corporation on March 8 and 9, 1989. The enclosed inspection report details the violations noted during the inspection.

The violations noted in the inspection report must be corrected no later than June 15, 1989. A follow-up inspection will be conducted at the time of North American Rayon Corporation's next quarterly sampling event to ensure North American Rayon Corporation's compliance with Tennessee's Hazardous Waste Management Regulations.

If you have any questions or comments on the accuracy of this correspondence, please do not hesitate to contact me at 928-6487.

Sincerely,

Randy M. Curtis

Randy M. Curtis
Environmental Geologist
Division of Solid Waste Management

RMC/jl SWM-1

Enclosure

cc: Ms. Melissa McGuire,
Ms. Lori Hoskins, EPA, Region IV
Mr. Dwight Hinch, DSWM, Nashville
Mr. Bill Krispin, DSWM, Nashville
Mr. Ron Potts, DSWM, Jackson
Mr. D. Larry Gilliam, DSWM, Johnson City
Mr. Darrell Hale, DSWM, Johnson City
DSWM, Nashville 10-23 80

DOCKET NO. 000104

ENI 000001

T095051207

copy to WCS [illegible]

Groundwater Compliance Evaluation Inspection

Site/Operation Inspected:

North American Rayon Corporation
West Elk Avenue
Elizabethton, Tennessee 37643
TND 09-505-1207

Facility Status:

Interin Status Detection Monitoring

Owner/Operator/Primary Contact:

Dr. Lou R. Raasch, Environmental Services Manager

Date and Time of Inspection:

March 8, 1989 - 8:00 A. M. - 5:25 P. M.
March 9, 1989 - 8:50 A. M. - 12:00 P. M.

Other Inspection Participants:

Mr. Jim Deaton, North American Rayon Corporation
Ms. Laura Harris, Haztech
Mr. Eric Bruce, Haztech

Report Prepared By:

Randy M. Curtis, Environmental Geologist
Tennessee Division of Solid Waste Management
1733 Sunset Drive
Johnson City, Tennessee 37604-3621
615-928-6487

Purpose of Inspection:

This inspection was conducted to evaluate North American Rayon Corporation's compliance with "Tennessee's Hazardous Waste Management Regulations". This inspection does not address North American Rayon Corporation's compliance with generator Closure, and Post Closure requirements.

Inspection Findings:

The following violations of "Tennessee Hazardous Waste Management Regulations" were identified during this inspection:

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ENI
00000

2820 Rule 1200-1-11-.05(6)(b)1(i) requires owners or operators of hazardous waste management facilities that are required to have groundwater monitoring to have at

TN9505 1207

least one monitoring well installed hydraulically upgradient from the limit of the waste management area.

North American Rayon Corporation must alter the detection monitoring system in such a manner that data generated from a position hydraulically upgradient from the limit of the waste management area, and, from within the uppermost aquifer is available for comparison with the downgradient area.

2900 Rule 1200-1-11-.05(6)(c)1 requires owners or operators of hazardous waste management facilities that are required to have groundwater monitoring to develop and follow a groundwater sampling and analysis plan and to keep this plan at the facility.

North American Rayon Corporation has an approved plan on file at the facility, however, it was not strictly followed. The following deviations were noted:

1. TOC samples were collected in 250 ml. plastic containers and preserved with sulphuric acid. Head space was not avoided.

2. Nitrate was collected in a plastic 250 ml. container that was also dedicated to sulfate, fluoride, and chloride. No preservation procedure was observed.

3. Coliform bacteria was sampled in a 125 ml. capacity container.

4. TOX sample was placed in a 1000 ml. capacity amber glass bottle. No preservative was added and headspace was not avoided.

These instances are all deviations from the sample containers and preservation information listed in Section 2.4 Table 1 of the Plan. Additionally, the table lists trichloroethylene and tetrachloroethylene as parameters associated with North American Rayon Corporation's groundwater monitoring program. These samples were not taken. Also, Section 2.3 of the Plan calls for sample withdrawal in a defined sequence. This was not observed.

Due to these deviations, the Division of Solid Waste Management must regard the data generated for these parameters as suspect. North American Rayon Corporation must sample according to the Plan or justify the deviations and show why the data generated should be considered acceptable.

Remarks and Recommendations

Although the sampling was not observed to follow a definite sequence, it should be noted that Haztech personnel undertook steps to avoid unnecessary aeration of the sample. The competency of the Haztech personnel involved is not being questioned, but the deviations in containers and preservatives must be avoided in the future or the Division of Solid Waste Management will be forced to disregard the data thus generated.

The fact that the North American Rayon Corporation site is immediately downstream of a monitored Superfund site should be considered in addressing the question of a suitable upgradient well.

Signed Randy M. Curtis Date 02/14/89

RC/jl SWM-1 10-23 80

DOCKET NO. 000104

ENI 000004

T095051207

RLB - 7/12
WEK - 3/12/90
File - HWPU

MAR - 8 1990

Tennessee Department of Health and Environment
Bureau of Environment
1733 Sunset Drive
Johnson City, Tennessee 37601-3621

TN-420

March 6, 1990

Dr. Lou Raasch, Environmental Manager
North American Rayon Corporation
West Elk Avenue
Elizabethton, Tennessee 37643

RE: Sampling Inspection

Dear Dr. Raasch:

Please find enclosed the results of a sampling inspection report concerning the sampling conducted at NARC on March 6, 1990.

When laboratory analysis results are obtained from NARC's samples and the State samples, the Division of Solid Waste Management will prepare a letter establishing the constituents of concern for closure of the surface impoundment.

If you have any questions concerning this letter, please contact me at 928-6487.

Sincerely,

Fred Willingham

Fred Willingham
Environmental Chemist
Division of Solid Waste Management

FW/13030065

Enclosure

cc: Mr. Anthony Hill, OSCO Environmental Management,
P. O. Box 1203, Columbia, Tennessee 38402-1203
Mr. Ronnie Bowers, DSWM, Nashville
DSWM, Nashville 10-23 123
DSWM, Johnson City

DOCKET NO. 000136

ENI
000001
T095051207

Sampling Inspection Report

Site/Operation Inspected:

North American Rayon Corporation
West Elk Avenue
Elizabethton, Tennessee 37643

Facility Status:

Generator
TND 09-505-1207

Owner/Operator/Primary Contact:

Dr. Lou Raasch, Environmental Manager
North American Rayon Corporation
West Elk Avenue
Elizabethton, Tennessee 37643
615/542-2141

Date and Time of Inspection:

March 6, 1990 - Starting at 9:45 a.m.

Other Inspection Participants:

Mr. Anthony Hill, OSCO
Dr. Lou Raasch, NARC

Report Prepared By:

Fred Willingham
Division of Solid Waste Management
1733 Sunset Drive
Johnson City, Tennessee 37604
615/928-6487

Purpose of Inspection:

This inspection was conducted to evaluate the sampling procedures used by OSCO personnel and to split samples of the soil in NARC's surface impoundment.

Description of Site:

After the sludge was removed from a hazardous waste surface impoundment, fourteen (14) soil samples were collected and composited in order to establish the constituents of concern. The surface impoundment is approximately 50 feet wide and 800 feet long.

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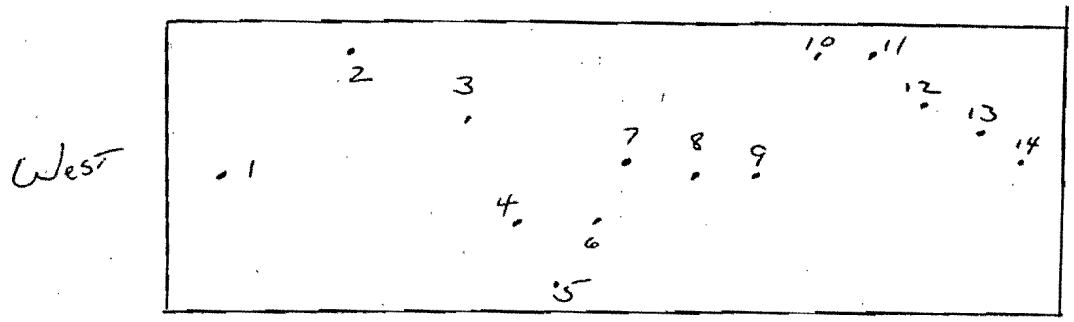
ENI 000002
T095051207

Sampling Procedures:

Fourteen (14) grab soil samples were obtained from the bottom of the surface impoundment as described below:



The samples were collected with a shovel and composited in a 2.5 gallon stainless steel pail. The composited sample was mixed and placed in prepared sampling bottles for laboratory analyses.

NARC's samples were labeled, placed on ice and prepared for shipment to IT Laboratory in Knoxville, Tennessee, via Federal Express.

State samples were labeled, sealed, and placed on ice and delivered to Dr. Phil Baker at the State Laboratory in Johnson City for transport to the Knoxville Branch Laboratory in Knoxville.

Sample Parameters:

Samples will be analyzed for total metals, VOA's and extractable organics.

Inspection Results:

The sampling procedures used by OSCO personnel were satisfactory and conformed to the sampling procedures recommended by the Division of Solid Waste Management.

Signed: Fred Willingham Date: 3/7/90

FW/13040065 10-23 123

DOCKET NO. 000136

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T095051207

LDO 4/10 4-9-9, mail
WEK 4/12
control file

James Scarbrough

CERTIFIED MAIL #29,262
RETURN RECEIPT REQUESTED

TN-100

1990 APR -6 PM 2:06
TN. DEPT. HEALTH & ENV.
DIV. OF SOLID WASTE

Tennessee Department of Health and Environment
Bureau of Environment
1733 Sunset Drive
Johnson City, Tennessee 37601-3621

March 26, 1990

Dr. Lou Raasch
North American Rayon Corporation
West Elk Avenue
Elizabethton, Tennessee 37643

RE: Hazardous Waste Generator/Partial TSDF/
Groundwater Inspection Report
TND 095 05 1207

NOTICE OF VIOLATION

Dear Sir::

This notice is in regard to the Generator/Partial TSDF/Groundwater Hazardous Waste Inspection conducted at North American Rayon Corporation (TND 095-05-1207) on March 19, 1990. The enclosed inspection report details the violations noted during this inspection.

The violations noted in the inspection report shall be corrected no later than May 1, 1990. A follow-up inspection will be conducted to insure compliance with the Tennessee Hazardous Waste Management Act.

If you have any questions or comments on the accuracy of this correspondence, do not hesitate to contact me at 928-6487.

Sincerely,

Darrell S. Hale

Darrell S. Hale, R. P. E.
Environmental Specialist IV
Division of Solid Waste Management

DSH/13020085

Attachment

cc: Mr. Ed Britt, NARC
Mr. D. Larry Gilliam, DSWM, Johnson City
Mr. Randy Curtis, DSWM, Johnson City
DSWM, Nashville 10-23 127

DOCKET NO. 2 000140

ENI 000001
T095051207

Hazardous Waste Inspection Report

Site/Operation Inspected:

North American Rayon Corporation
West Elk Avenue
Elizabethton, Tennessee 37643

Facility Status:

Non Permitted TSD/Generator
TND 095051207

Owner/Operator/Primary Contact:

North American Rayon Corporation
Dr. Lou Raasch
West Elk Avenue
Elizabethton, Tennessee 37643

Date and Time of Inspection:

March 19, 1990 - Starting at 9:45 a.m.

Other Inspection Participants:

Randy Curtis, DSWM

Report Prepared By:

Darrell S. Hale, R. P. E.

Division of Solid Waste Management
1733 Sunset Drive
Johnson City, Tennessee 37604
615/928-6487

Purpose of Inspection:

This inspection was conducted to determine North American Rayon Corporation's compliance with the Rules Governing Hazardous Waste Management in Tennessee. A partial TSDF/Groundwater and Generator inspection was conducted. This inspection does not address NARC's compliance with the Permit, Closure and Post Closure requirements.

Facility Description:

As previously described in my December 3, 1987 hazardous waste inspection report.

DOCKET NO. 000140
ENI 000002
T095051207

Inspection Findings:

Generator Inspection -

The sump (tank) which receives acid sewer discharges showed evidence of leakage this date allowing discharges to the on-site surface impoundment presently under a closure order. This sump must either be upgraded to meet the definition of a tank in Rule 1200-1-11-.01 of the Rules Governing Hazardous Waste Management in Tennessee or be closed.

As a result of this inspection, the following violations were noted:

0060 Rule 1200-1-11-.03(4)(b)1(ii) requires generators who accumulate hazardous waste temporarily on-site without requesting a permit or interim status to inspect the level of the waste in uncovered tanks, at least once each operating day to ensure that the uncovered tank is being operated to have at least two feet of freeboard or a containment structure with capacity that equals or exceeds the volume of the top two feet of the tank.

0065 Rule 1200-1-11-.03(4)(e)1(i) allows a generator to accumulate hazardous waste on-site for 90 days or less without a permit or without interim status under Rule 1200-1-11-.07 provided that the generator inspects the level of the waste in the tank, at least once each operating day, to ensure that uncovered tanks are operated to ensure at least two feet of freeboard, unless the tank is equipped with a containment structure (e.g., dike or trench), a drainage control system, or a diversion structure (e.g., standby tank) with a capacity that equals or exceeds the volume of the top two feet of the tank.

0505 Rule 1200-1-11-.03(4)(e)1(i) allows a generator to accumulate hazardous waste on-site for 90 days or less without a permit or without interim status under Rule 1200-1-11-.07 provided that the generator, if the waste is stored in a tank, ensures that where hazardous waste is continuously fed into a tank, the tank is equipped with a means to stop this inflow. (e.g., a waste feed cutoff system or bypass system to a standby tank).

0525 Rule 1200-1-11-.03(4)(e)1(iii) allows a generator to accumulate hazardous waste on-site for 90 days or less without a permit or without interim status under Rule 1200-1-11-.07 provided that the generator ensures that where hazardous waste is being accumulated on-site, each container and tank is labeled or marked clearly with the words, "Hazardous Waste".

0530 Rule 1200-1-11-.03(4)(b)1(v) requires generators who accumulate hazardous waste temporarily on-site without requesting a permit or interim status to maintain and operate the temporary storage area in a manner which will minimize the possibility of a fire, explosion, or any unplanned sudden or non-sudden release of hazardous waste or hazardous waste constituents to air, soil, or surface water which could threaten public health or the environment.

Partial TSDF Inspection -

The following violation was noted as a result of the partial TSDF inspection:

2015 Rule 1200-1-11-.05(2)(e)3 requires owners or operators of hazardous waste management facilities to post a sign with the legend "Danger-Unauthorized Personnel Keep Out", at each entrance to the active portion of the facility, and at other locations, in sufficient number to be seen from any approach to that active approach, unless exempted from this requirements. The legend must be written in English, and must be legible from a distance of at least 25 feet.

Groundwater Compliance Evaluation Inspection:

The facility's records were inspected and a Groundwater Monitoring Inspection Manual Checklist was filled out. The following violations were noted:

3060 Rule 1200-1-11-.05(6)(d)2 requires owners or operators of hazardous waste management facilities that are required to have groundwater monitoring to compare the analytical results obtained for the indicator parameters, for the samples taken after the first year, to the initial background data obtained during the first year, in accordance with the "Procedures for Statistically Evaluating Groundwater Monitoring Data" (Appendix .05/C) in order to determine if any well exhibits statistically significant increases in parameter values (and decreases in the case of pH) over the initial background values established for that upgradient well.

3065 Rule 1200-1-11-.05(6)(d)3(i) requires owners or operators of hazardous waste management facilities, that are required to have groundwater monitoring, to note that fact in a cover letter attached to the annual report if the comparisons for the upgradient wells show a significant increase (or pH decrease).

3070 Rule 1200-1-11-.05(6)(d)2 requires owners or operators of hazardous waste management facilities that are required to have groundwater monitoring to compare the analytical results obtained for the indicator parameters, for the samples taken after the first year, to the initial background data obtained during the first year, in accordance with the "Procedures for Statistically Evaluating Groundwater Monitoring Data" (Appendix .05/C) in order to determine if any well exhibits statistically significant increases in parameter values (and decreases in the case of pH) over the initial background values established for that downgradient well.

3080 Rule 1200-1-11-.05(6)(d)2 requires owners or operators of hazardous waste management facilities that are required to have groundwater monitoring to compare the analytical results obtained for the indicator parameters, for the samples taken after the first year, to the initial background data obtained during the first year, in accordance with the "Procedures for Statistically Evaluating Groundwater Monitoring Data" (Appendix .05/C) in order to determine if any downgradient well exhibits statistically significant increases in parameter values (and decreases in the case of pH) over the initial "pooled upgradient" background values.

3090 Rule 1200-1-11-.05(6)(d)3(ii) requires owners or operators of hazardous waste management facilities that are required to have groundwater monitoring to obtain additional groundwater samples from any downgradient well where a significant difference was detected, split the samples in two, and obtain analyses of all additional samples to determine whether the significant differences were a result of laboratory error.

3150 Rule 1200-1-11-.05(6)(e)1(i) requires owners or operators of hazardous waste management facilities that are required to have groundwater monitoring to keep records of the evaluations made to determine if the facility is affecting groundwater quality when using the "Procedures for Statistically Evaluating Groundwater Monitoring Data" (Appendix .05/C), throughout the active life of the facility, and, for disposal facilities, throughout the post-closure care period as well.

3180 Rule 1200-1-11-.05(6)(e)1(ii)(II) requires owners or operators of hazardous waste management facilities that are required to have groundwater monitoring to report annually to the Commissioner the concentrations and values of the parameters establishing groundwater quality and the parameters used as indicators of groundwater contamination for each groundwater monitoring well, along with the required evaluation made to determine if the facility is statistically affecting groundwater quality.

3190 Rule 1200-1-11-.05(6)(e)1(ii)(II) requires owners or operators of hazardous waste management facilities that are required to have groundwater monitoring to separately identify in the report submitted annually to the Commissioner any well that was found to be significantly affecting the groundwater, by noting that fact in a cover letter.

3200 Rule 1200-1-11-.05(6)(e)1(ii)(II) requires owners or operators of hazardous waste management facilities that are required to have groundwater monitoring to submit the information in the report due to the Commissioner annually as a part of the annual report.

3210 Rule 1200-1-11-.05(6)(e)1(ii)(III) requires owners or operators of hazardous waste management facilities that are required to have groundwater monitoring to submit as a part of the annual report, the results of the evaluation of groundwater surface elevations and a description if the response to that evaluation.

Remarks and Recommendations:

None.

Signed: Darrell S Hale Date: 4-5-90

DSH/13010085 10-23 127

DOCKET NO. ~~000140~~

ENI 000006

T095051207

STATE OF TENNESSEE
DEPARTMENT OF ENVIRONMENT AND CONSERVATION
JOHNSON CITY ENVIRONMENTAL FIELD OFFICE
900 NORTH STATE OF FRANKLIN ROAD
JOHNSON CITY, TENNESSEE 37604-3621
(615) 928-6487 FAX (615) 928-2187

January 27, 1994

Dr. Lou R. Raasch, Environmental Services Manager
North American Rayon Corporation
West Elk Avenue
Elizabethton, Tennessee 37643

RE: Hazardous Waste Compliance Evaluation Inspection
TND 09-505-1207

Dear Dr. Raasch:

This letter confirms the observations and recommendations which were made during the Hazardous Waste Compliance Evaluation Inspection conducted at North American Rayon Corporation on January 21, 1994. The attached inspection report verifies that no violations were identified during the inspection.

If you have any questions or comments concerning this letter or any part of the inspection report, do not hesitate to contact me at 928-6487.

Sincerely,

John Trimmer

John Trimmer
Division of Solid Waste Management

JT/14024027 CONFIRM

Attachment

cc: Ms. Judy Marshall, EPA Region IV, Atlanta
Mr. D. Larry Gilliam, DSWM, Johnson City
DSWM, Nashville 10-23 213

DOCKET NO. ~~000159~~
ENI
000001
T095051207

Hazardous Waste Inspection Report

Site/Operation Inspected:

North American Rayon Corporation
West Elk Avenue
Elizabethton, Tennessee 37643

Facility Status:

Generator/TSDR (non-permitted)
TND 09-505-1207

Owner/Operator/Primary Contact:

Dr. Lou R. Raasch, Environmental Services Manager
North American Rayon Corporation
West Elk Avenue
Elizabethton, Tennessee 37643
615/542-2141

Date and Time of Inspection:

January 21, 1994 - Starting at 8:55 A.M.

Other Inspection Participants:

Lou Raasch, NARCo

Report Prepared By:

John Trimmer
Division of Solid Waste Management
900 North State of Franklin Road
Johnson City, Tennessee 37604
Phone: (615)928-6487

Purpose of Inspection:

This inspection was conducted to evaluate North American Rayon Corporation's compliance with the applicable rules of "Tennessee's Hazardous Waste Management Regulations".

Facility Description:

North American Rayon Corporation manufactures rayon yarn by the viscose process. The plant produces four types of rayon:

1. Industrial yarn for reinforcement of rubber hose;

2. Textile yarn for apparel or furnishings;

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T095051207

3. Carbonizable yarn for the lining of the space shuttle rocket motor or nose cones of missiles; and

4. Tow (mini-fibers) yarn for paper reinforcement.

Stock cellulose pulp sheets are placed in dipping presses which contain a 18% sodium hydroxide solution. The pulp is allowed to soak for 45 minutes. Then, a hydraulic ram is activated to press the pulp and remove excess caustic. The alkali cellulose is dropped through a chute into the feed hopper of a shredder. Spillage in the shredder area is disposed into the Carter County Sanitary Landfill as a special waste. The excess caustic is recovered by dialyzers by the removal of hemicelluloses.

The shredded alkali cellulose is aged for twelve (12) hours in a vat and dumped into a feed hopper of a rotating vacuum drum where carbon disulfide is added to form orange colored cellulose xanthate. A portion of the xanthate is non-usable, rubbery material and is disposed into the county landfill as a special waste.

After the retention time of 1 1/2 to 2 hours, the xanthate is dropped into a mixer and dissolved in a dilute caustic solution. Titanium dioxide is added to a portion of the viscose to allow production of dull finish rayon. The solution is drained from the mixer to a tank and pumped through a three stage filtration process to remove entrained fibers. The polypropylene cloth leaves of the filter presses are cleaned in an on-site laundry. Wastewater from the viscose preparation areas is drained by a trench (alkaline sewer) to the facility treatment plant.

The viscose solution is vacuum deaerated for 8 to 11 hours and transferred by a metering pump to a spinning room. The viscose is injected through the openings of spinnerettes into a bath containing sulfuric acid, sodium sulfate, and zinc sulfate. Cellulose is regenerated by the bath solution, and the fibers are spun onto color coded spools. Process wastewater is drained by a trench (acid sewer) to the on-site treatment plant.

At the acid recovery building, the sulfuric acid solution from the spinning areas is regenerated by evaporation. Sodium sulfate is removed by crystallization. The sodium sulfate slurry is dried in a kiln and bagged for commercial use in dyes and detergents. Supplemental sulfuric acid is added to the recovered acid for reuse in the spinning process. The evaporated water is recovered for use as scrubber water in air emissions control equipment.

Zinc is removed by an ion-exchange column from zinc-rich process wastewater. The column effluent drains to the acid sewer. The zinc is recovered for reuse in the spin bath solutions.

The spools of rayon are placed in a pressure vacuum wash tank and rinsed with both cold and warm water to evaporate residual carbon

disulfide. The carbon disulfide is recovered in a distillation column. The yarn is washed in sodium carbonate solution and ammonium hydroxide/sulfide solution, rinsed and dried. A finish solution of 1% mineral oil and water is applied to the yarn product. Waste yarn is sold as fiber stock (filler material and paper reinforcement).

In a fabric coating process, plastisol (polyvinyl chloride and plasticizer) is applied to release paper by a perforated rotary screen. The paper is laminated by heat to cotton/polyester fabric, and vinyl coated fabric is formed. Scrap coated fabric is disposed into the county landfill as a special waste. Two tanks of mineral spirits located in this area are used for process line cleaning. Small quantities of titanium dioxide and carbonate are recovered from the tanks for reuse in process.

Latex is applied to industrial yarn to improve adhesion in rubber hose. Solidified latex is removed from application equipment and disposed into the county landfill as a special waste.

Yarn is twisted, and then spun either onto cones or large aluminum beams for shipment.

Parts washers containing either varsol or mineral spirits are located in the following maintenance areas:

1. Millwright Shop
2. Metering Pump Shop
3. Unit 2 Spinning Maintenance Shop
4. Unit 1 Spinning Maintenance Shop
5. Machine Shop

The spent mineral spirits is shipped off-site as hazardous waste to Safety Kleen Corporation.

Other shops are the following:

1. Riggers Area
2. Lead Shop
3. Viscose Maintenance
4. Car Shop
5. Sheet Metal Shop
6. Carpenter Shop
7. Pipe Shop
8. Paint Shop

At the lead shop, lead is melted in a pot for repair of the spinning equipment. Scrap lead and dross is remelted for reclamation. A portion of the waste lead dross is shipped off-site as hazardous waste.

Pipe cleaning activities at the pipe shop generate acetone contaminated rags. The rags are cleaned in an on-site laundry for reuse.

At the paint shop, machinery parts are painted at two spray booths provided with water curtain overspray collection systems. The recirculation spray water tanks are cleaned out periodically, and the sludge is disposed into the landfill as a special waste. Spent lacquer thinner from paint spray gun cleaning is stored in a 55 gallon satellite accumulation drum.

The perforated metal spools used in the spinning area are sand blasted in either a tumble blaster or walk in blasting room to remove paint. The spools are dipped in a tank of lacquer and then baked to dry the lacquer. The waste sandblast dust is collected in a baghouse and disposed as a special waste into the landfill. The lacquer dip tank process generates a waste solvent (Heresite - alcohol and ether mixture) which is shipped off-site as a hazardous waste. One (1) 55 gallon drum of waste Heresite is located in this area for satellite accumulation.

Two heated caustic solution dip tanks used for parts cleaning are located adjacent to the lacquer application area. Waste caustic solution is drained to the facility wastewater treatment plant.

The facility powerhouse generates flyash from boiler operations. A portion of the flyash is entrained in the boiler off-gas scrubber water that drains to the on-site wastewater treatment plant. The remainder of the flyash is either shipped to Bolton Block Company for the manufacture of cinder block or disposed into the county landfill as a special waste.

The wastewater treatment plant receives influent from the alkaline sewer (from viscose production areas), the acid sewer (from spinning rooms and acid recovery), and the boiler scrubbers. The acid sewer wastewater flows into a basin provided with a bar screen and then mixes with the alkaline sewer and boiler scrubber waters in an equalization basin. The mixed stream is transferred by screw pumps to a chamber where the pH is increased to 9 1/2 by the addition of lime solution. Peroxide is added to the wastewater to reduce sulfides. The wastewater drains into clarifiers which allow the suspended solids to settle. the clarifier overflow is passed through a sand filter and discharged at a NPDES discharge location at the Watauga river. The clarifier sludge is pumped to two filter presses. The filter sludge cake is released into 20 cubic yard roll-off containers and disposed into the landfill as special waste. If the clarifiers are non-operational, the combined clarifier over-flow and sludge flow is routed through a settling pond (spill diversion basin) before discharge to the river.

Process water to the NARCo facility is obtained from the river, a spring, and groundwater wells. Before plant use, the river water is treated with alum to remove solids. The alum sludge is disposed into the local landfill as a special waste.

Waste oil is shipped to Tri-City Oil Service or Necessary Oil for reclamation. Scrap metal is shipped to Elizabethton Herb and Metal for recycling.

The facility maintains a waste reduction plan and a contingency plan. Hazardous waste training for personnel is conducted yearly. An inspection log for the container accumulation area is maintained.

Review of manifests reveals the following shipments of hazardous wastes:

Transported by Safety Kleen Corporation to
Safety Kleen Corporation, Bristol VA

1/15/93	waste	combustible	liquids -	D001, D039	10 gallons
2/25/93	"	"	"	"	12 gallons
4/22/93	"	"	"	"	15 gallons
6/11/93	"	"	"	"	14 gallons
7/20/93	"	"	"	"	15 gallons
7/22/93	"	"	"	"	24 gallons
08/5/93	"	"	"	"	24 gallons
8/20/93	"	"	"	"	23 gallons
9/03/93	"	"	"	"	32 gallons
9/14/93	"	"	"	"	20 gallons
10/01/03	"	"	"	"	17 gallons
10/14/93	"	"	"	"	32 gallons
10/28/93	"	"	"	"	22 gallons
11/11/93	"	"	"	"	22 gallons
11/22/93	"	"	"	"	32 gallons
12/07/93	"	"	"	"	23 gallons
12/21/93	"	"	"	"	18 gallons

NARCo provided notification to the TSDR facility that the wastes are restricted from land disposal.

Closure:

An emergency spill diversion basin (surface impoundment) was formerly operated to receive the acid sewer flow. The basin was clean closed as a hazardous waste unit by removal of contaminated soil. A waste pile containing lead dross was also clean closed as a hazardous waste unit by shipment of the dross to a reclaimer and removal of contaminated soil.

The Division approved the Certification of Closure on May 20, 1991.

Groundwater:

Analytical results of the August 27, 1992 sampling event did not reveal the presence of .06/D list hazardous waste constituents in the groundwater. The analytical results of the second quarter assessment sampling conducted December 22, 1992 were equivalent

to first quarter results; consequently, sampling was suspended. The Division's determination of clean closure for groundwater is projected by mid 1994.

Inspection Findings:

No violations of "Tennessee's Hazardous Waste Management Regulations" were identified during the inspection.

Remarks and Recommendations:

1. The practice of allowing untreated wastewater to flow into the spill diversion basin during power outage or wastewater treatment plant upsets is not recommended.

2. The present rates of hazardous waste generation indicate that the facility qualifies for small quantity generator status.

Signed John Trimmer Date 01/31/94

JT/14014027 10-23 213

R-586-12-9-8

FINAL

ENVIRONMENTAL PRIORITIES INITIATIVE PRELIMINARY ASSESSMENT OF NORTH AMERICAN RAYON CORPORATION WEST ELK AVENUE ELIZABETHTON, TENNESSEE 37643 EPA ID #TND095051207

Prepared Under
TDD No. F4-8905-24
CONTRACT NO. 68-01-7346

Revision 0

FOR THE

WASTE MANAGEMENT DIVISION
U.S. ENVIRONMENTAL PROTECTION AGENCY

DECEMBER 6, 1989

NUS CORPORATION
SUPERFUND DIVISION

Prepared By	Reviewed By	Approved By
Mitch Cohen, P.E. Project Manager	Greg Schank Assistant Regional Project Manager	Murray Warner, P.E. Regional Project Manager

ENI DOCKET NO. 000130
T095051207

NOTICE

The information in this document has been funded wholly by the United States Environmental Protection Agency (EPA) under Contract Number 68-01-7346 and is considered proprietary to the EPA.

This information is not to be released to third parties without the expressed or written consent of the EPA.

DOCKET NO. 000130

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T095051207

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T095051207

EXECUTIVE SUMMARY

North American Rayon Corporation (North American Rayon) is located on West Elk Avenue in Elizabethton, Carter County, Tennessee. North American Rayon produces rayon, a synthetic fiber, by batch processing pulp, sodium hydroxide, and carbon disulfide into a thick, yellow, transluscent liquid called viscose. The viscose is further processed into rayon which is spun into yarn. The finished product is sold to manufacturers of clothing, puff wallpaper, ornamental patches and reinforced rubber hoses.

RCRA Part A interim status was withdrawn in 1983. Currently, the facility status is that of a generator. According to the state, the facility is presently in compliance and is in the process of closing RCRA-designated hazardous waste units.

Potable water supplies are provided to the majority of the population within the study area by several utilities. Elizabethton, North Elizabethton, South Elizabethton, First Utilities and the Siam Water Departments provide municipal service. Only Elizabethton has a source of drinking water within the study area. Johnson City is located outside of the study area; however, its Watauga River intake is located between 3 and 4 miles of the facility. A house count identified approximately 262 households not served by a municipal water system within the 3-mile radius of the facility.

The Watauga River flows along the northern and western boundaries of the facility property. Storm drainage runoff, as well as treated wastewater, discharge directly to the river via seven NPDES permitted outfalls. The Watauga River is recreationally fished. There are no critical habitats identified in the study area; however, several federally endangered species have been identified. These include the gray bat, bald eagle, Kirtland's warbler, and the Carolina northern flying squirrel.

The Visual Site Inspection (VSI) conducted during the investigation identified twenty-four Solid Waste Management Units (SWMUs) and five Areas of Concern (AOCs). Eleven of the SWMUs are recommended for further assessment. All five of the AOCs are recommended for further assessment.

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1.0 INTRODUCTION

The NUS Corporation Region 4 Field Investigation Team (FIT) conducted a Preliminary Assessment (PA) and a Visual Site Inspection (VSI) at the North American Rayon facility on August 21-22, 1989. The task was performed as part of the Environmental Priorities Initiative (EPI) program as stated in Technical Directive Document (TDD) No. F4-8905-24.

1.1 OBJECTIVE

The major objective of the EPI program is to conduct an onsite and offsite inspection of the assigned facility in order to characterize the Solid Waste Management Units (SWMUs), associated releases and other Areas of Concern (AOCs). The inspection is conducted in a two-phase operation: the Preliminary Review, which includes the review and evaluation of specific file documents; and the Visual Site Inspection (VSI), which identifies all SWMUs, known releases, and AOCs.

1.2 SCOPE OF WORK

The scope of this investigation included the following activities:

- a file search of State and EPA files in an attempt to obtain and review specific documents (RCRA, CERCLA, AIR, and NPDES) that will help characterize the facility,
- development of a detailed site base map to scale including site features, solid waste management unit locations, and photo-documentation areas,
- evaluation of target populations within a 3-mile radius from the site with regard to groundwater, air, and surface water,
- a private well survey within a 3-mile radius of the facility,
- inspection and photo-documentation of all Solid Waste Management Units (SWMUs) and related releases and exposure pathways, and
- inspection and photo-documentation of all Areas of Concern (AOCs).

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2.0 SITE DESCRIPTION

2.1 SITE LOCATION

The North American Rayon Corporation (North American Rayon) is located on West Elk Avenue in Elizabethton, Carter County, Tennessee. The facility is more specifically located at 36°21'02" N latitude and 82°14'50" W longitude on the United States Geological Survey (USGS) topographic map for Elizabethton, Tennessee (Appendix B).

2.2 SITE FEATURES

The North American Rayon facility consists of several plant building structures, tank farms, a powerhouse, a wastewater treatment facility, drying lagoons and a closed landfill, occupying about 130 acres. The facility is bounded to the north and west by the Watauga River. The remainder of the facility property is enclosed by fence. There are approximately nine guarded gates for entry located along the south fenceline. The property is fairly flat, although the surrounding area is mountainous (Refs. 1, p. 2; 2; Figure 2-1). Refer to Figure 2-2 for the site layout.

2.3 OWNERSHIP HISTORY

The North American Rayon property has a long history of operations. The majority of the plant buildings were constructed by August of 1928. Rayon production began at the plant when American Glanzstoff Company first implemented operations. During the 1930's, the name of the facility became North American Rayon. In 1942, the plant was nationalized by the United States government and was used to supply rayon for war needs. After World War II, in 1946, Beaunit Corporation bought the facility and privately operated it as a rayon producer once again. In 1968, El Paso Natural Gas took over ownership of the facility, and in 1976 the operation became known as Carter County Fibers. A local businessman, Mr. Jimmy Walker, bought the facility in 1977, and reverted the name back to North American Rayon. Mr. Walker continued to own North American Rayon until 1985, when he sold the facility to the employees. Currently, the employee stock ownership plan is still in effect. The facility is presently owned and operated by 1300 employees who produce rayon 24 hours per day, 7 days per week (Ref. 1, p. 3).

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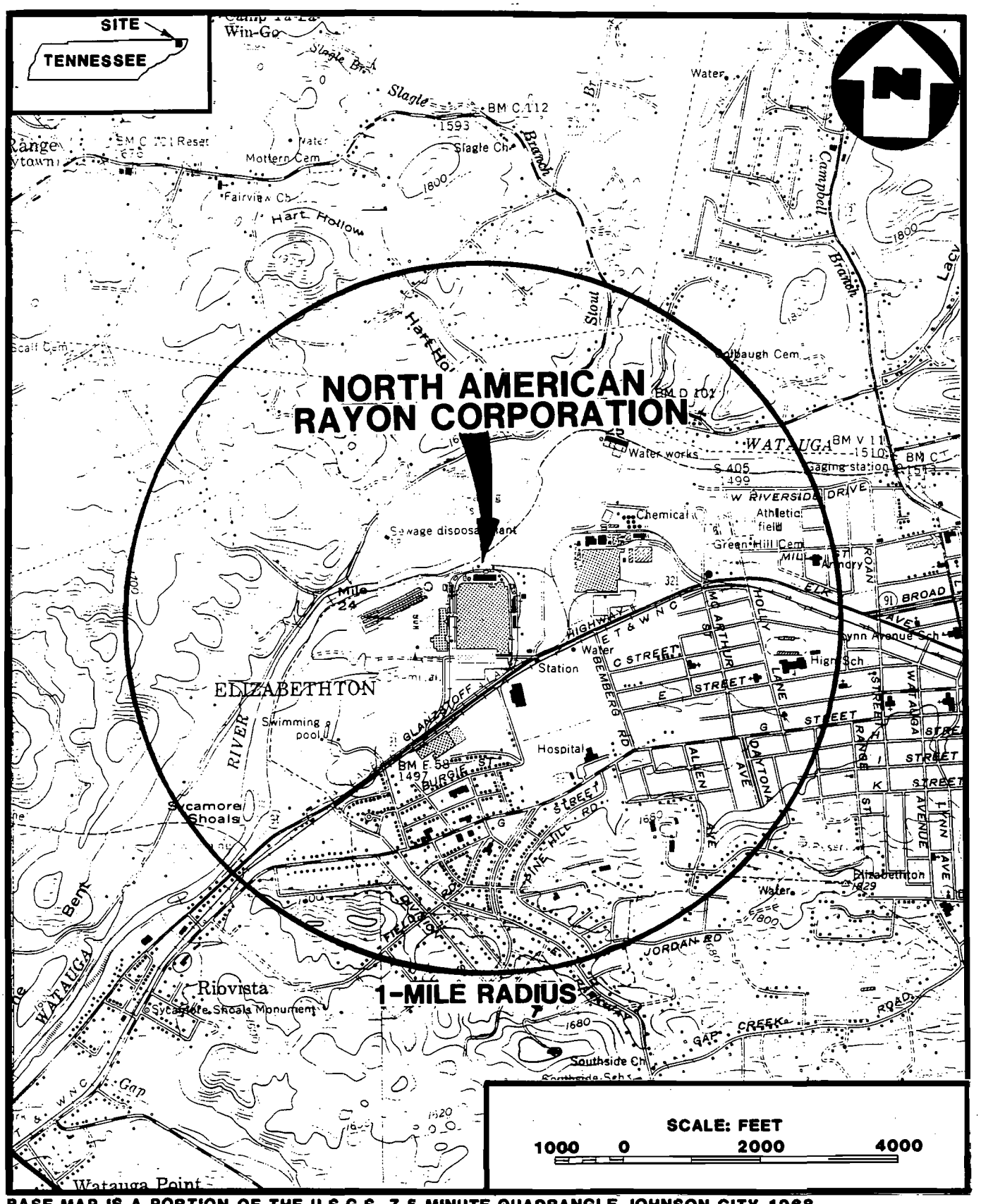

BASE MAP IS A PORTION OF THE U.S.G.S. 7.5 MINUTE QUADRANGLE JOHNSON CITY 1968, ELIZABETHTON 1968, TENNESSEE.

SITE LOCATION MAP
NORTH AMERICAN RAYON CORPORATION
ELIZABETHTON, CARTER COUNTY, TENNESSEE

NUS CORPORATION

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2.4 NATURE OF OPERATIONS

The facility uses the same rayon production process that was accidentally discovered in Europe when a chemist attempted to synthesize silk from mulberry leaves. Several batch operations are initiated. Sheets of pulp, similar to thick blotter paper are steeped in sodium hydroxide. After steeping, the treated pulp is shredded and combined with carbon disulfide. Water and sodium hydroxide are added back and the mass is thoroughly mixed. The batch is allowed to age, or ripen, and is then aerated. The thick, yellowish, transluscent material called viscose is then filtered. The viscose is then sent through a spin bath and further wet processing which incorporates sulfuric acid, sodium sulfate, zinc sulfate, sulfides, polysulfides, thiosulfate and surfactants. After processing, the raw rayon is dried and then spun into either textile spool yarn, plastic-coated yarn or latex-coated yarn. The finished product is sold to manufacturers of clothing, puff wallpaper, ornamental patches and reinforced rubber hoses.

During the filtration of the viscose and the wet processing of rayon, wastewater and process materials that enter the floor drain system are sent to the onsite wastewater treatment plant. The plant has two sewer lines, an acid sewer and the caustic sewer, that carry wastewaters to the treatment plant (Refs. 1, p. 4; 3).

2.5 PERMIT AND REGULATORY HISTORY

North American Rayon notified EPA about the landfill as a potential hazardous waste site in 1981, as required by CERCLA 103(c) (Ref. 4). Prior to this, in 1980, North American Rayon analyzed sludge for EP toxicity. Barium was detected at 265 ppm, so the facility filed a RCRA Part A application for an interim status hazardous waste permit. Additional analyses by independent and state laboratories revealed that parameters analyzed for were actually below RCRA standards for hazardous wastes. North American Rayon then requested withdrawal of the Part A application for interim status. The state notified the facility on July 7, 1983, that the withdrawal of interim status had been approved (Ref. 5).

North American Rayon holds an NPDES permit for wastewater discharge to the Watauga River. Permit No. TN0004421 regulates the discharge at river mile 24.2 to 24.6 for outfalls 002, 003, 004, 005, 006, 007 and 010. Parameters regulated include flow rate, pH, zinc, ammonia, sulfides, phenols, heavy metals, temperature and total suspended solids (TSS) (Ref. 6). North American Rayon also holds air permits regulating discharge to ambient air from many areas of the facility.

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The following air permits have been issued:

024991F -	Coal-fired boilers
019539P -	Nuveyor ash and fly ash conveying
019540P -	Lime storage bin
024156P -	Sodium sulfate rotary drying kiln
024583P -	Woodworking operation
024570P -	Carbon disulfide recovery
024571P -	Pressure-vacuum wash extension
024572P -	Low vacuum pump from viscose department
024573P -	Rotary dip coating of spools
024574P -	Spray coating of pressure-vacuum wash tanks and pipes
024575P -	Paint shop spray coating of metal parts
024576P -	Paint shop spray coating of metal parts
024577P -	Caustic dip tank for pressure-vacuum wash tanks
024578P -	Caustic dip tank for metal parts
024579P -	Sand and bead blasting operation
024580P -	Zinc recovery
024596P -	Lead melting pot
024582P -	Lead melting
024581P -	Coal handling
024584P -	Unit I acid recovery
024585P -	Unit II acid recovery
024586P -	Drying of electric motors
024587P -	Drying of metal parts
024588P -	Drying of metal parts
024589P -	Degreasing operations
024686P -	Pressure-vacuum wash
024680P -	Unit I spinning
024681P -	Unit II spinning
024682P -	Viscose preparation
024683P -	Fabric coating with PVC film (Ref. 7).

Currently, the facility has generator status and is in compliance according to the state. Closure of recently discovered RCRA units (holding basin and lead pile) are pending closure plan approval (Ref. 8).

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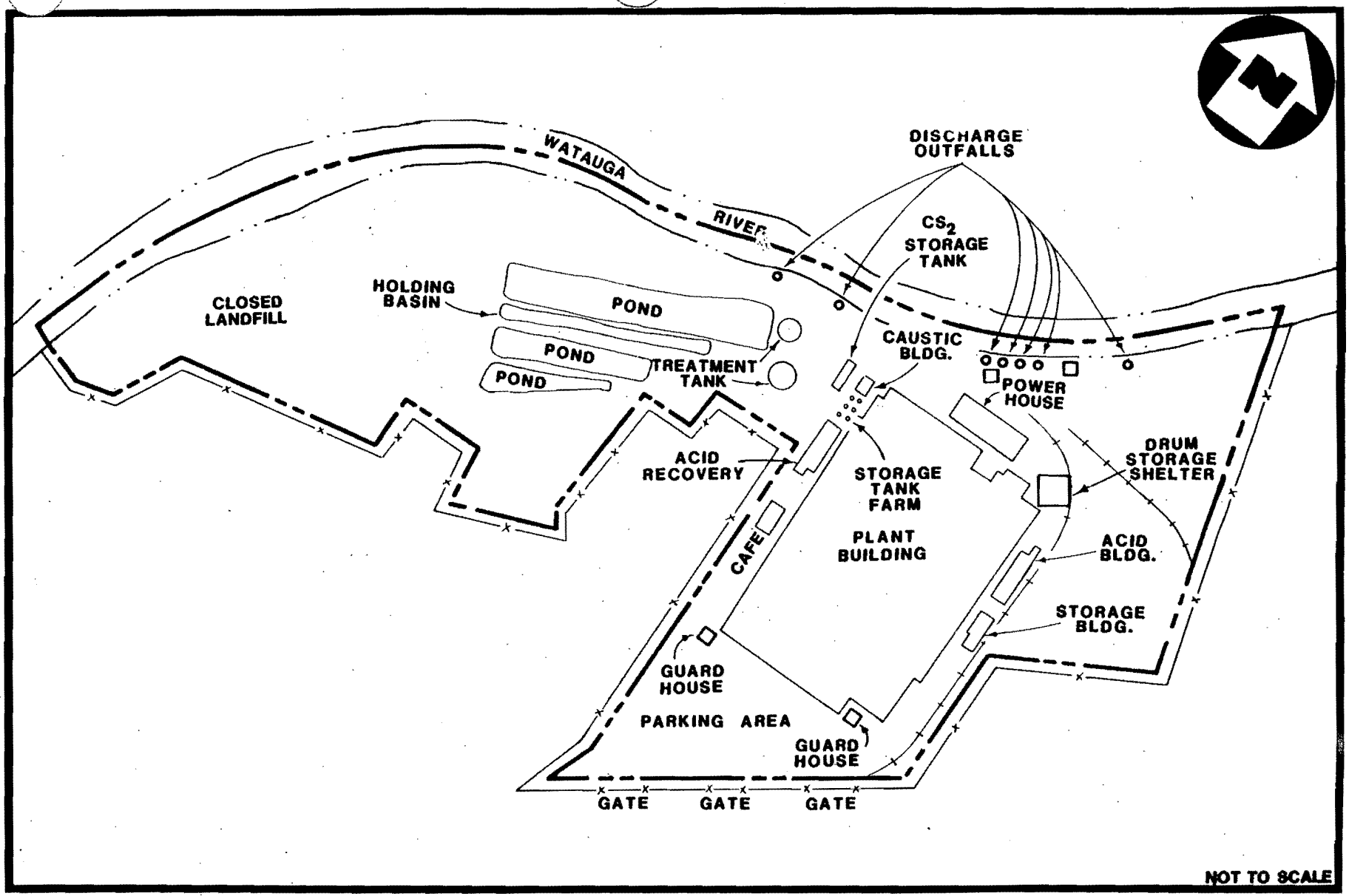

SITE LAYOUT MAP
NORTH AMERICAN RAYON CORP.
ELIZABETHON, CARTER COUNTY, TENNESSEE.

FIGURE 2-1

NUS CORPORATION

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3.0 ENVIRONMENTAL SETTING

The Environmental Setting section, in addition to the Preliminary Assessment Form (Appendix A) and Topographic Map (Appendix B), provides information to evaluate the potential for a release to groundwater and surface water resources and other receptors.

3.1 WATER SUPPLY

The majority of the population within the study area are supplied with potable water from several municipal water systems. The Elizabethton Water District, North Elizabethton Water Department, South Elizabethton Water Department, First Utilities and the Siam Utilities provide water within the 4-mile radius of the facility. One of the three source springs used by Elizabethton, the Big Spring located about 2.5 miles south of the facility, is within the study area. Water from the three springs is mixed prior to distribution. The Elizabethton Water District serves 9500 connections, as well as 725 connections in Siam and 350 connections in the North Elizabethton system. First Utilities and the South Elizabethton Water Department obtain water from sources located outside of the study area (Ref. 9).

The population not served by a municipal system use private wells for drinking water. A house count identified approximately 262 households within the 3-mile radius of the facility not served by a municipal system. Between the 3- and 4-mile radii, approximately 310 households are not served by a public supply. The population served by private wells within 3 miles of the facility is, therefore, 996 (262 household x 3.8 people/household) (Appendix B).

Johnson City is located just outside of the 4-mile radius. The Johnson City water intake, serving 5750 connections, is located on the Watauga River, at river mile #17, between the 3- and 4-mile radii of the facility approximately 4.5 stream miles downstream(Ref. 10, Appendix B).

3.2 SURFACE WATER

Runoff from the North American Rayon facility flows north-northwest and enters the Watauga River, which traverses adjacent to the facility. The storm drainage system used by North American Rayon is

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comprised of a network of drop inlets that flow to seven outfalls discharging directly into the river (Ref. 2). The Watauga River is fished for crappy, bass and other freshwater species (Ref. 1, p. 3). No commercial fishing operations are known.

3.3 CLIMATOLOGICAL, METEOROLOGICAL, AND HYDROGEOLOGICAL FACTORS

Most of Carter County lies in the Blue Ridge Physiographic Province which can be described as having a mountainous topography. Elevations range from 1,200 to greater than 6,600 feet (Ref. 11, pp. 6, 114). The area's annual precipitation is 48 inches and the total net annual precipitation is 15 inches (Ref. 12, pp. 43, 63). The 1-year, 24-hour rainfall is approximately 2.75 inches (Ref. 13, p. 93).

Carter County is underlain by a sequence of terrace and alluvial deposits, shale, dolomite, and crystalline rocks. These units consists of the Sevier shale, a blue, yellow-weathering silty to sandy calcareous shale. The Honaker dolomite, a siliceous dolomite with beds of limestone and dolomitic shale, the Rome formation, a varicolored layering of shale, siltstone, and sandstone with some dolomite and limestone, the Shady dolomite, a blue, gray, and white dolomite, the Erwin through the Unicoi which are mainly clastic and the Cambrian age crystalline complex (Ref. 11, pp. 44, 114, 115).

Groundwater in Carter County occurs primarily in fractures in the underlying rocks. A major portion of the rural population is supplied by springs or wells. Domestic well depths average about 322 feet bls in the Elizabethton area (Ref. 11, pp. 115, 120).

3.4 CRITICAL HABITATS/ENDANGERED SPECIES

There are no critical habitats identified in the area of the facility; however, several federally endangered species have been identified for general distribution in the entire state, and in the east portion of the state of Tennessee. These species are respectively, the gray bat (Myotis grisescens), bald eagle (Holiaeetus leucocephalus), Kirtland's warbler (Vermivora kirtlandii) and the Carolina northern flying squirrel (Gaucomys sabrinus coloratus) (Ref. 14).

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4.0 VISUAL SITE INSPECTION (VSI)

The Visual Site Inspection (VSI) of the North American Rayon facility was performed on August 21-22, 1989. The VSI focused on the past and present waste streams at the facility in order to identify all Solid Waste Management Units (SWMUs), and any Areas of Concern (AOCs) and to collect information beneficial in assessing their potential to release hazardous waste or constituents to the environment.

4.1 SOLID WASTE MANAGEMENT UNITS (SWMUs) AND OTHER AREAS OF CONCERN (AOCs)

Twenty-four SWMUs and five AOCs were identified at the North American Rayon facility during the Visual Site Inspection (VSI). Solid Waste Management Units identified include alkyl cellulose waste bins, five dumpsters, the sand blast bag house dust, a scrap metal bin, the drum storage area/drum crusher, an excavated underground storage tank and related soil, the lead scrap yard, a landfill, a holding basin, the sludge drying lagoons, the wastewater treatment plant, the carbon disulfide storage pond, two farms of sodium hydroxide storage tanks, the miscellaneous storage tank farm, a fly ash silo, the fuel oil storage tanks, a wastewater lift station, the sulfuric acid tanks and waste bins. The Areas of Concern include the raw material storage building, a caustic spill, a scrap yard, the asbestos insulated steam lines and the carbon disulfide recovery column (Ref. 1, p. 13).

During the Visual Site Inspection, a representative of North American Rayon accompanied the NUS Field Investigation Team members. The VSI was conducted in a fashion that followed the same route that wastes are handled at the facility. No SWMUs or AOCs were located outside of the facility's normal areas of operation.

All SWMUs and AOCs are delineated on Table 4-1, are located in Figure 4-1 and further discussed in this section. Figure 4-2 is a photograph location map. Weather during the VSI was sunny and warm, with temperatures in the low 80s. There was no precipitation during the VSI and ground conditions were dry (Ref. 1, p. 13).

4.2 VSI PARTICIPANTS

The following General Electric Company and NUS personnel were present during the Visual Site Inspection (VSI).

Mitch Cohen, P.E.
NUS Corporation
Civil Engineer

Lou Raasch, Ph.D.
North American Rayon Corporation
Environmental Services Manager

Robert Rose
NUS Corporation
Environmental Scientist

TABLE 4-1

SWMU IDENTIFICATION SUMMARY
NORTH AMERICAN RAYON CORPORATION
ELIZABETHTON, CARTER COUNTY, TENNESSEE

SWMU No.	Name of Unit	Yrs. of Oper.	Wastes Managed	Evidence of a Release	Recommendation		
					No Further Action	Further Action	Sampling
1	Alkyl Cellulose Waste Bins (SWMU)	61	alkyl cellulose	No	X		
2	Roll on/Roll off Dumpster (SWMU)	61	miscellaneous rubbish	No	X		
3	Raw Material Storage Building (AOC)	61	finishing oil, motors	No		*	

* prevent potential spills from entering the storm drain system
** spilled sodium hydroxide should be cleaned up
*** housekeeping practices need improvement
\+ remediation of contaminated soil and certified closure of unit
\+ \+ certified closure of this unit pends approval of closure plan
i ensurance of closure certification and approved groundwater monitoring by state
ii ensurance of closure plan approval and certified closure by state
iii the capacity of the plant is in question particularly during power outages
y the integrity of the concrete deck was poor
yy sampling of friable insulation to determine if asbestos is being released to ambient air throughout the facility
yyy housekeeping practices must be improved
z housekeeping practices must be improved; fly ash was scattered around the loading area
zz relief valve should enter sewer line not storm drain (to river)
zzz oil release should be cleaned up
o ensurance that overflow to river is sealed off

TABLE 4-1

SWMU IDENTIFICATION SUMMARY
NORTH AMERICAN RAYON CORPORATION
ELIZABETHTON, CARTER COUNTY, TENNESSEE

SWMU No.	Name of Unit	Yrs. of Oper.	Wastes Managed	Evidence of a Release	Recommendation		
					No Further Action	Further Action	Sampling
4	Caustic Spill (AOC)	1	sodium hydroxide	Yes		**	
5	Roll on/Roll off Dumpster (SWMU)	61	off-spec rayon yarn	No	X		
6	Sand Blast Bag House Dust (SWMU)	41	phenolic lacquer	No	X		
7	Scrap Metal Bin (SWMU)	4	ferrous and non-ferrous metals	No	X		

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ELIZABETHTON, CARTER COUNTY, TENNESSEE

SWMU No.	Name of Unit	Yrs. of Oper.	Wastes Managed	Evidence of a Release	Recommendation		
					No Further Action	Further Action	Sampling
8	Drum Storage Area and Drum Crusher (SWMU)	2	waste oils, degreasers, purge water	No		***	
9	Underground Storage Tank and Soil (SWMU)	31	No. 4 fuel oil	Yes - leak detected upon excavation		+	
10	Lead Scrap Yard (SWMU)	24	lead scrap and dross	Leachate may have entered storm drains		+ +	

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TABLE 4-1

SWMU IDENTIFICATION SUMMARY
NORTH AMERICAN RAYON CORPORATION
ELIZABETHTON, CARTER COUNTY, TENNESSEE

SWMU No.	Name of Unit	Yrs. of Oper.	Wastes Managed	Evidence of a Release	Recommendation		
					No Further Action	Further Action	Sampling
11	Scrap Yard (AOC)	61	lumber, steel, iron and aluminum	No	X		
12	Landfill (SWMU)	60	fly ash, flay ash sludge and water treatment sludge	No		i	
13	Holding Basin (SWMU)	61	sulfuric acid and water treatment sludge	Past discharge to river		ii	
14	Sludge Drying Lagoons (SWMU)	16	wastewater treatment sludge	No	X		

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SWMU IDENTIFICATION SUMMARY
NORTH AMERICAN RAYON CORPORATION
ELIZABETHTON, CARTER COUNTY, TENNESSEE

SWMU No.	Name of Unit	Yrs. of Oper.	Wastes Managed	Evidence of a Release	Recommendation		
					No Further Action	Further Action	Sampling
15	Wastewater Treatment Plant (SWMU)	16	acid and caustic wastewater	Past acid release to river		iii	
16	Bar Grit Dumpster (SWMU)	16	bar grit from influent	No	X		
17	Carbon Disulfide Storage Pond (SWMU)	36	carbon disulfide	No	X		

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NORTH AMERICAN RAYON CORPORATION
ELIZABETHTON, CARTER COUNTY, TENNESSEE

SWMU No.	Name of Unit	Yrs. of Oper.	Wastes Managed	Evidence of a Release	Recommendation		
					No Further Action	Further Action	Sampling
18	Sodium Hydroxide Storage Tanks (SWMU)	61	sodium hydroxide	Small leak in water seal	X		
19	Storage Tank Farm (SWMU)	61	sulfuric acid, ammonium sulfide, dimethyl amine	No		y	
20	Asbestos Insulated Steam Lines (AOC)	61	asbestos	Loose, friable asbestos		yy	yy

*	prevent potential spills from entering the storm drain system
**	spilled sodium hydroxide should be cleaned up
***	housekeeping practices need improvement
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+ +	certified closure of this unit pends approval of closure plan
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NORTH AMERICAN RAYON CORPORATION
ELIZABETHTON, CARTER COUNTY, TENNESSEE

SWMU No.	Name of Unit	Yrs. of Oper.	Wastes Managed	Evidence of a Release	Recommendation		
					No Further Action	Further Action	Sampling
21	Roll on/Roll off Dumpster (SWMU)	61	rayon, plastic, rubber	No	X		
22	Sodium Hydroxide Storage Tanks (SWMU)	61	sodium hydroxide	crystallized NaOH visible in many areas		yyy	
23	Dumpster (SWMU)	61	alkali cellulose	No	X		

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NORTH AMERICAN RAYON CORPORATION
ELIZABETHTON, CARTER COUNTY, TENNESSEE

SWMU No.	Name of Unit	Yrs. of Oper.	Wastes Managed	Evidence of a Release	Recommendation		
					No Further Action	Further Action	Sampling
24	Fly Ash Silo (SWMU)	33	fly ash	Runoff entering storm drain		z	
25	Fuel Oil Storage Tanks (SWMU)	37	fuel oil	No		zz	
26	Carbon Disulfide Recovery Column (AOC)	50	carbon disulfide and oil	Oily release seen on ground		zzz	

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TABLE 4-1

SWMU IDENTIFICATION SUMMARY
NORTH AMERICAN RAYON CORPORATION
ELIZABETHTON, CARTER COUNTY, TENNESSEE

SWMU No.	Name of Unit	Yrs. of Oper.	Wastes Managed	Evidence of a Release	Recommendation		
					No Further Action	Further Action	Sampling
27	Wastewater Lift Station (SWMU)	34	alkaline sewer water	past release to river		o	
28	Sulfuric Acid Tanks (SWMU)	61	sulfuric acid	Crystallized acid seen in areas	X		
29	Waste Bins (SWMU)	61	alkali cellulose, cellulose xanthate	No	X		

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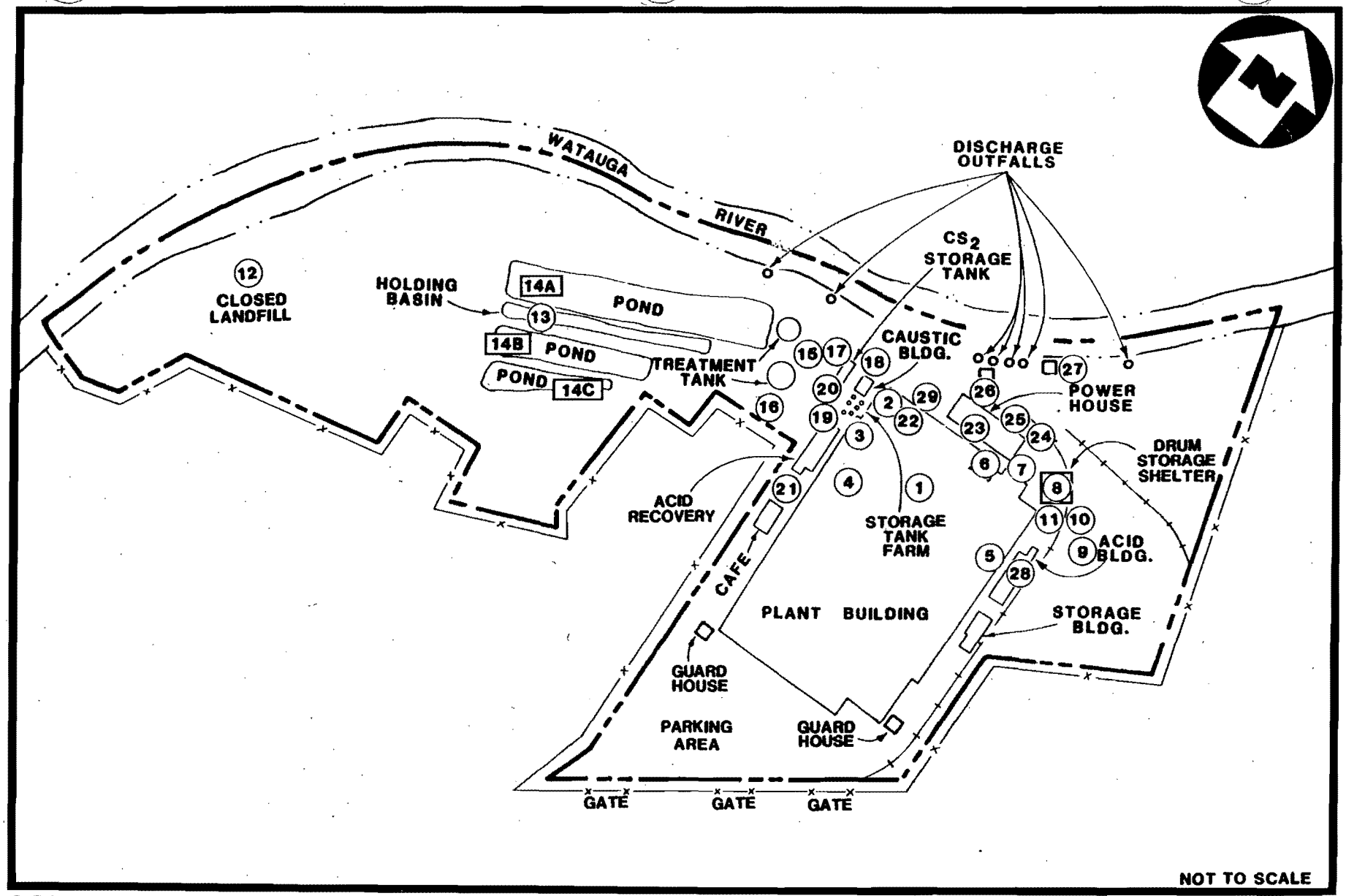

SOLID WASTE MANAGEMENT UNITS (SWMUS) AND OTHER AREAS OF CONCERN (AOC) LOCATIONS NORTH AMERICAN RAYON CORP. ELIZABETHON, CARTER COUNTY, TENNESSEE

FIGURE 4-1

NUS CORPORATION

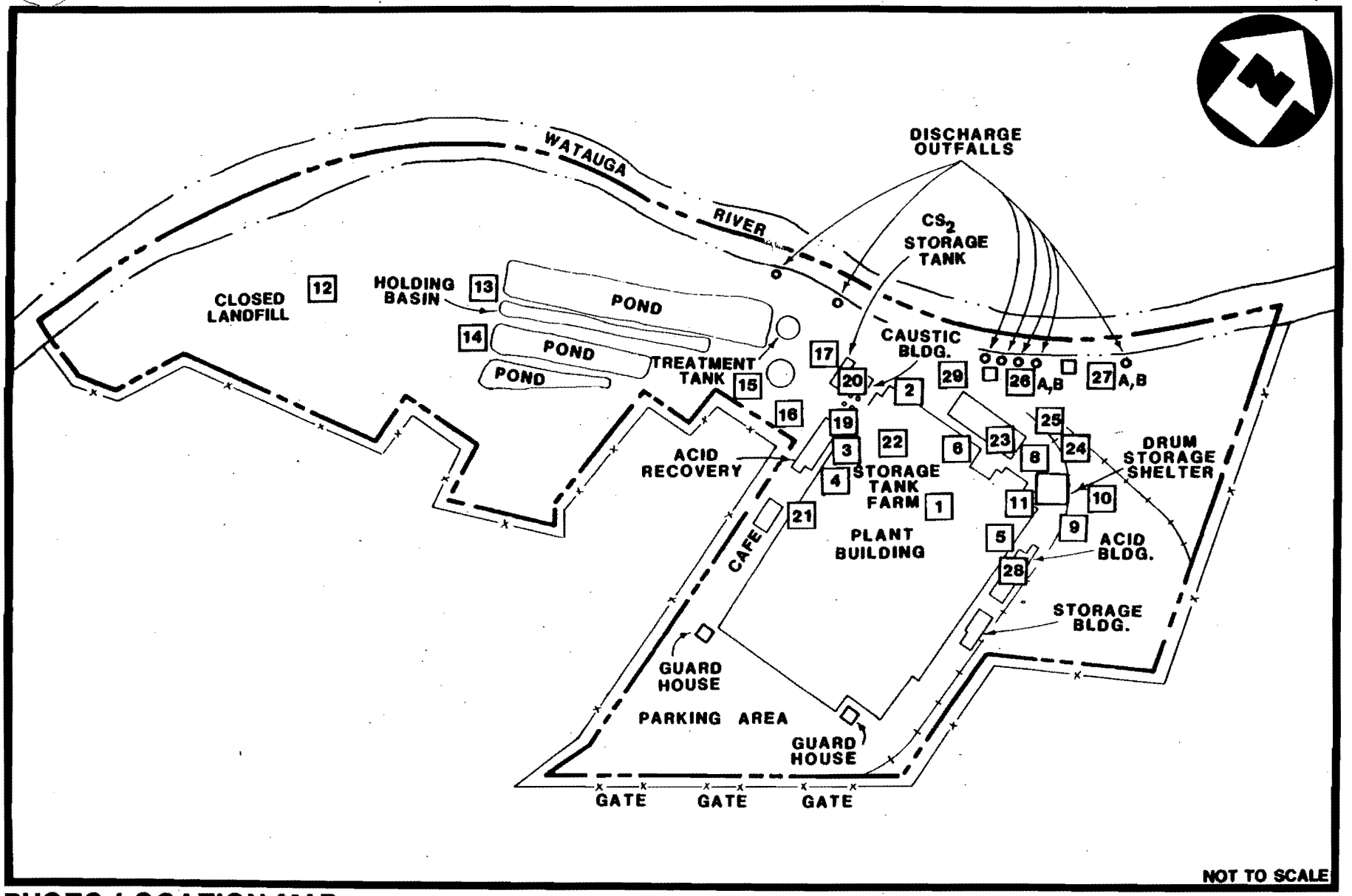

PHOTO LOCATION MAP
NORTH AMERICAN RAYON CORP.
ELIZABETHON, CARTER COUNTY, TENNESSEE

FIGURE 4-2

NUS CORPORATION

SWMU NUMBER: 1

SWMU NAME: Alkyl Cellulose Waste Bins

SWMU DESCRIPTION: Steel tubs with a capacity of 600 pounds of waste shredded alkyl cellulose (treated pulp). Waste shredded pulp is collected in the shredder room and placed in a chute that feeds the waste bins. It takes about 3 days to fill the hopper (Ref. 1, p. 13).

DATE OF START-UP: According to North American Rayon personnel, this unit is believed to have been placed in service in August of 1928.

DATE OF CLOSURE: This unit was active during the VSI.

WASTES MANAGED: Alkyl cellulose spillage, shredding equipment breakdown and floor sweepings. The waste is in a damp-solid form, with some of it looking like white crumbs generated from the steeping of pulp sheets and the shredding process. Approximately 47,000 pounds of alkyl cellulose waste is generated per year. The waste bins, when full, are transferred and dumped into dumpsters (SWMU No. 23) and eventually disposed of in the Carter County Landfill (Ref. 1, p. 13).

RELEASE CONTROLS: The bins are located in the facility plant. Any spillage around the bins are picked up and returned to the bins.

RELEASE HISTORY: According to North American Rayon personnel, there have been no appreciable releases from this unit (Ref. 1, p. 13).

INTERIM RECOMMENDATIONS: No Further Action

PHOTOGRAPH NO. 1

SWMU NUMBER: 2

SWMU NAME: Roll on/Roll off dumpster

SWMU DESCRIPTION: This 40-yd^3 container is located in the northwest corner of the facility plant. The unit receives waste paper and scrap metals that cannot be recycled (Ref. 1, p. 13).

DATE OF START-UP: This area of waste collection has been in service since August of 1928. The exact date of roll on/roll off container useage is unknown according to North American Rayon personnel.

DATE OF CLOSURE: This unit was active during the VSI.

WASTES MANAGED: Waste disposed of in this unit consists of bailing wire from pulp sheet bales, packing boxes, dirty pulp sheets and miscellaneous rubbish.

RELEASE CONTROLS: There are no release controls at this unit.

RELEASE HISTORY: According to North American Rayon personnel, there have been no releases from this unit (Ref. 1, p. 13).

INTERIM RECOMMENDATIONS: No Further Action - during the VSI, the area around the unit was free of waste.

PHOTOGRAPH NO. 2

AOC NUMBER: 3

AOC NAME: Raw material storage building

AOC DESCRIPTION: This area of concern is located at the northwest corner of the facility plant. The entrance, which allows access for trucks, is 15 feet upgradient from a storm drain drop inlet. The storm drain flows directly to the Watauga River (Ref. 1, p. 13).

DATE OF START-UP: According to North American Rayon personnel, this area is believed to have been placed in service in August of 1928.

DATE OF CLOSURE: This area was active during the VSI.

WASTES MANAGED: Inside the access door to the storage area, eight sealed electric motors and three 5000-gallon tanks of finishing oil were stored.

RELEASE CONTROLS: There were no release controls at this area. A depressed area of the pavement outside of the door directs flow to the drain.

RELEASE HISTORY: According to North American Rayon personnel, there have not been any spills in the storage area that have entered the drainage system (Ref. 1, p. 13).

INTERIM RECOMMENDATIONS: Further Action - Low priority - a raised area needs to be constructed at the access doorway to prevent potential spills from entering the storm drainage system. Any spills should remain inside to plant and cleaned up.

PHOTOGRAPH NO. 3

AOC NUMBER: 4

AOC NAME: Caustic Spill

AOC DESCRIPTION: The spill is located in the unit one aging basement below the shredder room. Approximately 5 gallons of sodium hydroxide were released on the concrete floor when a pipe in the lye circulation system broke. The spill residue remains on the floor (Ref. 1, p. 13).

DATE OF START-UP: The lye circulation system has been in service since August of 1928. The spill occurred in 1988.

DATE OF CLOSURE: The circulation system was active during the VSI. Repairs had been made on the broken pipe upon discovery.

WASTES MANAGED: The lye circulation system carries 18% sodium hydroxide from storage area (SWMU No. 22) to the dipping room where sheets of pulp are treated prior to shredding.

RELEASE CONTROLS: There are no release controls in this area other than the concrete floor of the plant. A center drain near the spill flows to the alkaline sewer.

RELEASE HISTORY: This spill occurred in 1988 according to North American Rayon personnel (Ref. 1, p. 13).

INTERIM RECOMMENDATIONS: Further Action - Low priority - sodium hydroxide has crystallized on the floor. The area needs to be cleaned up.

PHOTOGRAPH NO. 4A and 4B

SWMU NUMBER: 5

SWMU NAME: Roll on/Roll off Dumpster

SWMU DESCRIPTION: This 40-yd^3 dumpster is located in the northeast corner of the plant. It is picked up two times per week and shipped to the Carter County Landfill by Waste Management (Ref. 1, p. 13).

DATE OF START-UP: This area of waste collection has been in service since August of 1928. The exact date of roll on/roll off container useage is unknown according to North American Rayon personnel.

DATE OF CLOSURE: This unit was active during the VSI.

WASTES MANAGED: This unit is used to dispose of general types of trash including waste or off-spec rayon yarn.

RELEASE CONTROLS: There are no release controls for this unit. The dumpster is in the open with no lid to prevent rain or snow from entering.

RELEASE HISTORY: According to North American Rayon personnel, there have been no releases from this unit (Ref. 1, p. 13).

INTERIM RECOMMENDATIONS: No Further Action - The integrity of the unit appeared satisfactory. No appreciable wear or damage to the unit was seen during the VSI.

PHOTOGRAPH NO. 5

SWMU NUMBER: 6

SWMU NAME: Sand Blast Bag House Dust

SWMU DESCRIPTION: This 5-yd^3 roll-on bin is located in the northeast portion of the plant and is used to store sand blast material used to clean aluminum lacquer-coated spools and pressure vacuum wash tanks. When full, the bin is transferred to a roll on/roll off dumpster (SWMU No. 23) and shipped to the Carter County Landfill by Waste Management (Ref. 1, p. 13).

DATE OF START-UP: According to North American Rayon personnel, this unit is believed to have been placed in service in 1948.

DATE OF CLOSURE: This unit was active during the VSI.

WASTES MANAGED: The lacquer used to coat spools and tanks is phenolic, with a trade name of Heresite (Ref. 1, p. 13). Samples of the sand blast waste were analyzed in 1988 and proved to be below EP toxicity parameters, with only barium detected at 0.06 mg/l (Ref. 15).

RELEASE CONTROLS: The unit rests under a shelter just outside of the plant to protect against runoff from rain.

RELEASE HISTORY: According to North American Rayon personnel, there have been no releases from this unit other than small amounts of spillage while filling or emptying. Spillage was seen during the VSI (Ref. 1, p. 13).

INTERIM RECOMMENDATIONS: No Further Action - although care should be taken to ensure that spilled sand blast material does not enter the storm drainage system, this unit appeared to be in satisfactory condition.

PHOTOGRAPH NO. 6

SWMU NUMBER: 7

SWMU NAME: Scrap Metal Bin

SWMU DESCRIPTION: This 20-yd^3 bin is located in the north portion of the plant building and is used to store recyclable scrap metal prior to its sale. The bin stores a mixture of pipes, wire, fittings, valves, etc. (Ref. 1, p. 13).

DATE OF START-UP: According to North American Rayon personnel, this unit is believed to have been placed in service in 1985. Prior to this, plant personnel took the scrap to the recycler.

DATE OF CLOSURE: This unit was active during the VSI.

WASTES MANAGED: Various ferrous and non-ferrous metals such as iron, stainless steel, aluminum, lead and copper are stored prior to pick up. Elizabethton Herbs and Scrap Metals picks up and recycles the scrap.

RELEASE CONTROLS: There are no release controls for this unit.

RELEASE HISTORY: According to North American Rayon personnel, there have been no releases from this unit (Ref. 1, p. 13).

INTERIM RECOMMENDATIONS: No Further Action - This unit appeared to be in satisfactory condition, and no releases were seen during the VSI.

PHOTOGRAPH NO. Photograph not available.

SWMU NUMBER: 8

SWMU NAME: Drum Storage Area and Drum Crusher

SWMU DESCRIPTION: The drum storage area is located in the northeast corner of the facility. The 30' x 30' contained area stores primarily empty drums prior to being sent to a drum crusher, which is adjacent to the storage area. During the VSI, approximately thirty 55-gallon drums and three 5-gallon buckets were being stored at this unit (Ref. 1, p. 13).

DATE OF START-UP: According to North American Rayon personnel, this unit is believed to have been placed in service in 1987.

DATE OF CLOSURE: This unit was active during the VSI.

WASTES MANAGED: 24 of the drums were labeled waste lubricating oil, 3 drums were purge water from onsite monitoring wells and 3 drums contained varsol, a degreasing agent. The three 5-gallon buckets contained waste oil. Waste oils and varsol are picked up and recycled by Tricity Oil Recycling and Enterprise Oil Recycling. In the fall of 1987, GSX of Tennessee picked up 177 drums of various wastes that had accumulated in the plant over time, according to North American Rayon personnel.

RELEASE CONTROLS: The area is surrounded by a 6" x 6" curb and is covered by a metal roof. A 250-gallon sump can contain any potential spills. A portable pump can be used to purge the sump and bags of "Oil-dry" absorbent material can be used for small oil spills. A fire extinguisher is in place since waste thinners might be stored at this unit.

RELEASE HISTORY: Small quantities of liquids remaining in drums prior to crushing are released when crushing occurs. There has been one episode of the bottom of a drum rusting out, releasing oil. All releases have been contained in the sump. However, the sump is presently full (Ref. 1, p. 13).

INTERIM RECOMMENDATIONS: Further Assessment - Low priority. The sump, when full, cannot contain future releases in significant amounts, which is always a potential occurrence. Standing water was seen inside the diked area. Several drums were not on pallets increasing the risk of bottom rust-outs. Housekeeping practices need to be improved.

PHOTOGRAPH NO. 8

SWMU NUMBER: 9

SWMU NAME: Underground Storage Tank and Soil

SWMU DESCRIPTION: North American Rayon decided to excavate and dispose of the underground storage tank used to store No. 5 fuel oil located in the northern corner of the facility. While excavating the 15,000-gallon steel tank, several holes were discovered, as well as discolored soil. A polyethylene liner was placed on the ground nearby and the tank, along with 260 tons of contaminated soil, were placed on it. At the present time, the tank and soil remain onsite awaiting instructions from the state pertaining to disposal.

DATE OF START-UP: According to North American Rayon personnel, the unit is believed to have been placed in service in 1958 (Ref. 1, p. 13).

DATE OF CLOSURE: North American Rayon is in the process of designing an Environmental Assessment Plan, which is due for submission to the state by September 30, 1989 (Ref. 1, p. 13).

METHOD OF CLOSURE: Closure will proceed upon approval of the above-described Environmental Assessment Plan.

WASTES MANAGED: The tank stored No. 5 fuel oil, which was used as an alternate source for the drying kiln. The tank contained about 2500 gallons of oil prior to excavation. The oil was transferred to the powerhouse fuel oil storage tanks (SWMU No. 25).

RELEASE CONTROLS: There were no release controls for this unit.

RELEASE HISTORY: An unknown amount of fuel oil was released to surrounding soil from the leaking tank. The leak was discovered during excavation of the tank (Ref. 1, p. 13).

INTERIM

RECOMMENDATIONS: Further Assessment - High Priority. It is imperative that all contaminated soil and/or groundwater be removed and properly disposed of at a hazardous waste disposal facility. A follow-up groundwater monitoring program should be implemented after closure is certified.

PHOTOGRAPH NO. 9

SWMU NUMBER: 10

SWMU NAME: Lead Scrap Yard

SWMU DESCRIPTION: Lead debris accumulated on an asphalt pad, approximately 105 x 26 foot, located on the northeast side of the plant.

DATE OF START-UP: According to North American Rayon personnel, this unit is believed to have been placed in service in 1975 (Ref. 1, p. 13).

DATE OF CLOSURE: According to North American Rayon personnel, the accumulation of lead scrap ceased on November 18, 1987.

METHOD OF CLOSURE: According to the closure plan, a recycler was to reclaim the lead. Debris left behind would be collected and disposed of at a hazardous waste landfill. The asphalt pad was to be high pressure washed. A berm with a sump was to be constructed to contain the wash water. Polyethylene was to be used to prevent wash water from coming into contact with surrounding soil. The collected wash water was to be pumped to the wastewater treatment plant and solids and the liner were to be disposed of at a hazardous waste landfill. Sampling the asphalt pad before and after would ensure clean closure (Ref. 16., p. 2).

According to North American Rayon personnel, the closure plan will be revised and resubmitted for approval. The lead debris was removed for recycling in May of 1988; however, the remainder of the stated remediation has not been performed yet. When the asphalt pad is pressure-cleaned, total metals analysis of the rinsate will be conducted (Ref. 17).

WASTES MANAGED: The debris consists of lead pipes and equipment parts resulting from overhaul of machinery.

RELEASE CONTROLS: There are no release controls at this unit. Materials are accumulated in an open area without benefit of cover or containment. Material was stored over storm drains that flow to the Watauga River, north of the storage area (Ref. 1, p. 13).

RELEASE HISTORY: Because there were no release controls, leachate containing lead may have been released to the storm drains during the use of this unit, from 1975 to 1987 (Ref. 1, p. 13).

INTERIM RECOMMENDATIONS: Further assessment - low-priority oversight of closure plan approval and implementation to ensure certified closure.

PHOTOGRAPH NO. 10

AOC NUMBER: 11

AOC NAME: Scrap Yard

AOC DESCRIPTION: Open storage area 100 yards x 15 yards, slightly upgradient from a storm sewer drain.

DATE OF START-UP: According to North American Rayon personnel, this area is believed to have been placed in service in 1928.

DATE OF CLOSURE: This area was active during the VSI.

WASTES MANAGED: The scrap consists of lumber, steel, aluminum and iron. Included are crates, barrels, pipes, valves, filter presses, fittings, centrifuges, condensers, a large battery (dry), bricks and miscellaneous scrap. No motors or sealed units are included in the scrap.

RELEASE CONTROLS: There are no release controls at this area. Materials have accumulated in an open area, without benefit of cover or containment. Runoff from the area flows downgradient to the storm drains that flow to the Watauga River.

RELEASE HISTORY: No known evidence of a release is documented; however, the site is upgradient to the storm drains. Heavy rains may have caused releases to flow to the storm drains and the Watauga River (Ref. 1, p. 13).

INTERIM RECOMMENDATIONS: No Further Action - Runoff would most likely carry away non-hazardous iron oxide from the area to the river.

PHOTOGRAPH NO. 11

SWMU NUMBER: 12

SWMU NAME: Landfill

SWMU DESCRIPTION: The approximate 18.3-acre landfill site is located in the western portion of the facility property. North American Rayon disposed of fly ash and sludge at the site. In 1981, American Limestone agreed to take dry fly ash from the landfill for use in constructing roadbeds. The excavation left by American Limestone was filled with approximately 50,000 cubic yards of sludge that was stored in the nearby holding lagoons generated by the wastewater treatment plant. Waste materials generated by the facility are now disposed of at the Carter County Landfill, after verbal special waste approval was granted by the state.

DATE OF START-UP: According to information acquired from North American Rayon, the landfill is believed to have been placed in service in 1929 (Ref. 18, pp. 2, 3).

DATE OF CLOSURE: The landfill closure is in the process of being reviewed for certification by the state (Ref. 17).

METHOD OF CLOSURES: According to the closure plan, sludge from the wastewater holding lagoons was used to fill low lying areas of the landfill. Six inches of local fill material and 1.5 feet of compacted high clay content soil was used as cover material. The final grade of 0.02 (vertical to horizontal) on the surface and 3:1 on the sides were established to prevent erosion. After grading, the site was revegetated with various grasses (Ref. 18, pp. 9, 10). Groundwater monitoring wells were installed. However, an upgradient well location was rejected, and a new location has been established (Ref. 19).

WASTES MANAGED: The wastes disposed of in this unit consisted of fly ash, fly ash sludge and sludge from the holding basin (SWMU No. 13). About 300,000 yd^3 of waste had been disposed of in the landfill (Ref. 18).

RELEASE CONTROLS: There were no release controls for this unit since the landfill was unlined (Ref. 1, p. 13).

RELEASE HISTORY: According to North American Rayon personnel, there had been no releases from this unit (Ref. 1, p. 13).

INTERIM

RECOMMENDATIONS: Further Assessment: low priority oversight of closure certification review by state and acceptable groundwater sample collection and analysis.

PHOTOGRAPH NO. 12A, 12B, 12C

SWMU NUMBER: 13

SWMU NAME: Holding Basin

SWMU DESCRIPTION: The 800 feet x 15 feet x 15 foot deep impoundment with a capacity of 1,000,000 gallons was used as part of a serpentine system of waste holding prior to the utilization of the waste water treatment plant (SWMU No. 15). This unit was used primarily for settling solids prior to discharge to the Watauga River. The basin was bermed up in 1972, and soon after in 1973, the present clarifier tank was constructed. The basin was no longer used as a settling unit after the clarifier was placed in service. However, whenever the clarifier was shut down for maintenance or during a power failure, wastewater was diverted to the holding basin. When the clarifier was placed back in service after downtime, the wastewater would be pumped back to it from the basin. Sludges were transferred to one of the three drying ponds located adjacent to the holding basin with a clamshell bucket periodically (Ref. 1, p. 13). On November 18, 1987, a state inspection revealed that the holding basin had received sulfuric acid with a pH of 1.9. This made the holding basin a RCRA storage unit because the sulfuric acid is considered a characteristic hazardous waste. The unit is in the process of closure at the present time (Refs. 1, p. 13; 16, p. 1).

DATE OF START-UP: According to North American Rayon personnel, this unit is believed to have been placed in service in August 1928 (Ref. 1, p. 13).

DATE OF CLOSURE: Discharge to the holding basin ceased as of February 22, 1988. Closure of the basin is ongoing at the present time, and the closure plan is pending state approval so that closure can be certified (Ref. 17).

METHOD OF CLOSURE: According to North American Rayon personnel, closure will consist of slurrying the material in the basin and pumping it to the wastewater treatment plant (SWMU No. 15). The slurry will then be treated with hydrogen peroxide in addition to the standard treatment that occurs at the treatment plant. Approximately 500,000 pounds of solids are to be treated. Effluent will be analyzed for zinc, pH, ammonia, sulfides, biochemical oxygen demand (BOD) and suspended solids prior to discharge.

WASTES MANAGED: A past release of sulfuric acid dropped the pH to 1.9. The basin received dried water treatment sludge from the three sludge drying ponds (SWMU No. 14).

RELEASE CONTROLS: An overflow structure allows excessive levels of wastewater to be discharged directly to the Watauga River. During the 1940s, 10 feet of clay was placed in the basin as an impermeable liner (Ref. 1, p. 13).

RELEASE HISTORY: When the clarifier was down for maintenance or during a power failure, discharges to the river have occurred. Treated effluent discharges have ranged from between 3 and 10 days (4.5 - 5.5 MGD). According to North American Rayon personnel, whenever discharge to the river occurred from the basin, the state was notified (Ref. 1, p. 13).

INTERIM RECOMMENDATIONS: Further Assessment - low-priority oversight and ensurance of approval and certification of closure plan and closure by the state.

PHOTOGRAPH NO. 13

SWMU NUMBER: 14

SWMU NAME: Sludge Drying Lagoons

SWMU DESCRIPTION: Three of the four impoundments located just east of the landfill. Lagoon A is approximately 1100 feet by 40 feet and is 12 feet deep. Lagoon B is approximately 600 feet by 30 feet and is 8 feet deep. Lagoon C is approximately 400 feet by 20 feet and is 6 feet deep. The fourth lagoon is the holding basin in the process of closure (SWMU No. 13). The three ponds receive wastewater treatment sludge. Material from lagoons A and B was used as fill during the closure of the landfill (SWMU No. 12). Lagoon A takes about 5 years to fill, while lagoons B and C take only about 1 year to fill. Since closure of the landfill, dried sludge is disposed of at the Carter County Landfill (Ref. 1, p. 13).

DATE OF START-UP: According to North American Rayon personnel, this unit is believed to have been placed in service in 1973. Prior to 1973, lagoon A was used as a polishing lagoon before the installation of the clarifier tank (Ref. 1, p. 13).

DATE OF CLOSURE: The unit was active during the VSI.

WASTES MANAGED: This unit is used to dry sludges from the wastewater treatment plant. Sludges consist mostly of fly ash, zinc hydroxide and calcium sulfate.

RELEASE CONTROLS: In 1943, 10 feet of clay was placed in lagoon A as a liner. The clays in the bottom of lagoon B and C are most likely indigenous to the area and have settled.

RELEASE HISTORY: According to North American Rayon personnel, there have been no releases from this unit (Ref. 1, p. 13).

INTERIM RECOMMENDATIONS: No Further Action

PHOTOGRAPH NOS. 14a, 14b, 14c

SWMU NUMBER: 15

SWMU NAME: Waste Water Treatment Plant

SWMU DESCRIPTION: The waste water treatment plant is used to treat process wastewater from the alkaline sewer and the acid sewer, as well as scrubber water from the powerhouse emission stacks. First of all, wastewaters from the alkaline sewer (pH 11 - 12) pass through a bar screen and then an equalization and aeration basin. Next, the wastewater goes to a acidification tank where air and sulfuric acid are added, to bring the pH down to 3. At this point, wastewater from the acid sewer and scrubber water join with the acidified alkaline water. In mixing basins, calcium hydroxide and hydrogen peroxide are added to bring the pH to between 6 and 7. Two auger screws transport the water to adjustment tanks where sodium hydroxide and more calcium hydroxide is added to raise the pH to between 9 and 10. The water next goes to a clarifier tank where sludge is settled out. The sludge either is sent to the sludge drying lagoons or recirculated back to the mixing basins. The clarified, treated water is next passed through a sand filter for a final filtering prior to being sent to a retention pond The pH is adjusted for a final time to between 7 and 8. Finally, the pH-adjusted treated water is discharged through outfall No. 010 (Ref. 20). Discharge is approximately 150 gal/min at 8 hour intervals, and the effluent contains approximately 2 - 6% solids (Ref. 1, p. 13).

DATE OF START-UP: According to North American Rayon personnel, this plant was placed in service as it now operates in 1973. Prior to this, wastewater was only treated in a settlement basin prior to discharge into the river.

DATE OF CLOSURE: This unit was active during the VSI. Only three (SWMU No. 14) of the four ponds are in service. A fourth, called the holding basin (SWMU No. 13) is in the process of being closed after it was discovered that acidic wastewater (pH <2) was stored in it while the clarifier unit was disabled.

WASTES MANAGED: Process wastewater from the north to south alkaline sewer, the east to west acid sewer and scrubber water from the powerhouse stacks is treated at this unit.

RELEASE CONTROLS: The acid sewer is constructed of acid brick while the alkaline sewer is cast in the concrete foundation of the plant. Outside of the plant, the sewer lines are concrete encased 30-inch conduit (Ref. 1, p. 13).

RELEASE HISTORY: In 1985 and 1986 there were power outages causing plant downtime. The 1985 episode lasted 10 days. Acidic water was stored in the holding basin located in between the three sludge drying ponds. The holding basin (SWMU No. 13) is in the process of closure. In 1976, sulfuric acid was released (SWMU No. 19), bypassing the treatment plant and was discharged directly into the river (Ref. 1, p. 13).

INTERIM RECOMMENDATIONS: Further Action: Low priority oversight of state certification of clean closure of the holding basin is recommended. Also, the capacity of the treatment plant is in question, since a prior acid release was bypassed into the river.

PHOTOGRAPH NO. 15A, 15B

SWMU NUMBER: 16

SWMU NAME: Bar Grit Dumpster

SWMU DESCRIPTION: This approximately 20 cubic yard dumpster receives bar grit from wastewater treatment plant screens, cardboard and paper waste. During the VSI, the unit was about one-quarter full. The dumpster had an open top and the front door was open (Ref. 1, p. 13).

DATE OF START-UP: According to North American Rayon personnel, this unit is believed to have been placed in service in 1973.

DATE OF CLOSURE: This unit was active during the VSI.

WASTES MANAGED: The unit receives bar grit from influent wastewater and the lime slacker. The grit consists of cellulose fibers and lime. Also seen during the VSI, was cardboard and miscellaneous paper (Ref. 1, p. 13).

RELEASE CONTROLS: There are no release controls. However, any releases of material would not appear to migrate far away.

RELEASE HISTORY: Although there is no evidence of past or present releases, during a heavy rainstorm, contents may escape through the open door (Ref. 1, p. 13).

INTERIM RECOMMENDATIONS: No Further Action - It is recommended, however, that the door be kept closed.

PHOTOGRAPH NO. 16

SWMU NUMBER: 17

SWMU NAME: Carbon Disulfide Storage Pond

SWMU DESCRIPTION: Concrete holding basin, 125 feet x 40 feet with ten tanks submerged in about 10 feet of water; there is no circulation of the water. Each steel tank holds 16,000 gallons of water and carbon disulfide (specific gravity 1.26). Transfer of the carbon disulfide is by water displacement, water is pumped in to remove product. This system is used due to the low flash point, 100°C, of carbon disulfide.

DATE OF START-UP: According to North American Rayon personnel, this unit is believed to have been placed in service in 1952 (Ref. 1, p. 13).

DATE OF CLOSURE: Seven tanks were active during the VSI. Three tanks were empty but not closed during the VSI.

WASTES MANAGED: This unit contains clean carbon disulfide. Carbon disulfide is recovered and reused with a loss of 4.5 million pounds/year via air emission.

RELEASE CONTROLS: The tanks are in a concrete holding basin with overflow going to the wastewater treatment plant (Ref. 1, p. 13).

RELEASE HISTORY: According to North American Rayon personnel, there have been no releases or spillage from this unit (Ref. 1, p. 13).

INTERIM RECOMMENDATIONS: No Further Action.

PHOTOGRAPH NO. 17

SWMU NUMBER: 18

SWMU NAME: Sodium Hydroxide Storage Tanks

SWMU DESCRIPTION: Two stationary tanks for the storage of 180,000 gallons of 50% sodium hydroxide used in viscose rayon production. The sodium hydroxide is diluted to concentrations varying from 13.7 to 22% and stored in tanks inside the plant (SWMU No. 22) (Ref. 1, p. 13).

DATE OF START-UP: According to North American Rayon personnel, this unit is believed to have been placed in service in 1928.

DATE OF CLOSURE: The unit was active during the VSI.

WASTES MANAGED: A 50% sodium hydroxide solution is stored in these tanks.

RELEASE CONTROLS: The tanks are in a concrete building approximately 5 feet below grade. Overflow goes to the wastewater treatment plant.

RELEASE HISTORY: According to North American Rayon Personnel, there have been no releases from this unit. NUS personnel noticed a leaking water seal during the VSI (Ref. 1, p. 13).

INTERIM RECOMMENDATIONS: No Further Action - However, the leak should be repaired.

PHOTOGRAPH NO. 18

SWMU NUMBER: 19

SWMU NAME: Storage Tank Farm

SWMU DESCRIPTION: Storage tank farm located in the northwestern portion of the facility. The farm consists of approximately ten 20,000-gallon steel tanks. Six of the tanks store 95 percent sulfuric acid, two tanks store 40 percent ammonium sulfide and the other two tanks store dimethyl amine. In the northeast corner of the tank farm is a pump house (Ref. 1, p. 13).

DATE OF START-UP: According to North American Rayon personnel, this unit is believed to have been placed in service in August of 1928.

DATE OF CLOSURE: The unit was active during the VSI (Ref. 1, p. 13).

WASTES MANAGED: Raw product is stored in the tanks prior to use in processing.

RELEASE CONTROLS: The tanks are constructed on a concrete deck surrounded by a 6 inch by 8 inch high retention wall. In the event of tank rupture, the release would flow via a trench to the acid building. A sump in the acid building has a capacity of 25,000 gallons, and is directed to the wastewater treatment plant. During the VSI, the integrity of the concrete deck appeared to be very poor. Releases to subgrade appear likely (Ref. 1, p. 13).

RELEASE HISTORY: In 1975, 20,000 gallons of sulfuric acid was released. The release bypassed the wastewater treatment plant via a release valve and was discharged directly into the Watauga River. The pH of the river was impacted (Ref. 1, p. 13).

INTERIM RECOMMENDATIONS: Further Assessment - Medium Priority. A past release impacted the river, it appears that a similar release could not be stored and handled by the wastewater treatment plant. The integrity of the decking appears poor, and release to groundwater appears likely.

PHOTOGRAPH NO. 19A, 19B

AOC NUMBER: 20

AOC NAME: Asbestos Insulated Steam Line System

AOC DESCRIPTION: Exposed, friable asbestos insulation was seen in several locations during the VSI. Most of the elbow joints on the steam lines seen in the sulfuric acid storage tank farm area were exposed and peeling. Friable asbestos releases miniscule fibers that, at very low concentrations, are suspected of being carcinogenic. Loose insulation was seen in many other locations within the plant including the basement area, production areas, stairwells and rest rooms (Ref. 1, p. 13).

DATE OF START-UP: According to North American Rayon personnel, the steam lines were placed in service in August of 1928.

DATE OF CLOSURE: The steam lines were active during the VSI.

WASTES MANAGED: The friable asbestos is of concern.

RELEASE CONTROLS: In the powerhouse, the steam lines have recently been encapsulated; however, the remainder of the lines with loose insulation have not been remediated.

RELEASE HISTORY: It appears that the friability of insulation has been occurring for some time since it was first applied over 60 years ago (Ref. 1, p. 13).

INTERIM RECOMMENDATIONS: Further Action - High-priority investigation needed to determine if, and in what concentrations, asbestos appears in exposed and friable steam line insulation. If present, all areas of exposure should be encapsulated.

PHOTOGRAPH NO. 20A and 20B

SWMU NUMBER: 21

SWMU NAME: Roll on/Roll off Dumpster

SWMU DESCRIPTION: The roll on/off dumpster holds approximately 40 cubic yards of miscellaneous waste. Waste Management picks up the dumpster daily and deposits the contents in the Carter County Landfill.

DATE OF START-UP: According to North American Rayon personnel, this unit is believed to have been placed in service in 1928; however, date of use for this specific container is unknown (Ref. 1, p. 13).

DATE OF CLOSURE: This unit was active during the VSI.

WASTES MANAGED: Rayon, plastic, rubber and miscellaneous trash are deposited in this dumpster.

RELEASE CONTROLS: There are no release controls at this unit. This unit has an open tap and is exposed to rain and open dumping.

RELEASE HISTORY: There is no known record of a release from this unit (Ref. 1, p. 13).

INTERIM RECOMMENDATIONS: No Further Action

PHOTOGRAPH NO. 21

SWMU NUMBER: 22

SWMU NAME: Sodium Hydroxide Storage Tanks

SWMU DESCRIPTION: Sixty-two 20,000-gallon vertical storage tanks constructed of riveted steel. The tanks are located inside the plant and receive 13.7% - 22% sodium hydroxide from railroad tank cars and storage tanks located in the caustic storage building west of the plant. According to North American Rayon personnel, not all the tanks are full. Annually, approximately 1.6 million pounds of sodium hydroxide is stored at this unit (Ref. 1, p. 13).

DATE OF START-UP: According to North American Rayon personnel, this unit is believed to have been placed in service in August 1928.

DATE OF CLOSURE: The unit was active during the VSI.

WASTES MANAGED: Raw sodium hydroxide is used to treat pulp in order to produce alkali cellulose and cellulose xanthate viscous.

RELEASE CONTROLS: The tanks are supported and any spills flow to the alkaline sewer trench which in turn is pumped to the wastewater treatment plant.

RELEASE HISTORY: During the VSI, a pipe flange was seen leaking. There were many areas of crystallized sodium hydroxide seen as well, on the floor, other pipes and even on the tanks (Ref. 1, p. 13).

INTERIM RECOMMENDATIONS: Further Action: Low Priority - Housekeeping practices must be improved. It appears that a tank rupture would inundate the sewer trench and cause flooding of caustic solution. Also, crystallized sodium hydroxide seen may cause burns if inadvertently touched by an employee.

PHOTOGRAPH NO. 22

SWMU NUMBER: 23

SWMU NAME: Dumpster

SWMU DESCRIPTION: The roll on/off dumpster holds approximately 40 cubic yards of miscellaneous trash. Waste management picks up the dumpster and deposits the contents in the Carter County Landfill.

DATE OF START-UP: According to North American Rayon personnel, this unit is believed to have been placed in service in 1928 (Ref. 1, p. 13).

DATE OF CLOSURE: This unit was active during the VSI.

WASTES MANAGED: The alkali cellulose hopper (SWMU 1) is disposed of in this dumpster along with cellulose xanthate skins, rayon, fluorescent light bulbs, wood, paper and other miscellaneous trash (Ref. 1, p. 13).

RELEASE CONTROLS: There are no release controls at this unit; the container is open.

RELEASE HISTORY: There is no known record of a release from this unit (Ref. 1, p. 13).

INTERIM RECOMMENDATIONS: No Further Action

PHOTOGRAPH NO. 23

SWMU NUMBER: 24

SWMU NAME: Fly Ash Silo

SWMU DESCRIPTION: This unit is used to store fly ash that is a product of the firing of coal in boiler furnaces that produce electricity and steam. The powerhouse is located in the northern portion of the facility. The fly ash is collected in a hopper and then conveyed to the silo by means of a steam vacuum system. The ash is then loaded into trucks that haul and dispose of the fly ash at the Carter County Landfill Water is used to hold down dust in the silo (Ref. 21, p. 1).

DATE OF START-UP: According to North American Rayon personnel, fuel oil, coal and natural gas was used to fire the furnaces until the mid-1960s. The facility then switched totally to coal, with oil as a back-up. The silo was placed in service in 1956 (Ref. 1, p. 13).

DATE OF CLOSURE: The unit was active during the VSI.

WASTES MANAGED: Analysis of the fly ash showed the following constituents: 42% silicon dioxide, 2.7% calcium oxide, 1.3% magnesium oxide, 46% iron and aluminum oxides, 0.2% potassium oxide, 0.45% sulfur trioxide and 0.09% sodium oxide. The pH ranged between 4.2 and 10.7. According to Tennessee Rule 1200-1-11-0.02(4), this waste was designated as non-hazardous (Ref. 21, p. 2).

RELEASE CONTROLS: There were no release controls for this unit.

RELEASE HISTORY: During the VSI, releases of fly ash and sediment-filled water runoff were seen surrounding the silo. Runoff was also seen entering a storm drain drop inlet, which flows directly to the river (Ref. 1, p. 13).

INTERIM RECOMMENDATIONS: Further Action: Low Priority - Although designated as non-hazardous, fly ash was seen entering the storm drainage system. Housekeeping practices should be improved to keep fly ash off the ground surrounding the silo, and rinsewater from easily flowing to the drop inlet.

PHOTOGRAPH NO. 24

SWMU NUMBER: 25

SWMU NAME: Fuel Oil Storage Tanks

SWMU DESCRIPTION: Four steel tanks each with a capacity of 2,750 gallons. Oil used to start up boilers or as a substitute for pulverized coal.

DATE OF START-UP: According to North American Rayon personnel, this unit is believed to have been placed in service in 1952 (Ref. 1, p. 13).

DATE OF CLOSURE: This unit was active during the VSI.

WASTES MANAGED: Fuel oil to fire boilers is stored at this unit.

RELEASE CONTROLS: This unit has concrete diking with a sprinkling system for temperature control. There is a valve located at a storm sewer inlet; the valve is normally closed (Ref. 1, p. 13).

RELEASE HISTORY: There is no known record of a release from this unit.

INTERIM RECOMMENDATIONS: Further Assessment - Low Priority - The release valve should be directed to the sewer system instead of the storm drainage system which flows directly to the river.

PHOTOGRAPH NO. 25

AOC NUMBER: 26

AOC NAME: Carbon Disulfide Recovery Column

AOC DESCRIPTION: Carbon disulfide-laden air from the pressure vacuum wash is vacuum pumped to the unit. The air is run through absorbtion columns in which oil is used to absorb the carbon disulfide. The oil is then distilled to remove the carbon disulfide. The carbon disulfide is sent back to the carbon disulfide storage unit. The system's oil capacity is 350 gallons.

DATE OF START-UP: According to North American Rayon personnel, this area is believed to have been placed in service in 1939 (Ref. 1, p. 13).

DATE OF CLOSURE: This unit was active during the VSI.

WASTES MANAGED: Carbon disulfide and oil

RELEASE CONTROLS: There are no release controls at this unit. If a vacuum line is perforated, oil may blow through the top of the column.

RELEASE HISTORY: During the VSI a 15 feet x 8 feet oily release was seen on the ground downgradient of the unit, about 100 feet from the river. The column was repaired in April 1989. This maintenance is reportedly responsible for this release; however, oil was seen on the ground prior to this according to North American Rayon personnel (Ref. 1, p. 13).

INTERIM RECOMMENDATIONS: Further Assessment - Low Priority - The oil release needs to be cleaned to ensure that during rainfall, it does not migrate to the river.

PHOTOGRAPH NO. 26A and 26B

SWMU NUMBER: 27

SWMU NAME: Wastewater Lift Station

SWMU DESCRIPTION: The 15 feet x 15 feet x 25 feet deep rectangular open-top concrete tank receives wastewater from the alkaline sewer and pumps it to the wastewater treatment plant. The tank has a capacity of 10,000 gallons.

DATE OF START-UP: According to North American Rayon personnel, this unit is believed to have been placed in service in 1955 (Ref. 1, p. 13).

DATE OF CLOSURE: This unit was active during the VSI.

WASTES MANAGED: The unit receives wastewater from the alkaline sewer. The major constituent in the alkaline sewer is waste sodium hydroxide.

RELEASE CONTROLS: The tank is constructed of concrete and has an overflow that mixes with storm sewer outfall No. 004 for cooling water. The overflow is to be sealed based on an order issued by the state after a recent compliance inspection (Ref. 1, p. 13).

RELEASE HISTORY: In March of 1987, approximately 6000 gallons of wastewater were released through the overflow during a pump backwash (Ref. 1, p. 13).

INTERIM RECOMMENDATIONS: Further Assessment: low priority ensurance that the overflow does indeed get sealed.

PHOTOGRAPH NO. 27A and 27B

R-586-12-9-8

FINAL

ENVIRONMENTAL PRIORITIES INITIATIVE PRELIMINARY ASSESSMENT OF NORTH AMERICAN RAYON CORPORATION WEST ELK AVENUE ELIZABETHTON, TENNESSEE 37643 EPA ID #TND095051207

Prepared Under
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FOR THE

WASTE MANAGEMENT DIVISION
U.S. ENVIRONMENTAL PROTECTION AGENCY

DECEMBER 6, 1989

NUS CORPORATION
SUPERFUND DIVISION

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NOTICE

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EXECUTIVE SUMMARY

North American Rayon Corporation (North American Rayon) is located on West Elk Avenue in Elizabethton, Carter County, Tennessee. North American Rayon produces rayon, a synthetic fiber, by batch processing pulp, sodium hydroxide, and carbon disulfide into a thick, yellow, transluscent liquid called viscose. The viscose is further processed into rayon which is spun into yarn. The finished product is sold to manufacturers of clothing, puff wallpaper, ornamental patches and reinforced rubber hoses.

RCRA Part A interim status was withdrawn in 1983. Currently, the facility status is that of a generator. According to the state, the facility is presently in compliance and is in the process of closing RCRA-designated hazardous waste units.

Potable water supplies are provided to the majority of the population within the study area by several utilities. Elizabethton, North Elizabethton, South Elizabethton, First Utilities and the Siam Water Departments provide municipal service. Only Elizabethton has a source of drinking water within the study area. Johnson City is located outside of the study area; however, its Watauga River intake is located between 3 and 4 miles of the facility. A house count identified approximately 262 households not served by a municipal water system within the 3-mile radius of the facility.

The Watauga River flows along the northern and western boundaries of the facility property. Storm drainage runoff, as well as treated wastewater, discharge directly to the river via seven NPDES permitted outfalls. The Watauga River is recreationally fished. There are no critical habitats identified in the study area; however, several federally endangered species have been identified. These include the gray bat, bald eagle, Kirtland's warbler, and the Carolina northern flying squirrel.

The Visual Site Inspection (VSI) conducted during the investigation identified twenty-four Solid Waste Management Units (SWMUs) and five Areas of Concern (AOCs). Eleven of the SWMUs are recommended for further assessment. All five of the AOCs are recommended for further assessment.

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1.0 INTRODUCTION

The NUS Corporation Region 4 Field Investigation Team (FIT) conducted a Preliminary Assessment (PA) and a Visual Site Inspection (VSI) at the North American Rayon facility on August 21-22, 1989. The task was performed as part of the Environmental Priorities Initiative (EPI) program as stated in Technical Directive Document (TDD) No. F4-8905-24.

1.1 OBJECTIVE

The major objective of the EPI program is to conduct an onsite and offsite inspection of the assigned facility in order to characterize the Solid Waste Management Units (SWMUs), associated releases and other Areas of Concern (AOCs). The inspection is conducted in a two-phase operation: the Preliminary Review, which includes the review and evaluation of specific file documents; and the Visual Site Inspection (VSI), which identifies all SWMUs, known releases, and AOCs.

1.2 SCOPE OF WORK

The scope of this investigation included the following activities:

- a file search of State and EPA files in an attempt to obtain and review specific documents (RCRA, CERCLA, AIR, and NPDES) that will help characterize the facility,
- development of a detailed site base map to scale including site features, solid waste management unit locations, and photo-documentation areas,
- evaluation of target populations within a 3-mile radius from the site with regard to groundwater, air, and surface water,
- a private well survey within a 3-mile radius of the facility,
- inspection and photo-documentation of all Solid Waste Management Units (SWMUs) and related releases and exposure pathways, and
- inspection and photo-documentation of all Areas of Concern (AOCs).

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2.0 SITE DESCRIPTION

2.1 SITE LOCATION

The North American Rayon Corporation (North American Rayon) is located on West Elk Avenue in Elizabethton, Carter County, Tennessee. The facility is more specifically located at 36°21'02" N latitude and 82°14'50" W longitude on the United States Geological Survey (USGS) topographic map for Elizabethton, Tennessee (Appendix B).

2.2 SITE FEATURES

The North American Rayon facility consists of several plant building structures, tank farms, a powerhouse, a wastewater treatment facility, drying lagoons and a closed landfill, occupying about 130 acres. The facility is bounded to the north and west by the Watauga River. The remainder of the facility property is enclosed by fence. There are approximately nine guarded gates for entry located along the south fenceline. The property is fairly flat, although the surrounding area is mountainous (Refs. 1, p. 2; 2; Figure 2-1). Refer to Figure 2-2 for the site layout.

2.3 OWNERSHIP HISTORY

The North American Rayon property has a long history of operations. The majority of the plant buildings were constructed by August of 1928. Rayon production began at the plant when American Glanzstoff Company first implemented operations. During the 1930's, the name of the facility became North American Rayon. In 1942, the plant was nationalized by the United States government and was used to supply rayon for war needs. After World War II, in 1946, Beaunit Corporation bought the facility and privately operated it as a rayon producer once again. In 1968, El Paso Natural Gas took over ownership of the facility, and in 1976 the operation became known as Carter County Fibers. A local businessman, Mr. Jimmy Walker, bought the facility in 1977, and reverted the name back to North American Rayon. Mr. Walker continued to own North American Rayon until 1985, when he sold the facility to the employees. Currently, the employee stock ownership plan is still in effect. The facility is presently owned and operated by 1300 employees who produce rayon 24 hours per day, 7 days per week (Ref. 1, p. 3).

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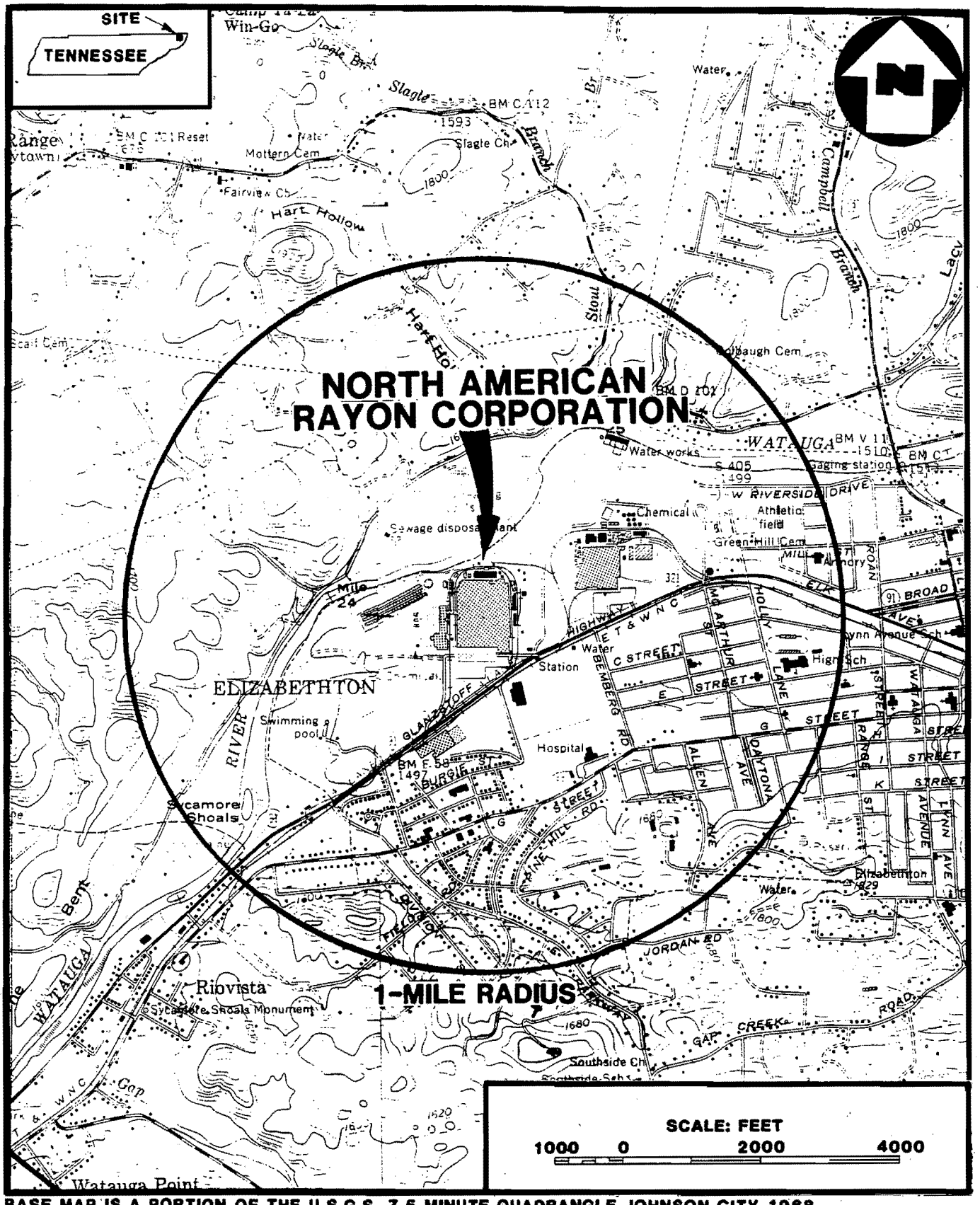

BASE MAP IS A PORTION OF THE U.S.G.S. 7.5 MINUTE QUADRANGLE JOHNSON CITY 1968, ELIZABETHTON 1968, TENNESSEE.

SITE LOCATION MAP
NORTH AMERICAN RAYON CORPORATION
ELIZABETHTON, CARTER COUNTY, TENNESSEE

NUS CORPORATION

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2.4 NATURE OF OPERATIONS

The facility uses the same rayon production process that was accidentally discovered in Europe when a chemist attempted to synthesize silk from mulberry leaves. Several batch operations are initiated. Sheets of pulp, similar to thick blotter paper are steeped in sodium hydroxide. After steeping, the treated pulp is shredded and combined with carbon disulfide. Water and sodium hydroxide are added back and the mass is thoroughly mixed. The batch is allowed to age, or ripen, and is then aerated. The thick, yellowish, transluscent material called viscose is then filtered. The viscose is then sent through a spin bath and further wet processing which incorporates sulfuric acid, sodium sulfate, zinc sulfate, sulfides, polysulfides, thiosulfate and surfactants. After processing, the raw rayon is dried and then spun into either textile spool yarn, plastic-coated yarn or latex-coated yarn. The finished product is sold to manufacturers of clothing, puff wallpaper, ornamental patches and reinforced rubber hoses.

During the filtration of the viscose and the wet processing of rayon, wastewater and process materials that enter the floor drain system are sent to the onsite wastewater treatment plant. The plant has two sewer lines, an acid sewer and the caustic sewer, that carry wastewaters to the treatment plant (Refs. 1, p. 4; 3).

2.5 PERMIT AND REGULATORY HISTORY

North American Rayon notified EPA about the landfill as a potential hazardous waste site in 1981, as required by CERCLA 103(c) (Ref. 4). Prior to this, in 1980, North American Rayon analyzed sludge for EP toxicity. Barium was detected at 265 ppm, so the facility filed a RCRA Part A application for an interim status hazardous waste permit. Additional analyses by independent and state laboratories revealed that parameters analyzed for were actually below RCRA standards for hazardous wastes. North American Rayon then requested withdrawal of the Part A application for interim status. The state notified the facility on July 7, 1983, that the withdrawal of interim status had been approved (Ref. 5).

North American Rayon holds an NPDES permit for wastewater discharge to the Watauga River. Permit No. TN0004421 regulates the discharge at river mile 24.2 to 24.6 for outfalls 002, 003, 004, 005, 006, 007 and 010. Parameters regulated include flow rate, pH, zinc, ammonia, sulfides, phenols, heavy metals, temperature and total suspended solids (TSS) (Ref. 6). North American Rayon also holds air permits regulating discharge to ambient air from many areas of the facility.

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The following air permits have been issued:

024991F -	Coal-fired boilers
019539P -	Nuveyor ash and fly ash conveying
019540P -	Lime storage bin
024156P -	Sodium sulfate rotary drying kiln
024583P -	Woodworking operation
024570P -	Carbon disulfide recovery
024571P -	Pressure-vacuum wash extension
024572P -	Low vacuum pump from viscose department
024573P -	Rotary dip coating of spools
024574P -	Spray coating of pressure-vacuum wash tanks and pipes
024575P -	Paint shop spray coating of metal parts
024576P -	Paint shop spray coating of metal parts
024577P -	Caustic dip tank for pressure-vacuum wash tanks
024578P -	Caustic dip tank for metal parts
024579P -	Sand and bead blasting operation
024580P -	Zinc recovery
024596P -	Lead melting pot
024582P -	Lead melting
024581P -	Coal handling
024584P -	Unit I acid recovery
024585P -	Unit II acid recovery
024586P -	Drying of electric motors
024587P -	Drying of metal parts
024588P -	Drying of metal parts
024589P -	Degreasing operations
024686P -	Pressure-vacuum wash
024680P -	Unit I spinning
024681P -	Unit II spinning
024682P -	Viscose preparation
024683P -	Fabric coating with PVC film (Ref. 7).

Currently, the facility has generator status and is in compliance according to the state. Closure of recently discovered RCRA units (holding basin and lead pile) are pending closure plan approval (Ref. 8).

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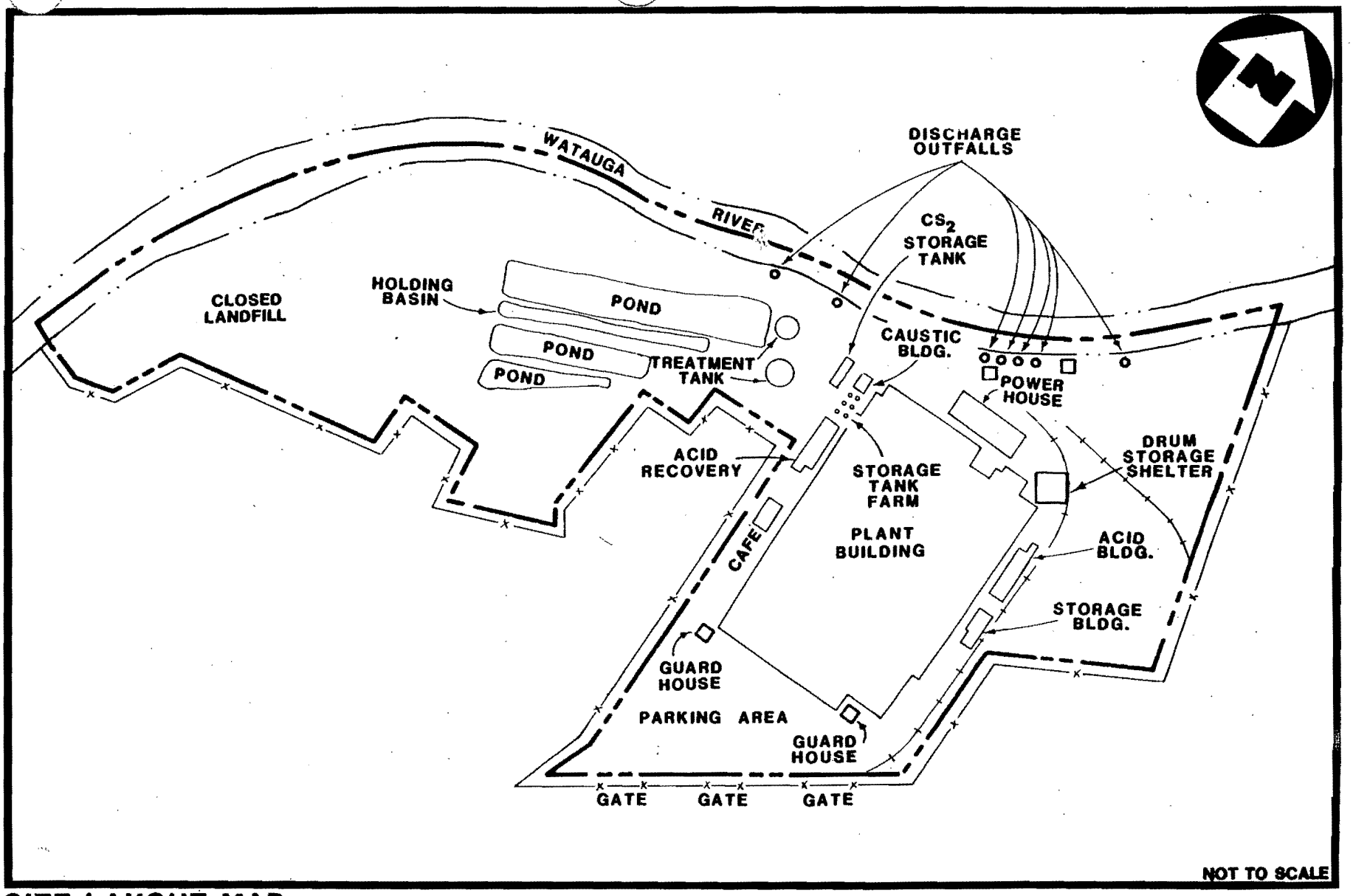

SITE LAYOUT MAP
NORTH AMERICAN RAYON CORP.
ELIZABETHON, CARTER COUNTY, TENNESSEE.

FIGURE 2-1

NUS CORPORATION

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3.0 ENVIRONMENTAL SETTING

The Environmental Setting section, in addition to the Preliminary Assessment Form (Appendix A) and Topographic Map (Appendix B), provides information to evaluate the potential for a release to groundwater and surface water resources and other receptors.

3.1 WATER SUPPLY

The majority of the population within the study area are supplied with potable water from several municipal water systems. The Elizabethton Water District, North Elizabethton Water Department, South Elizabethton Water Department, First Utilities and the Siam Utilities provide water within the 4-mile radius of the facility. One of the three source springs used by Elizabethton, the Big Spring located about 2.5 miles south of the facility, is within the study area. Water from the three springs is mixed prior to distribution. The Elizabethton Water District serves 9500 connections, as well as 725 connections in Siam and 350 connections in the North Elizabethton system. First Utilities and the South Elizabethton Water Department obtain water from sources located outside of the study area (Ref. 9).

The population not served by a municipal system use private wells for drinking water. A house count identified approximately 262 households within the 3-mile radius of the facility not served by a municipal system. Between the 3- and 4-mile radii, approximately 310 households are not served by a public supply. The population served by private wells within 3 miles of the facility is, therefore, 996 (262 household x 3.8 people/household) (Appendix B).

Johnson City is located just outside of the 4-mile radius. The Johnson City water intake, serving 5750 connections, is located on the Watauga River, at river mile #17, between the 3- and 4-mile radii of the facility approximately 4.5 stream miles downstream(Ref. 10, Appendix B).

3.2 SURFACE WATER

Runoff from the North American Rayon facility flows north-northwest and enters the Watauga River, which traverses adjacent to the facility. The storm drainage system used by North American Rayon is

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comprised of a network of drop inlets that flow to seven outfalls discharging directly into the river (Ref. 2). The Watauga River is fished for crappy, bass and other freshwater species (Ref. 1, p. 3). No commercial fishing operations are known.

3.3 CLIMATOLOGICAL, METEOROLOGICAL, AND HYDROGEOLOGICAL FACTORS

Most of Carter County lies in the Blue Ridge Physiographic Province which can be described as having a mountainous topography. Elevations range from 1,200 to greater than 6,600 feet (Ref. 11, pp. 6, 114). The area's annual precipitation is 48 inches and the total net annual precipitation is 15 inches (Ref. 12, pp. 43, 63). The 1-year, 24-hour rainfall is approximately 2.75 inches (Ref. 13, p. 93).

Carter County is underlain by a sequence of terrace and alluvial deposits, shale, dolomite, and crystalline rocks. These units consists of the Sevier shale, a blue, yellow-weathering silty to sandy calcareous shale. The Honaker dolomite, a siliceous dolomite with beds of limestone and dolomitic shale, the Rome formation, a varicolored layering of shale, siltstone, and sandstone with some dolomite and limestone, the Shady dolomite, a blue, gray, and white dolomite, the Erwin through the Unicoi which are mainly clastic and the Cambrian age crystalline complex (Ref. 11, pp. 44, 114, 115).

Groundwater in Carter County occurs primarily in fractures in the underlying rocks. A major portion of the rural population is supplied by springs or wells. Domestic well depths average about 322 feet bls in the Elizabethton area (Ref. 11, pp. 115, 120).

3.4 CRITICAL HABITATS/ENDANGERED SPECIES

There are no critical habitats identified in the area of the facility; however, several federally endangered species have been identified for general distribution in the entire state, and in the east portion of the state of Tennessee. These species are respectively, the gray bat (Myotis grisescens), bald eagle (Holiaeetus leucocephalus), Kirtland's warbler (Vermivora kirtlandii) and the Carolina northern flying squirrel (Gaucomys sabrinus coloratus) (Ref. 14).

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4.0 VISUAL SITE INSPECTION (VSI)

The Visual Site Inspection (VSI) of the North American Rayon facility was performed on August 21-22, 1989. The VSI focused on the past and present waste streams at the facility in order to identify all Solid Waste Management Units (SWMUs), and any Areas of Concern (AOCs) and to collect information beneficial in assessing their potential to release hazardous waste or constituents to the environment.

4.1 SOLID WASTE MANAGEMENT UNITS (SWMUs) AND OTHER AREAS OF CONCERN (AOCs)

Twenty-four SWMUs and five AOCs were identified at the North American Rayon facility during the Visual Site Inspection (VSI). Solid Waste Management Units identified include alkyl cellulose waste bins, five dumpsters, the sand blast bag house dust, a scrap metal bin, the drum storage area/drum crusher, an excavated underground storage tank and related soil, the lead scrap yard, a landfill, a holding basin, the sludge drying lagoons, the wastewater treatment plant, the carbon disulfide storage pond, two farms of sodium hydroxide storage tanks, the miscellaneous storage tank farm, a fly ash silo, the fuel oil storage tanks, a wastewater lift station, the sulfuric acid tanks and waste bins. The Areas of Concern include the raw material storage building, a caustic spill, a scrap yard, the asbestos insulated steam lines and the carbon disulfide recovery column (Ref. 1, p. 13).

During the Visual Site Inspection, a representative of North American Rayon accompanied the NUS Field Investigation Team members. The VSI was conducted in a fashion that followed the same route that wastes are handled at the facility. No SWMUs or AOCs were located outside of the facility's normal areas of operation.

All SWMUs and AOCs are delineated on Table 4-1, are located in Figure 4-1 and further discussed in this section. Figure 4-2 is a photograph location map. Weather during the VSI was sunny and warm, with temperatures in the low 80s. There was no precipitation during the VSI and ground conditions were dry (Ref. 1, p. 13).

4.2 VSI PARTICIPANTS

The following General Electric Company and NUS personnel were present during the Visual Site Inspection (VSI).

Mitch Cohen, P.E.
NUS Corporation
Civil Engineer

Lou Raasch, Ph.D.
North American Rayon Corporation
Environmental Services Manager

Robert Rose
NUS Corporation
Environmental Scientist

TABLE 4-1

SWMU IDENTIFICATION SUMMARY
NORTH AMERICAN RAYON CORPORATION
ELIZABETHTON, CARTER COUNTY, TENNESSEE

SWMU No.	Name of Unit	Yrs. of Oper.	Wastes Managed	Evidence of a Release	Recommendation		
					No Further Action	Further Action	Sampling
1	Alkyl Cellulose Waste Bins (SWMU)	61	alkyl cellulose	No	X		
2	Roll on/Roll off Dumpster (SWMU)	61	miscellaneous rubbish	No	X		
3	Raw Material Storage Building (AOC)	61	finishing oil, motors	No		*	

* prevent potential spills from entering the storm drain system
** spilled sodium hydroxide should be cleaned up
*** housekeeping practices need improvement
\+ remediation of contaminated soil and certified closure of unit
\+ \+ certified closure of this unit pends approval of closure plan
i ensurance of closure certification and approved groundwater monitoring by state
ii ensurance of closure plan approval and certified closure by state
iii the capacity of the plant is in question particularly during power outages
y the integrity of the concrete deck was poor
yy sampling of friable insulation to determine if asbestos is being released to ambient air throughout the facility
yyy housekeeping practices must be improved
z housekeeping practices must be improved; fly ash was scattered around the loading area
zz relief valve should enter sewer line not storm drain (to river)
zzz oil release should be cleaned up
o ensurance that overflow to river is sealed off

TABLE 4-1

SWMU IDENTIFICATION SUMMARY
NORTH AMERICAN RAYON CORPORATION
ELIZABETHTON, CARTER COUNTY, TENNESSEE

SWMU No.	Name of Unit	Yrs. of Oper.	Wastes Managed	Evidence of a Release	Recommendation		
					No Further Action	Further Action	Sampling
4	Caustic Spill (AOC)	1	sodium hydroxide	Yes		**	
5	Roll on/Roll off Dumpster (SWMU)	61	off-spec rayon yarn	No	X		
6	Sand Blast Bag House Dust (SWMU)	41	phenolic lacquer	No	X		
7	Scrap Metal Bin (SWMU)	4	ferrous and non-ferrous metals	No	X		

* prevent potential spills from entering the storm drain system
** spilled sodium hydroxide should be cleaned up
*** housekeeping practices need improvement
\+ remediation of contaminated soil and certified closure of unit
\+ + certified closure of this unit pends approval of closure plan
i ensurance of closure certification and approved groundwater monitoring by state
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TABLE 4-1

SWMU IDENTIFICATION SUMMARY
NORTH AMERICAN RAYON CORPORATION
ELIZABETHTON, CARTER COUNTY, TENNESSEE

SWMU No.	Name of Unit	Yrs. of Oper.	Wastes Managed	Evidence of a Release	Recommendation		
					No Further Action	Further Action	Sampling
8	Drum Storage Area and Drum Crusher (SWMU)	2	waste oils, degreasers, purge water	No		***	
9	Underground Storage Tank and Soil (SWMU)	31	No. 4 fuel oil	Yes - leak detected upon excavation		+	
10	Lead Scrap Yard (SWMU)	24	lead scrap and dross	Leachate may have entered storm drains		+ +	

*	prevent potential spills from entering the storm drain system
**	spilled sodium hydroxide should be cleaned up
***	housekeeping practices need improvement
+	remediation of contaminated soil and certified closure of unit
+ +	certified closure of this unit pends approval of closure plan
i	ensurance of closure certification and approved groundwater monitoring by state
ii	ensurance of closure plan approval and certified closure by state
iii	the capacity of the plant is in question particularly during power outages
y	the integrity of the concrete deck was poor
yy	sampling of friable insulation to determine if asbestos is being released to ambient air throughout the facility
yyy	housekeeping practices must be improved
z	housekeeping practices must be improved; fly ash was scattered around the loading area
zz	relief valve should enter sewer line not storm drain (to river)
zzz	oil release should be cleaned up
o	ensurance that overflow to river is sealed off

TABLE 4-1

SWMU IDENTIFICATION SUMMARY
NORTH AMERICAN RAYON CORPORATION
ELIZABETHTON, CARTER COUNTY, TENNESSEE

SWMU No.	Name of Unit	Yrs. of Oper.	Wastes Managed	Evidence of a Release	Recommendation		
					No Further Action	Further Action	Sampling
11	Scrap Yard (AOC)	61	lumber, steel, iron and aluminum	No	X		
12	Landfill (SWMU)	60	fly ash, flay ash sludge and water treatment sludge	No		i	
13	Holding Basin (SWMU)	61	sulfuric acid and water treatment sludge	Past discharge to river		ii	
14	Sludge Drying Lagoons (SWMU)	16	wastewater treatment sludge	No	X		

* prevent potential spills from entering the storm drain system
** spilled sodium hydroxide should be cleaned up
*** housekeeping practices need improvement
\+ remediation of contaminated soil and certified closure of unit
\+ \+ certified closure of this unit pends approval of closure plan
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TABLE 4-1

SWMU IDENTIFICATION SUMMARY
NORTH AMERICAN RAYON CORPORATION
ELIZABETHTON, CARTER COUNTY, TENNESSEE

SWMU No.	Name of Unit	Yrs. of Oper.	Wastes Managed	Evidence of a Release	Recommendation		
					No Further Action	Further Action	Sampling
15	Wastewater Treatment Plant (SWMU)	16	acid and caustic wastewater	Past acid release to river		iii	
16	Bar Grit Dumpster (SWMU)	16	bar grit from influent	No	X		
17	Carbon Disulfide Storage Pond (SWMU)	36	carbon disulfide	No	X		

* prevent potential spills from entering the storm drain system
** spilled sodium hydroxide should be cleaned up
*** housekeeping practices need improvement
\+ remediation of contaminated soil and certified closure of unit
\+ \+ certified closure of this unit pends approval of closure plan
i ensurance of closure certification and approved groundwater monitoring by state
ii ensurance of closure plan approval and certified closure by state
iii the capacity of the plant is in question particularly during power outages
y the integrity of the concrete deck was poor
yy sampling of friable insulation to determine if asbestos is being released to ambient air throughout the facility
yyy housekeeping practices must be improved
z housekeeping practices must be improved; fly ash was scattered around the loading area
zz relief valve should enter sewer line not storm drain (to river)
zzz oil release should be cleaned up
o ensurance that overflow to river is sealed off

TABLE 4-1

SWMU IDENTIFICATION SUMMARY
NORTH AMERICAN RAYON CORPORATION
ELIZABETHTON, CARTER COUNTY, TENNESSEE

SWMU No.	Name of Unit	Yrs. of Oper.	Wastes Managed	Evidence of a Release	Recommendation		
					No Further Action	Further Action	Sampling
18	Sodium Hydroxide Storage Tanks (SWMU)	61	sodium hydroxide	Small leak in water seal	X		
19	Storage Tank Farm (SWMU)	61	sulfuric acid, ammonium sulfide, dimethyl amine	No		y	
20	Asbestos Insulated Steam Lines (AOC)	61	asbestos	Loose, friable asbestos		yy	yy

*	prevent potential spills from entering the storm drain system
**	spilled sodium hydroxide should be cleaned up
***	housekeeping practices need improvement
+	remediation of contaminated soil and certified closure of unit
+ +	certified closure of this unit pends approval of closure plan
i	ensurance of closure certification and approved groundwater monitoring by state
ii	ensurance of closure plan approval and certified closure by state
iii	the capacity of the plant is in question particularly during power outages
y	the integrity of the concrete deck was poor
yy	sampling of friable insulation to determine if asbestos is being released to ambient air throughout the facility
yyy	housekeeping practices must be improved
z	housekeeping practices must be improved; fly ash was scattered around the loading area
zz	relief valve should enter sewer line not storm drain (to river)
zzz	oil release should be cleaned up
o	ensurance that overflow to river is sealed off

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NORTH AMERICAN RAYON CORPORATION
ELIZABETHTON, CARTER COUNTY, TENNESSEE

SWMU No.	Name of Unit	Yrs. of Oper.	Wastes Managed	Evidence of a Release	Recommendation		
					No Further Action	Further Action	Sampling
21	Roll on/Roll off Dumpster (SWMU)	61	rayon, plastic, rubber	No	X		
22	Sodium Hydroxide Storage Tanks (SWMU)	61	sodium hydroxide	crystallized NaOH visible in many areas		yyy	
23	Dumpster (SWMU)	61	alkali cellulose	No	X		

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TABLE 4-1

SWMU IDENTIFICATION SUMMARY
NORTH AMERICAN RAYON CORPORATION
ELIZABETHTON, CARTER COUNTY, TENNESSEE

SWMU No.	Name of Unit	Yrs. of Oper.	Wastes Managed	Evidence of a Release	Recommendation		
					No Further Action	Further Action	Sampling
24	Fly Ash Silo (SWMU)	33	fly ash	Runoff entering storm drain		z	
25	Fuel Oil Storage Tanks (SWMU)	37	fuel oil	No		zz	
26	Carbon Disulfide Recovery Column (AOC)	50	carbon disulfide and oil	Oily release seen on ground		zzz	

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TABLE 4-1

SWMU IDENTIFICATION SUMMARY
NORTH AMERICAN RAYON CORPORATION
ELIZABETHTON, CARTER COUNTY, TENNESSEE

SWMU No.	Name of Unit	Yrs. of Oper.	Wastes Managed	Evidence of a Release	Recommendation		
					No Further Action	Further Action	Sampling
27	Wastewater Lift Station (SWMU)	34	alkaline sewer water	past release to river		o	
28	Sulfuric Acid Tanks (SWMU)	61	sulfuric acid	Crystallized acid seen in areas	X		
29	Waste Bins (SWMU)	61	alkali cellulose, cellulose xanthate	No	X		

* prevent potential spills from entering the storm drain system
** spilled sodium hydroxide should be cleaned up
*** housekeeping practices need improvement
\+ remediation of contaminated soil and certified closure of unit
\+ \+ certified closure of this unit pends approval of closure plan
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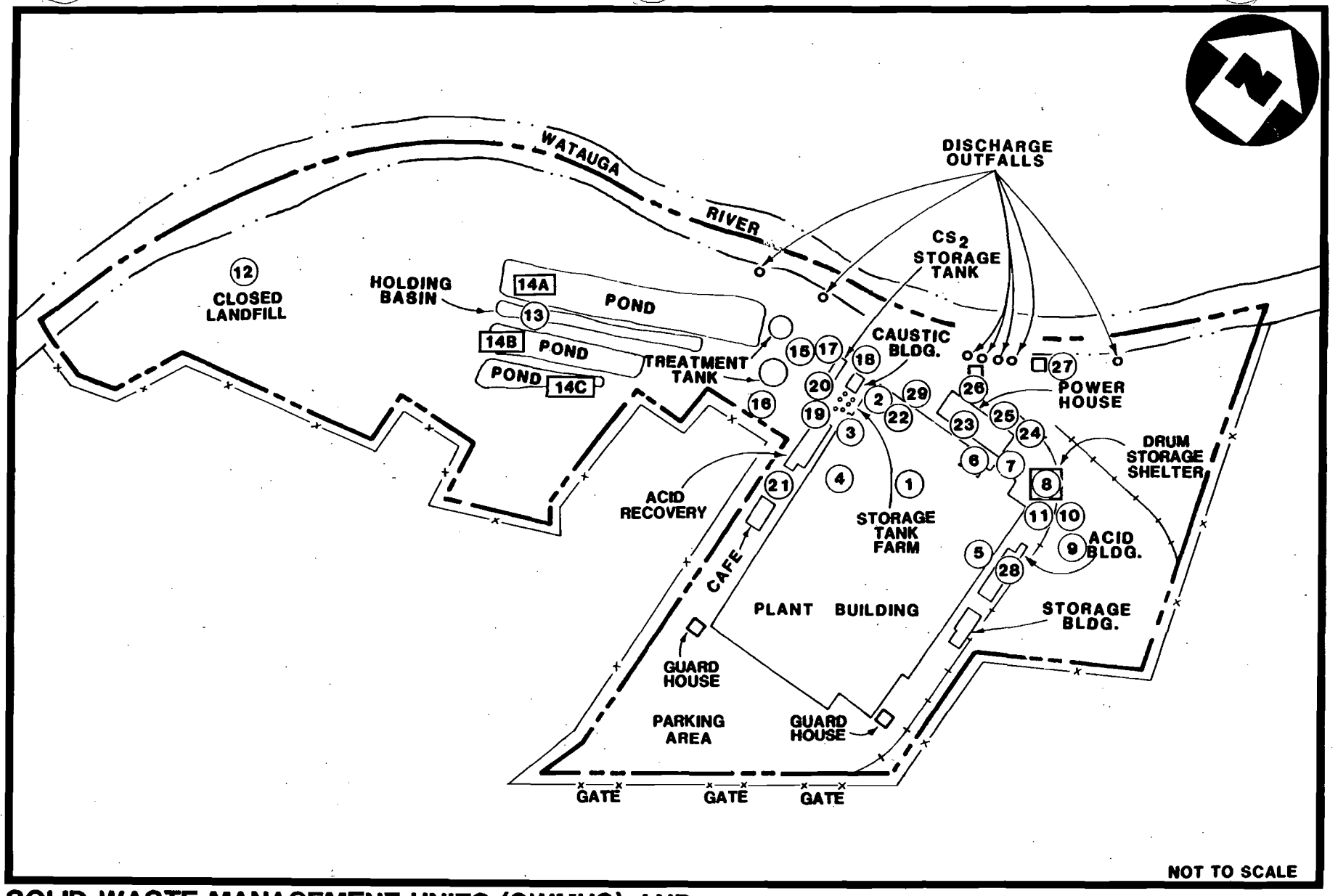


SOLID WASTE MANAGEMENT UNITS (SWMUS) AND OTHER AREAS OF CONCERN (AOC) LOCATIONS NORTH AMERICAN RAYON CORP. ELIZABETHON, CARTER COUNTY, TENNESSEE

FIGURE 4-1

NUS CORPORATION

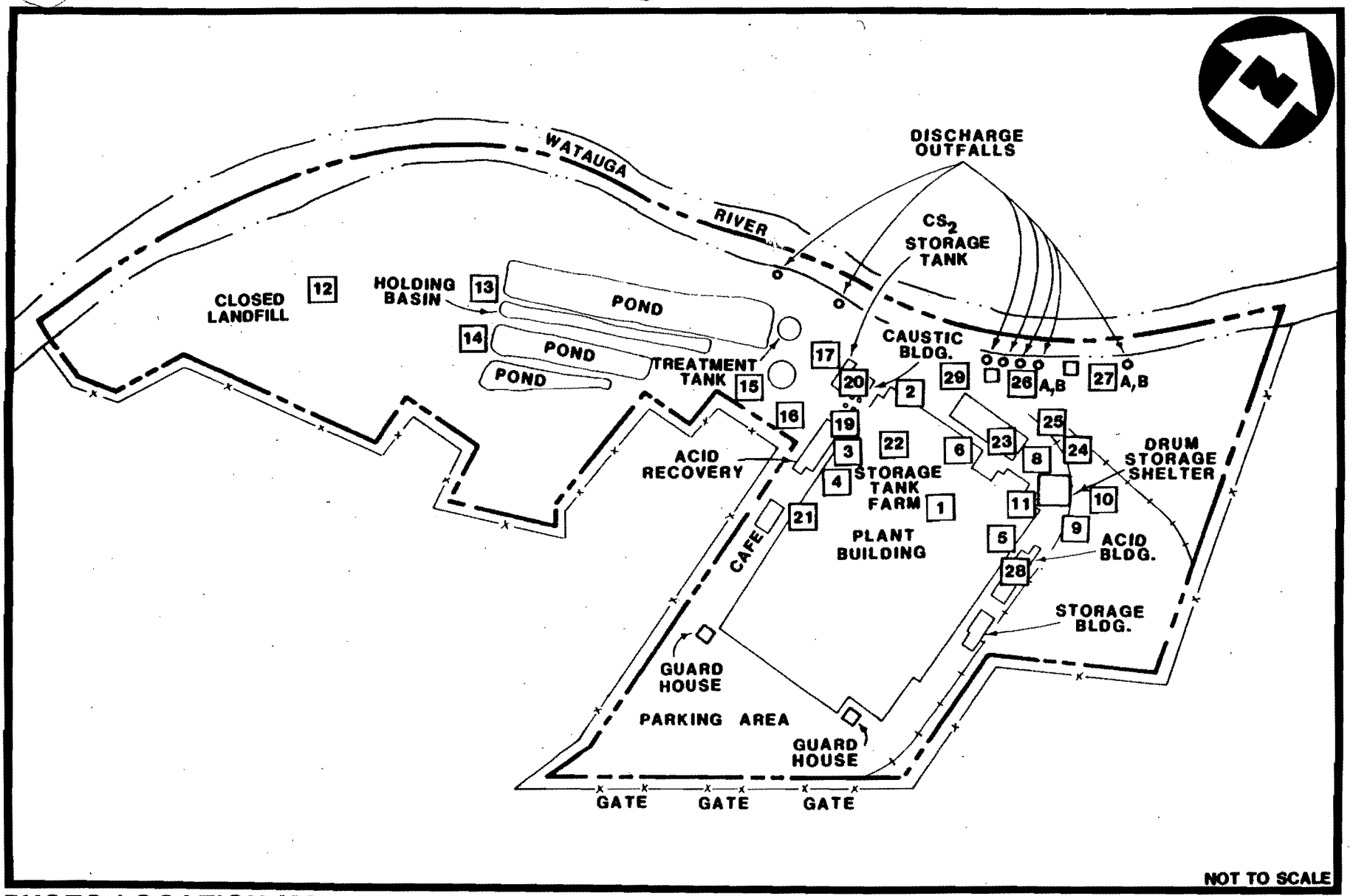


PHOTO LOCATION MAP
NORTH AMERICAN RAYON CORP.
ELIZABETHON, CARTER COUNTY, TENNESSEE

FIGURE 4-2

NUS CORPORATION

SWMU NUMBER: 1

SWMU NAME: Alkyl Cellulose Waste Bins

SWMU DESCRIPTION: Steel tubs with a capacity of 600 pounds of waste shredded alkyl cellulose (treated pulp). Waste shredded pulp is collected in the shredder room and placed in a chute that feeds the waste bins. It takes about 3 days to fill the hopper (Ref. 1, p. 13).

DATE OF START-UP: According to North American Rayon personnel, this unit is believed to have been placed in service in August of 1928.

DATE OF CLOSURE: This unit was active during the VSI.

WASTES MANAGED: Alkyl cellulose spillage, shredding equipment breakdown and floor sweepings. The waste is in a damp-solid form, with some of it looking like white crumbs generated from the steeping of pulp sheets and the shredding process. Approximately 47,000 pounds of alkyl cellulose waste is generated per year. The waste bins, when full, are transferred and dumped into dumpsters (SWMU No. 23) and eventually disposed of in the Carter County Landfill (Ref. 1, p. 13).

RELEASE CONTROLS: The bins are located in the facility plant. Any spillage around the bins are picked up and returned to the bins.

RELEASE HISTORY: According to North American Rayon personnel, there have been no appreciable releases from this unit (Ref. 1, p. 13).

INTERIM RECOMMENDATIONS: No Further Action

PHOTOGRAPH NO. 1

SWMU NUMBER: 2

SWMU NAME: Roll on/Roll off dumpster

SWMU DESCRIPTION: This 40-yd^3 container is located in the northwest corner of the facility plant. The unit receives waste paper and scrap metals that cannot be recycled (Ref. 1, p. 13).

DATE OF START-UP: This area of waste collection has been in service since August of 1928. The exact date of roll on/roll off container useage is unknown according to North American Rayon personnel.

DATE OF CLOSURE: This unit was active during the VSI.

WASTES MANAGED: Waste disposed of in this unit consists of bailing wire from pulp sheet bales, packing boxes, dirty pulp sheets and miscellaneous rubbish.

RELEASE CONTROLS: There are no release controls at this unit.

RELEASE HISTORY: According to North American Rayon personnel, there have been no releases from this unit (Ref. 1, p. 13).

INTERIM RECOMMENDATIONS: No Further Action - during the VSI, the area around the unit was free of waste.

PHOTOGRAPH NO. 2

AOC NUMBER: 3

AOC NAME: Raw material storage building

AOC DESCRIPTION: This area of concern is located at the northwest corner of the facility plant. The entrance, which allows access for trucks, is 15 feet upgradient from a storm drain drop inlet. The storm drain flows directly to the Watauga River (Ref. 1, p. 13).

DATE OF START-UP: According to North American Rayon personnel, this area is believed to have been placed in service in August of 1928.

DATE OF CLOSURE: This area was active during the VSI.

WASTES MANAGED: Inside the access door to the storage area, eight sealed electric motors and three 5000-gallon tanks of finishing oil were stored.

RELEASE CONTROLS: There were no release controls at this area. A depressed area of the pavement outside of the door directs flow to the drain.

RELEASE HISTORY: According to North American Rayon personnel, there have not been any spills in the storage area that have entered the drainage system (Ref. 1, p. 13).

INTERIM RECOMMENDATIONS: Further Action - Low priority - a raised area needs to be constructed at the access doorway to prevent potential spills from entering the storm drainage system. Any spills should remain inside to plant and cleaned up.

PHOTOGRAPH NO. 3

AOC NUMBER: 4

AOC NAME: Caustic Spill

AOC DESCRIPTION: The spill is located in the unit one aging basement below the shredder room. Approximately 5 gallons of sodium hydroxide were released on the concrete floor when a pipe in the lye circulation system broke. The spill residue remains on the floor (Ref. 1, p. 13).

DATE OF START-UP: The lye circulation system has been in service since August of 1928. The spill occurred in 1988.

DATE OF CLOSURE: The circulation system was active during the VSI. Repairs had been made on the broken pipe upon discovery.

WASTES MANAGED: The lye circulation system carries 18% sodium hydroxide from storage area (SWMU No. 22) to the dipping room where sheets of pulp are treated prior to shredding.

RELEASE CONTROLS: There are no release controls in this area other than the concrete floor of the plant. A center drain near the spill flows to the alkaline sewer.

RELEASE HISTORY: This spill occurred in 1988 according to North American Rayon personnel (Ref. 1, p. 13).

INTERIM RECOMMENDATIONS: Further Action - Low priority - sodium hydroxide has crystallized on the floor. The area needs to be cleaned up.

PHOTOGRAPH NO. 4A and 4B

SWMU NUMBER: 5

SWMU NAME: Roll on/Roll off Dumpster

SWMU DESCRIPTION: This 40-yd^3 dumpster is located in the northeast corner of the plant. It is picked up two times per week and shipped to the Carter County Landfill by Waste Management (Ref. 1, p. 13).

DATE OF START-UP: This area of waste collection has been in service since August of 1928. The exact date of roll on/roll off container useage is unknown according to North American Rayon personnel.

DATE OF CLOSURE: This unit was active during the VSI.

WASTES MANAGED: This unit is used to dispose of general types of trash including waste or off-spec rayon yarn.

RELEASE CONTROLS: There are no release controls for this unit. The dumpster is in the open with no lid to prevent rain or snow from entering.

RELEASE HISTORY: According to North American Rayon personnel, there have been no releases from this unit (Ref. 1, p. 13).

INTERIM RECOMMENDATIONS: No Further Action - The integrity of the unit appeared satisfactory. No appreciable wear or damage to the unit was seen during the VSI.

PHOTOGRAPH NO. 5

SWMU NUMBER: 6

SWMU NAME: Sand Blast Bag House Dust

SWMU DESCRIPTION: This 5-yd^3 roll-on bin is located in the northeast portion of the plant and is used to store sand blast material used to clean aluminum lacquer-coated spools and pressure vacuum wash tanks. When full, the bin is transferred to a roll on/roll off dumpster (SWMU No. 23) and shipped to the Carter County Landfill by Waste Management (Ref. 1, p. 13).

DATE OF START-UP: According to North American Rayon personnel, this unit is believed to have been placed in service in 1948.

DATE OF CLOSURE: This unit was active during the VSI.

WASTES MANAGED: The lacquer used to coat spools and tanks is phenolic, with a trade name of Heresite (Ref. 1, p. 13). Samples of the sand blast waste were analyzed in 1988 and proved to be below EP toxicity parameters, with only barium detected at 0.06 mg/l (Ref. 15).

RELEASE CONTROLS: The unit rests under a shelter just outside of the plant to protect against runoff from rain.

RELEASE HISTORY: According to North American Rayon personnel, there have been no releases from this unit other than small amounts of spillage while filling or emptying. Spillage was seen during the VSI (Ref. 1, p. 13).

INTERIM RECOMMENDATIONS: No Further Action - although care should be taken to ensure that spilled sand blast material does not enter the storm drainage system, this unit appeared to be in satisfactory condition.

PHOTOGRAPH NO. 6

SWMU NUMBER: 7

SWMU NAME: Scrap Metal Bin

SWMU DESCRIPTION: This 20-yd^3 bin is located in the north portion of the plant building and is used to store recyclable scrap metal prior to its sale. The bin stores a mixture of pipes, wire, fittings, valves, etc. (Ref. 1, p. 13).

DATE OF START-UP: According to North American Rayon personnel, this unit is believed to have been placed in service in 1985. Prior to this, plant personnel took the scrap to the recycler.

DATE OF CLOSURE: This unit was active during the VSI.

WASTES MANAGED: Various ferrous and non-ferrous metals such as iron, stainless steel, aluminum, lead and copper are stored prior to pick up. Elizabethton Herbs and Scrap Metals picks up and recycles the scrap.

RELEASE CONTROLS: There are no release controls for this unit.

RELEASE HISTORY: According to North American Rayon personnel, there have been no releases from this unit (Ref. 1, p. 13).

INTERIM RECOMMENDATIONS: No Further Action - This unit appeared to be in satisfactory condition, and no releases were seen during the VSI.

PHOTOGRAPH NO. Photograph not available.

SWMU NUMBER: 8

SWMU NAME: Drum Storage Area and Drum Crusher

SWMU DESCRIPTION: The drum storage area is located in the northeast corner of the facility. The 30' x 30' contained area stores primarily empty drums prior to being sent to a drum crusher, which is adjacent to the storage area. During the VSI, approximately thirty 55-gallon drums and three 5-gallon buckets were being stored at this unit (Ref. 1, p. 13).

DATE OF START-UP: According to North American Rayon personnel, this unit is believed to have been placed in service in 1987.

DATE OF CLOSURE: This unit was active during the VSI.

WASTES MANAGED: 24 of the drums were labeled waste lubricating oil, 3 drums were purge water from onsite monitoring wells and 3 drums contained varsol, a degreasing agent. The three 5-gallon buckets contained waste oil. Waste oils and varsol are picked up and recycled by Tricity Oil Recycling and Enterprise Oil Recycling. In the fall of 1987, GSX of Tennessee picked up 177 drums of various wastes that had accumulated in the plant over time, according to North American Rayon personnel.

RELEASE CONTROLS: The area is surrounded by a 6" x 6" curb and is covered by a metal roof. A 250-gallon sump can contain any potential spills. A portable pump can be used to purge the sump and bags of "Oil-dry" absorbent material can be used for small oil spills. A fire extinguisher is in place since waste thinners might be stored at this unit.

RELEASE HISTORY: Small quantities of liquids remaining in drums prior to crushing are released when crushing occurs. There has been one episode of the bottom of a drum rusting out, releasing oil. All releases have been contained in the sump. However, the sump is presently full (Ref. 1, p. 13).

INTERIM

RECOMMENDATIONS: Further Assessment - Low priority. The sump, when full, cannot contain future releases in significant amounts, which is always a potential occurrence. Standing water was seen inside the diked area. Several drums were not on pallets increasing the risk of bottom rust-outs. Housekeeping practices need to be improved.

PHOTOGRAPH NO. 8

SWMU NUMBER: 9

SWMU NAME: Underground Storage Tank and Soil

SWMU DESCRIPTION: North American Rayon decided to excavate and dispose of the underground storage tank used to store No. 5 fuel oil located in the northern corner of the facility. While excavating the 15,000-gallon steel tank, several holes were discovered, as well as discolored soil. A polyethylene liner was placed on the ground nearby and the tank, along with 260 tons of contaminated soil, were placed on it. At the present time, the tank and soil remain onsite awaiting instructions from the state pertaining to disposal.

DATE OF START-UP: According to North American Rayon personnel, the unit is believed to have been placed in service in 1958 (Ref. 1, p. 13).

DATE OF CLOSURE: North American Rayon is in the process of designing an Environmental Assessment Plan, which is due for submission to the state by September 30, 1989 (Ref. 1, p. 13).

METHOD OF CLOSURE: Closure will proceed upon approval of the above-described Environmental Assessment Plan.

WASTES MANAGED: The tank stored No. 5 fuel oil, which was used as an alternate source for the drying kiln. The tank contained about 2500 gallons of oil prior to excavation. The oil was transferred to the powerhouse fuel oil storage tanks (SWMU No. 25).

RELEASE CONTROLS: There were no release controls for this unit.

RELEASE HISTORY: An unknown amount of fuel oil was released to surrounding soil from the leaking tank. The leak was discovered during excavation of the tank (Ref. 1, p. 13).

INTERIM RECOMMENDATIONS: Further Assessment - High Priority. It is imperative that all contaminated soil and/or groundwater be removed and properly disposed of at a hazardous waste disposal facility. A follow-up groundwater monitoring program should be implemented after closure is certified.

PHOTOGRAPH NO. 9

SWMU NUMBER: 10

SWMU NAME: Lead Scrap Yard

SWMU DESCRIPTION: Lead debris accumulated on an asphalt pad, approximately 105 x 26 foot, located on the northeast side of the plant.

DATE OF START-UP: According to North American Rayon personnel, this unit is believed to have been placed in service in 1975 (Ref. 1, p. 13).

DATE OF CLOSURE: According to North American Rayon personnel, the accumulation of lead scrap ceased on November 18, 1987.

METHOD OF CLOSURE: According to the closure plan, a recycler was to reclaim the lead. Debris left behind would be collected and disposed of at a hazardous waste landfill. The asphalt pad was to be high pressure washed. A berm with a sump was to be constructed to contain the wash water. Polyethylene was to be used to prevent wash water from coming into contact with surrounding soil. The collected wash water was to be pumped to the wastewater treatment plant and solids and the liner were to be disposed of at a hazardous waste landfill. Sampling the asphalt pad before and after would ensure clean closure (Ref. 16., p. 2).

According to North American Rayon personnel, the closure plan will be revised and resubmitted for approval. The lead debris was removed for recycling in May of 1988; however, the remainder of the stated remediation has not been performed yet. When the asphalt pad is pressure-cleaned, total metals analysis of the rinsate will be conducted (Ref. 17).

WASTES MANAGED: The debris consists of lead pipes and equipment parts resulting from overhaul of machinery.

RELEASE CONTROLS: There are no release controls at this unit. Materials are accumulated in an open area without benefit of cover or containment. Material was stored over storm drains that flow to the Watauga River, north of the storage area (Ref. 1, p. 13).

RELEASE HISTORY: Because there were no release controls, leachate containing lead may have been released to the storm drains during the use of this unit, from 1975 to 1987 (Ref. 1, p. 13).

INTERIM RECOMMENDATIONS: Further assessment - low-priority oversight of closure plan approval and implementation to ensure certified closure.

PHOTOGRAPH NO. 10

AOC NUMBER: 11

AOC NAME: Scrap Yard

AOC DESCRIPTION: Open storage area 100 yards x 15 yards, slightly upgradient from a storm sewer drain.

DATE OF START-UP: According to North American Rayon personnel, this area is believed to have been placed in service in 1928.

DATE OF CLOSURE: This area was active during the VSI.

WASTES MANAGED: The scrap consists of lumber, steel, aluminum and iron. Included are crates, barrels, pipes, valves, filter presses, fittings, centrifuges, condensers, a large battery (dry), bricks and miscellaneous scrap. No motors or sealed units are included in the scrap.

RELEASE CONTROLS: There are no release controls at this area. Materials have accumulated in an open area, without benefit of cover or containment. Runoff from the area flows downgradient to the storm drains that flow to the Watauga River.

RELEASE HISTORY: No known evidence of a release is documented; however, the site is upgradient to the storm drains. Heavy rains may have caused releases to flow to the storm drains and the Watauga River (Ref. 1, p. 13).

INTERIM RECOMMENDATIONS: No Further Action - Runoff would most likely carry away non-hazardous iron oxide from the area to the river.

PHOTOGRAPH NO. 11

SWMU NUMBER: 12

SWMU NAME: Landfill

SWMU DESCRIPTION: The approximate 18.3-acre landfill site is located in the western portion of the facility property. North American Rayon disposed of fly ash and sludge at the site. In 1981, American Limestone agreed to take dry fly ash from the landfill for use in constructing roadbeds. The excavation left by American Limestone was filled with approximately 50,000 cubic yards of sludge that was stored in the nearby holding lagoons generated by the wastewater treatment plant. Waste materials generated by the facility are now disposed of at the Carter County Landfill, after verbal special waste approval was granted by the state.

DATE OF START-UP: According to information acquired from North American Rayon, the landfill is believed to have been placed in service in 1929 (Ref. 18, pp. 2, 3).

DATE OF CLOSURE: The landfill closure is in the process of being reviewed for certification by the state (Ref. 17).

METHOD OF CLOSURES: According to the closure plan, sludge from the wastewater holding lagoons was used to fill low lying areas of the landfill. Six inches of local fill material and 1.5 feet of compacted high clay content soil was used as cover material. The final grade of 0.02 (vertical to horizontal) on the surface and 3:1 on the sides were established to prevent erosion. After grading, the site was revegetated with various grasses (Ref. 18, pp. 9, 10). Groundwater monitoring wells were installed. However, an upgradient well location was rejected, and a new location has been established (Ref. 19).

WASTES MANAGED: The wastes disposed of in this unit consisted of fly ash, fly ash sludge and sludge from the holding basin (SWMU No. 13). About 300,000 yd^3 of waste had been disposed of in the landfill (Ref. 18).

RELEASE CONTROLS: There were no release controls for this unit since the landfill was unlined (Ref. 1, p. 13).

RELEASE HISTORY: According to North American Rayon personnel, there had been no releases from this unit (Ref. 1, p. 13).

INTERIM

RECOMMENDATIONS: Further Assessment: low priority oversight of closure certification review by state and acceptable groundwater sample collection and analysis.

PHOTOGRAPH NO. 12A, 12B, 12C

SWMU NUMBER: 13

SWMU NAME: Holding Basin

SWMU DESCRIPTION: The 800 feet x 15 feet x 15 foot deep impoundment with a capacity of 1,000,000 gallons was used as part of a serpentine system of waste holding prior to the utilization of the waste water treatment plant (SWMU No. 15). This unit was used primarily for settling solids prior to discharge to the Watauga River. The basin was bermed up in 1972, and soon after in 1973, the present clarifier tank was constructed. The basin was no longer used as a settling unit after the clarifier was placed in service. However, whenever the clarifier was shut down for maintenance or during a power failure, wastewater was diverted to the holding basin. When the clarifier was placed back in service after downtime, the wastewater would be pumped back to it from the basin. Sludges were transferred to one of the three drying ponds located adjacent to the holding basin with a clamshell bucket periodically (Ref. 1, p. 13). On November 18, 1987, a state inspection revealed that the holding basin had received sulfuric acid with a pH of 1.9. This made the holding basin a RCRA storage unit because the sulfuric acid is considered a characteristic hazardous waste. The unit is in the process of closure at the present time (Refs. 1, p. 13; 16, p. 1).

DATE OF START-UP: According to North American Rayon personnel, this unit is believed to have been placed in service in August 1928 (Ref. 1, p. 13).

DATE OF CLOSURE: Discharge to the holding basin ceased as of February 22, 1988. Closure of the basin is ongoing at the present time, and the closure plan is pending state approval so that closure can be certified (Ref. 17).

METHOD OF CLOSURE: According to North American Rayon personnel, closure will consist of slurrying the material in the basin and pumping it to the wastewater treatment plant (SWMU No. 15). The slurry will then be treated with hydrogen peroxide in addition to the standard treatment that occurs at the treatment plant. Approximately 500,000 pounds of solids are to be treated. Effluent will be analyzed for zinc, pH, ammonia, sulfides, biochemical oxygen demand (BOD) and suspended solids prior to discharge.

WASTES MANAGED: A past release of sulfuric acid dropped the pH to 1.9. The basin received dried water treatment sludge from the three sludge drying ponds (SWMU No. 14).

RELEASE CONTROLS: An overflow structure allows excessive levels of wastewater to be discharged directly to the Watauga River. During the 1940s, 10 feet of clay was placed in the basin as an impermeable liner (Ref. 1, p. 13).

RELEASE HISTORY: When the clarifier was down for maintenance or during a power failure, discharges to the river have occurred. Treated effluent discharges have ranged from between 3 and 10 days (4.5 - 5.5 MGD). According to North American Rayon personnel, whenever discharge to the river occurred from the basin, the state was notified (Ref. 1, p. 13).

INTERIM RECOMMENDATIONS: Further Assessment - low-priority oversight and ensurance of approval and certification of closure plan and closure by the state.

PHOTOGRAPH NO. 13

SWMU NUMBER: 14

SWMU NAME: Sludge Drying Lagoons

SWMU DESCRIPTION: Three of the four impoundments located just east of the landfill. Lagoon A is approximately 1100 feet by 40 feet and is 12 feet deep. Lagoon B is approximately 600 feet by 30 feet and is 8 feet deep. Lagoon C is approximately 400 feet by 20 feet and is 6 feet deep. The fourth lagoon is the holding basin in the process of closure (SWMU No. 13). The three ponds receive wastewater treatment sludge. Material from lagoons A and B was used as fill during the closure of the landfill (SWMU No. 12). Lagoon A takes about 5 years to fill, while lagoons B and C take only about 1 year to fill. Since closure of the landfill, dried sludge is disposed of at the Carter County Landfill (Ref. 1, p. 13).

DATE OF START-UP: According to North American Rayon personnel, this unit is believed to have been placed in service in 1973. Prior to 1973, lagoon A was used as a polishing lagoon before the installation of the clarifier tank (Ref. 1, p. 13).

DATE OF CLOSURE: The unit was active during the VSI.

WASTES MANAGED: This unit is used to dry sludges from the wastewater treatment plant. Sludges consist mostly of fly ash, zinc hydroxide and calcium sulfate.

RELEASE CONTROLS: In 1943, 10 feet of clay was placed in lagoon A as a liner. The clays in the bottom of lagoon B and C are most likely indigenous to the area and have settled.

RELEASE HISTORY: According to North American Rayon personnel, there have been no releases from this unit (Ref. 1, p. 13).

INTERIM RECOMMENDATIONS: No Further Action

PHOTOGRAPH NOS. 14a, 14b, 14c

SWMU NUMBER: 15

SWMU NAME: Waste Water Treatment Plant

SWMU DESCRIPTION: The waste water treatment plant is used to treat process wastewater from the alkaline sewer and the acid sewer, as well as scrubber water from the powerhouse emission stacks. First of all, wastewaters from the alkaline sewer (pH 11 - 12) pass through a bar screen and then an equalization and aeration basin. Next, the wastewater goes to a acidification tank where air and sulfuric acid are added, to bring the pH down to 3. At this point, wastewater from the acid sewer and scrubber water join with the acidified alkaline water. In mixing basins, calcium hydroxide and hydrogen peroxide are added to bring the pH to between 6 and 7. Two auger screws transport the water to adjustment tanks where sodium hydroxide and more calcium hydroxide is added to raise the pH to between 9 and 10. The water next goes to a clarifier tank where sludge is settled out. The sludge either is sent to the sludge drying lagoons or recirculated back to the mixing basins. The clarified, treated water is next passed through a sand filter for a final filtering prior to being sent to a retention pond The pH is adjusted for a final time to between 7 and 8. Finally, the pH-adjusted treated water is discharged through outfall No. 010 (Ref. 20). Discharge is approximately 150 gal/min at 8 hour intervals, and the effluent contains approximately 2 - 6% solids (Ref. 1, p. 13).

DATE OF START-UP: According to North American Rayon personnel, this plant was placed in service as it now operates in 1973. Prior to this, wastewater was only treated in a settlement basin prior to discharge into the river.

DATE OF CLOSURE: This unit was active during the VSI. Only three (SWMU No. 14) of the four ponds are in service. A fourth, called the holding basin (SWMU No. 13) is in the process of being closed after it was discovered that acidic wastewater (pH <2) was stored in it while the clarifier unit was disabled.

WASTES MANAGED: Process wastewater from the north to south alkaline sewer, the east to west acid sewer and scrubber water from the powerhouse stacks is treated at this unit.

RELEASE CONTROLS: The acid sewer is constructed of acid brick while the alkaline sewer is cast in the concrete foundation of the plant. Outside of the plant, the sewer lines are concrete encased 30-inch conduit (Ref. 1, p. 13).

RELEASE HISTORY: In 1985 and 1986 there were power outages causing plant downtime. The 1985 episode lasted 10 days. Acidic water was stored in the holding basin located in between the three sludge drying ponds. The holding basin (SWMU No. 13) is in the process of closure. In 1976, sulfuric acid was released (SWMU No. 19), bypassing the treatment plant and was discharged directly into the river (Ref. 1, p. 13).

INTERIM RECOMMENDATIONS: Further Action: Low priority oversight of state certification of clean closure of the holding basin is recommended. Also, the capacity of the treatment plant is in question, since a prior acid release was bypassed into the river.

PHOTOGRAPH NO. 15A, 15B

SWMU NUMBER: 16

SWMU NAME: Bar Grit Dumpster

SWMU DESCRIPTION: This approximately 20 cubic yard dumpster receives bar grit from wastewater treatment plant screens, cardboard and paper waste. During the VSI, the unit was about one-quarter full. The dumpster had an open top and the front door was open (Ref. 1, p. 13).

DATE OF START-UP: According to North American Rayon personnel, this unit is believed to have been placed in service in 1973.

DATE OF CLOSURE: This unit was active during the VSI.

WASTES MANAGED: The unit receives bar grit from influent wastewater and the lime slacker. The grit consists of cellulose fibers and lime. Also seen during the VSI, was cardboard and miscellaneous paper (Ref. 1, p. 13).

RELEASE CONTROLS: There are no release controls. However, any releases of material would not appear to migrate far away.

RELEASE HISTORY: Although there is no evidence of past or present releases, during a heavy rainstorm, contents may escape through the open door (Ref. 1, p. 13).

INTERIM RECOMMENDATIONS: No Further Action - It is recommended, however, that the door be kept closed.

PHOTOGRAPH NO. 16

SWMU NUMBER: 17

SWMU NAME: Carbon Disulfide Storage Pond

SWMU DESCRIPTION: Concrete holding basin, 125 feet x 40 feet with ten tanks submerged in about 10 feet of water; there is no circulation of the water. Each steel tank holds 16,000 gallons of water and carbon disulfide (specific gravity 1.26). Transfer of the carbon disulfide is by water displacement, water is pumped in to remove product. This system is used due to the low flash point, 100°C, of carbon disulfide.

DATE OF START-UP: According to North American Rayon personnel, this unit is believed to have been placed in service in 1952 (Ref. 1, p. 13).

DATE OF CLOSURE: Seven tanks were active during the VSI. Three tanks were empty but not closed during the VSI.

WASTES MANAGED: This unit contains clean carbon disulfide. Carbon disulfide is recovered and reused with a loss of 4.5 million pounds/year via air emission.

RELEASE CONTROLS: The tanks are in a concrete holding basin with overflow going to the wastewater treatment plant (Ref. 1, p. 13).

RELEASE HISTORY: According to North American Rayon personnel, there have been no releases or spillage from this unit (Ref. 1, p. 13).

INTERIM RECOMMENDATIONS: No Further Action.

PHOTOGRAPH NO. 17

SWMU NUMBER: 18

SWMU NAME: Sodium Hydroxide Storage Tanks

SWMU DESCRIPTION: Two stationary tanks for the storage of 180,000 gallons of 50% sodium hydroxide used in viscose rayon production. The sodium hydroxide is diluted to concentrations varying from 13.7 to 22% and stored in tanks inside the plant (SWMU No. 22) (Ref. 1, p. 13).

DATE OF START-UP: According to North American Rayon personnel, this unit is believed to have been placed in service in 1928.

DATE OF CLOSURE: The unit was active during the VSI.

WASTES MANAGED: A 50% sodium hydroxide solution is stored in these tanks.

RELEASE CONTROLS: The tanks are in a concrete building approximately 5 feet below grade. Overflow goes to the wastewater treatment plant.

RELEASE HISTORY: According to North American Rayon Personnel, there have been no releases from this unit. NUS personnel noticed a leaking water seal during the VSI (Ref. 1, p. 13).

INTERIM RECOMMENDATIONS: No Further Action - However, the leak should be repaired.

PHOTOGRAPH NO. 18

SWMU NUMBER: 19

SWMU NAME: Storage Tank Farm

SWMU DESCRIPTION: Storage tank farm located in the northwestern portion of the facility. The farm consists of approximately ten 20,000-gallon steel tanks. Six of the tanks store 95 percent sulfuric acid, two tanks store 40 percent ammonium sulfide and the other two tanks store dimethyl amine. In the northeast corner of the tank farm is a pump house (Ref. 1, p. 13).

DATE OF START-UP: According to North American Rayon personnel, this unit is believed to have been placed in service in August of 1928.

DATE OF CLOSURE: The unit was active during the VSI (Ref. 1, p. 13).

WASTES MANAGED: Raw product is stored in the tanks prior to use in processing.

RELEASE CONTROLS: The tanks are constructed on a concrete deck surrounded by a 6 inch by 8 inch high retention wall. In the event of tank rupture, the release would flow via a trench to the acid building. A sump in the acid building has a capacity of 25,000 gallons, and is directed to the wastewater treatment plant. During the VSI, the integrity of the concrete deck appeared to be very poor. Releases to subgrade appear likely (Ref. 1, p. 13).

RELEASE HISTORY: In 1975, 20,000 gallons of sulfuric acid was released. The release bypassed the wastewater treatment plant via a release valve and was discharged directly into the Watauga River. The pH of the river was impacted (Ref. 1, p. 13).

INTERIM RECOMMENDATIONS: Further Assessment - Medium Priority. A past release impacted the river, it appears that a similar release could not be stored and handled by the wastewater treatment plant. The integrity of the decking appears poor, and release to groundwater appears likely.

PHOTOGRAPH NO. 19A, 19B

AOC NUMBER: 20

AOC NAME: Asbestos Insulated Steam Line System

AOC DESCRIPTION: Exposed, friable asbestos insulation was seen in several locations during the VSI. Most of the elbow joints on the steam lines seen in the sulfuric acid storage tank farm area were exposed and peeling.. Friable asbestos releases miniscule fibers that, at very low concentrations, are suspected of being carcinogenic. Loose insulation was seen in many other locations within the plant including the basement area, production areas, stairwells and rest rooms (Ref. 1, p. 13).

DATE OF START-UP: According to North American Rayon personnel, the steam lines were placed in service in August of 1928.

DATE OF CLOSURE: The steam lines were active during the VSI.

WASTES MANAGED: The friable asbestos is of concern.

RELEASE CONTROLS: In the powerhouse, the steam lines have recently been encapsulated; however, the remainder of the lines with loose insulation have not been remediated.

RELEASE HISTORY: It appears that the friability of insulation has been occurring for some time since it was first applied over 60 years ago (Ref. 1, p. 13).

INTERIM RECOMMENDATIONS: Further Action - High-priority investigation needed to determine if, and in what concentrations, asbestos appears in exposed and friable steam line insulation. If present, all areas of exposure should be encapsulated.

PHOTOGRAPH NO. 20A and 20B

SWMU NUMBER: 21

SWMU NAME: Roll on/Roll off Dumpster

SWMU DESCRIPTION: The roll on/off dumpster holds approximately 40 cubic yards of miscellaneous waste. Waste Management picks up the dumpster daily and deposits the contents in the Carter County Landfill.

DATE OF START-UP: According to North American Rayon personnel, this unit is believed to have been placed in service in 1928; however, date of use for this specific container is unknown (Ref. 1, p. 13).

DATE OF CLOSURE: This unit was active during the VSI.

WASTES MANAGED: Rayon, plastic, rubber and miscellaneous trash are deposited in this dumpster.

RELEASE CONTROLS: There are no release controls at this unit. This unit has an open tap and is exposed to rain and open dumping.

RELEASE HISTORY: There is no known record of a release from this unit (Ref. 1, p. 13).

INTERIM RECOMMENDATIONS: No Further Action

PHOTOGRAPH NO. 21

SWMU NUMBER: 22

SWMU NAME: Sodium Hydroxide Storage Tanks

SWMU DESCRIPTION: Sixty-two 20,000-gallon vertical storage tanks constructed of riveted steel. The tanks are located inside the plant and receive 13.7% - 22% sodium hydroxide from railroad tank cars and storage tanks located in the caustic storage building west of the plant. According to North American Rayon personnel, not all the tanks are full. Annually, approximately 1.6 million pounds of sodium hydroxide is stored at this unit (Ref. 1, p. 13).

DATE OF START-UP: According to North American Rayon personnel, this unit is believed to have been placed in service in August 1928.

DATE OF CLOSURE: The unit was active during the VSI.

WASTES MANAGED: Raw sodium hydroxide is used to treat pulp in order to produce alkali cellulose and cellulose xanthate viscous.

RELEASE CONTROLS: The tanks are supported and any spills flow to the alkaline sewer trench which in turn is pumped to the wastewater treatment plant.

RELEASE HISTORY: During the VSI, a pipe flange was seen leaking. There were many areas of crystallized sodium hydroxide seen as well, on the floor, other pipes and even on the tanks (Ref. 1, p. 13).

INTERIM RECOMMENDATIONS: Further Action: Low Priority - Housekeeping practices must be improved. It appears that a tank rupture would inundate the sewer trench and cause flooding of caustic solution. Also, crystallized sodium hydroxide seen may cause burns if inadvertently touched by an employee.

PHOTOGRAPH NO. 22

SWMU NUMBER: 23

SWMU NAME: Dumpster

SWMU DESCRIPTION: The roll on/off dumpster holds approximately 40 cubic yards of miscellaneous trash. Waste management picks up the dumpster and deposits the contents in the Carter County Landfill.

DATE OF START-UP: According to North American Rayon personnel, this unit is believed to have been placed in service in 1928 (Ref. 1, p. 13).

DATE OF CLOSURE: This unit was active during the VSI.

WASTES MANAGED: The alkali cellulose hopper (SWMU 1) is disposed of in this dumpster along with cellulose xanthate skins, rayon, fluorescent light bulbs, wood, paper and other miscellaneous trash (Ref. 1, p. 13).

RELEASE CONTROLS: There are no release controls at this unit; the container is open.

RELEASE HISTORY: There is no known record of a release from this unit (Ref. 1, p. 13).

INTERIM RECOMMENDATIONS: No Further Action

PHOTOGRAPH NO. 23

SWMU NUMBER: 24

SWMU NAME: Fly Ash Silo

SWMU DESCRIPTION: This unit is used to store fly ash that is a product of the firing of coal in boiler furnaces that produce electricity and steam. The powerhouse is located in the northern portion of the facility. The fly ash is collected in a hopper and then conveyed to the silo by means of a steam vacuum system. The ash is then loaded into trucks that haul and dispose of the fly ash at the Carter County Landfill Water is used to hold down dust in the silo (Ref. 21, p. 1).

DATE OF START-UP: According to North American Rayon personnel, fuel oil, coal and natural gas was used to fire the furnaces until the mid-1960s. The facility then switched totally to coal, with oil as a back-up. The silo was placed in service in 1956 (Ref. 1, p. 13).

DATE OF CLOSURE: The unit was active during the VSI.

WASTES MANAGED: Analysis of the fly ash showed the following constituents: 42% silicon dioxide, 2.7% calcium oxide, 1.3% magnesium oxide, 46% iron and aluminum oxides, 0.2% potassium oxide, 0.45% sulfur trioxide and 0.09% sodium oxide. The pH ranged between 4.2 and 10.7. According to Tennessee Rule 1200-1-11-0.02(4), this waste was designated as non-hazardous (Ref. 21, p. 2).

RELEASE CONTROLS: There were no release controls for this unit.

RELEASE HISTORY: During the VSI, releases of fly ash and sediment-filled water runoff were seen surrounding the silo. Runoff was also seen entering a storm drain drop inlet, which flows directly to the river (Ref. 1, p. 13).

INTERIM RECOMMENDATIONS: Further Action: Low Priority - Although designated as non-hazardous, fly ash was seen entering the storm drainage system. Housekeeping practices should be improved to keep fly ash off the ground surrounding the silo, and rinsewater from easily flowing to the drop inlet.

PHOTOGRAPH NO. 24

SWMU NUMBER: 25

SWMU NAME: Fuel Oil Storage Tanks

SWMU DESCRIPTION: Four steel tanks each with a capacity of 2,750 gallons. Oil used to start up boilers or as a substitute for pulverized coal.

DATE OF START-UP: According to North American Rayon personnel, this unit is believed to have been placed in service in 1952 (Ref. 1, p. 13).

DATE OF CLOSURE: This unit was active during the VSI.

WASTES MANAGED: Fuel oil to fire boilers is stored at this unit.

RELEASE CONTROLS: This unit has concrete diking with a sprinkling system for temperature control. There is a valve located at a storm sewer inlet; the valve is normally closed (Ref. 1, p. 13).

RELEASE HISTORY: There is no known record of a release from this unit.

INTERIM RECOMMENDATIONS: Further Assessment - Low Priority - The release valve should be directed to the sewer system instead of the storm drainage system which flows directly to the river.

PHOTOGRAPH NO. 25

AOC NUMBER: 26

AOC NAME: Carbon Disulfide Recovery Column

AOC DESCRIPTION: Carbon disulfide-laden air from the pressure vacuum wash is vacuum pumped to the unit. The air is run through absorbtion columns in which oil is used to absorb the carbon disulfide. The oil is then distilled to remove the carbon disulfide. The carbon disulfide is sent back to the carbon disulfide storage unit. The system's oil capacity is 350 gallons.

DATE OF START-UP: According to North American Rayon personnel, this area is believed to have been placed in service in 1939 (Ref. 1, p. 13).

DATE OF CLOSURE: This unit was active during the VSI.

WASTES MANAGED: Carbon disulfide and oil

RELEASE CONTROLS: There are no release controls at this unit. If a vacuum line is perforated, oil may blow through the top of the column.

RELEASE HISTORY: During the VSI a 15 feet x 8 feet oily release was seen on the ground downgradient of the unit, about 100 feet from the river. The column was repaired in April 1989. This maintenance is reportedly responsible for this release; however, oil was seen on the ground prior to this according to North American Rayon personnel (Ref. 1, p. 13).

INTERIM RECOMMENDATIONS: Further Assessment - Low Priority - The oil release needs to be cleaned to ensure that during rainfall, it does not migrate to the river.

PHOTOGRAPH NO. 26A and 26B

SWMU NUMBER: 27

SWMU NAME: Wastewater Lift Station

SWMU DESCRIPTION: The 15 feet x 15 feet x 25 feet deep rectangular open-top concrete tank receives wastewater from the alkaline sewer and pumps it to the wastewater treatment plant. The tank has a capacity of 10,000 gallons.

DATE OF START-UP: According to North American Rayon personnel, this unit is believed to have been placed in service in 1955 (Ref. 1, p. 13).

DATE OF CLOSURE: This unit was active during the VSI.

WASTES MANAGED: The unit receives wastewater from the alkaline sewer. The major constituent in the alkaline sewer is waste sodium hydroxide.

RELEASE CONTROLS: The tank is constructed of concrete and has an overflow that mixes with storm sewer outfall No. 004 for cooling water. The overflow is to be sealed based on an order issued by the state after a recent compliance inspection (Ref. 1, p. 13).

RELEASE HISTORY: In March of 1987, approximately 6000 gallons of wastewater were released through the overflow during a pump backwash (Ref. 1, p. 13).

INTERIM RECOMMENDATIONS: Further Assessment: low priority ensurance that the overflow does indeed get sealed.

PHOTOGRAPH NO. 27A and 27B

SWMU NUMBER: 28

SWMU NAME: Sulfuric Acid Tanks

SWMU DESCRIPTION: The five 20,000-gallon steel riveted tanks are housed in the acid building located in the eastern portion of the facility. The sulfuric acid is used in the regeneration of the spin bath (Ref. 1, p. 13).

DATE OF START-UP: According to North American Rayon personnel, this unit is believed to have been placed in service in August of 1928.

DATE OF CLOSURE: The unit was active during the VSI.

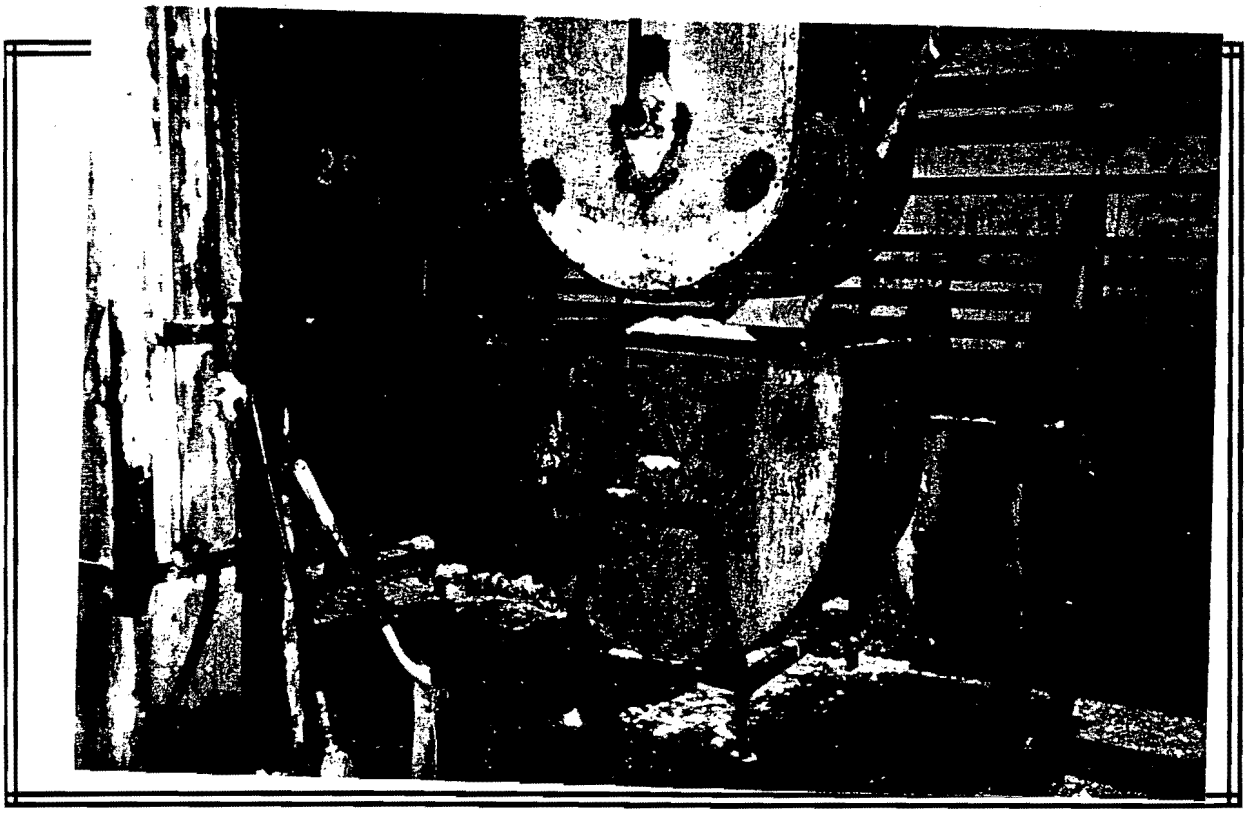
WASTES MANAGED: The tanks are used to store raw 95 - 98% sulfuric acid.

RELEASE CONTROLS: The tanks are supported on steel structures which are set on a floor constructed of acid brick. Any releases are contained in a zinc sump located adjacent to the acid building.

RELEASE HISTORY: According to North American Rayon personnel, there have been no releases from this unit. However, during the VSI, crystallized sulfuric acid was seen on fittings, sides of tanks and on the floor. Also, the acid building was very dirty and the tanks had many areas of peeling paint (Ref. 1, p. 13).

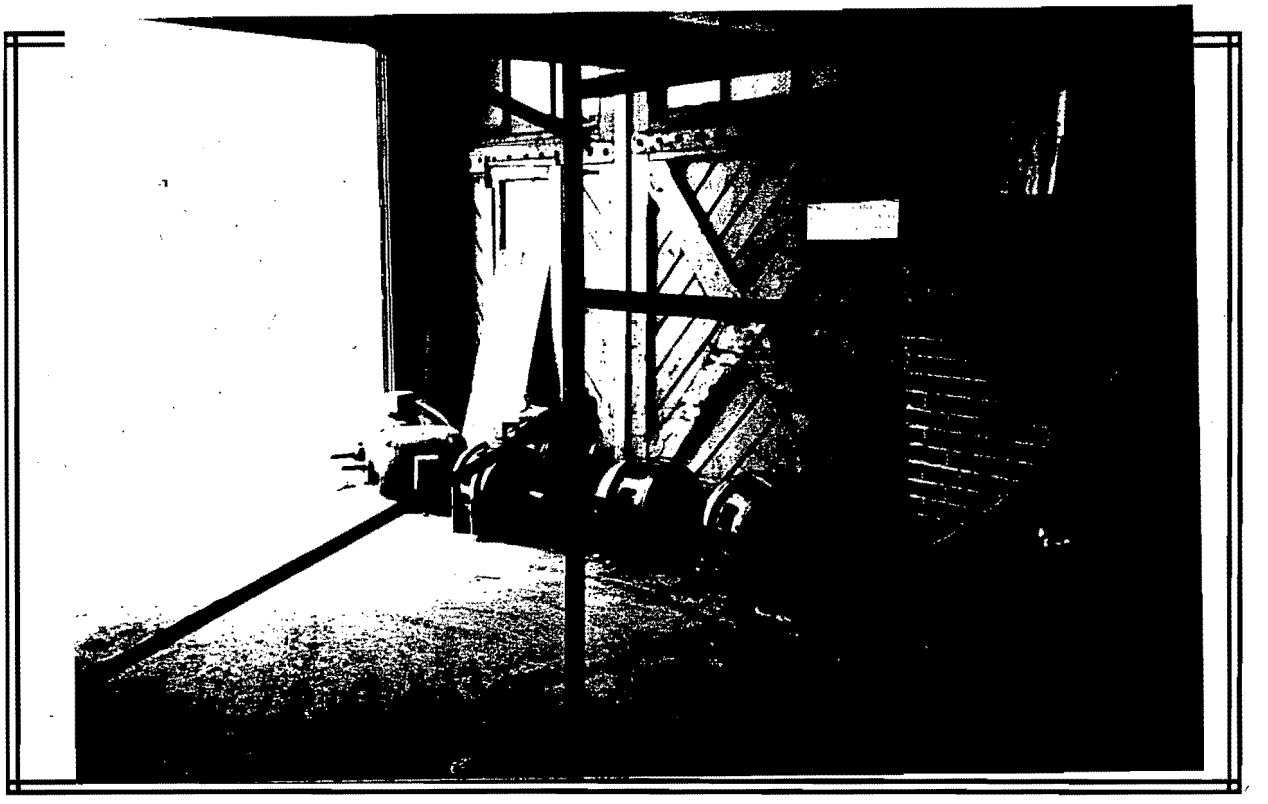
INTERIM RECOMMENDATIONS: No Further Action - However, housekeeping should be improved.

PHOTOGRAPH NO. 28



PHOTOGRAPH No.1 (SWMU No. 1) Steel tubs used to store alkyl cellulose.

PHOTOGRAPH No.2 (SWMU No. 2) Roll on/Roll off dumpster that receives waste paper and scrap metal.

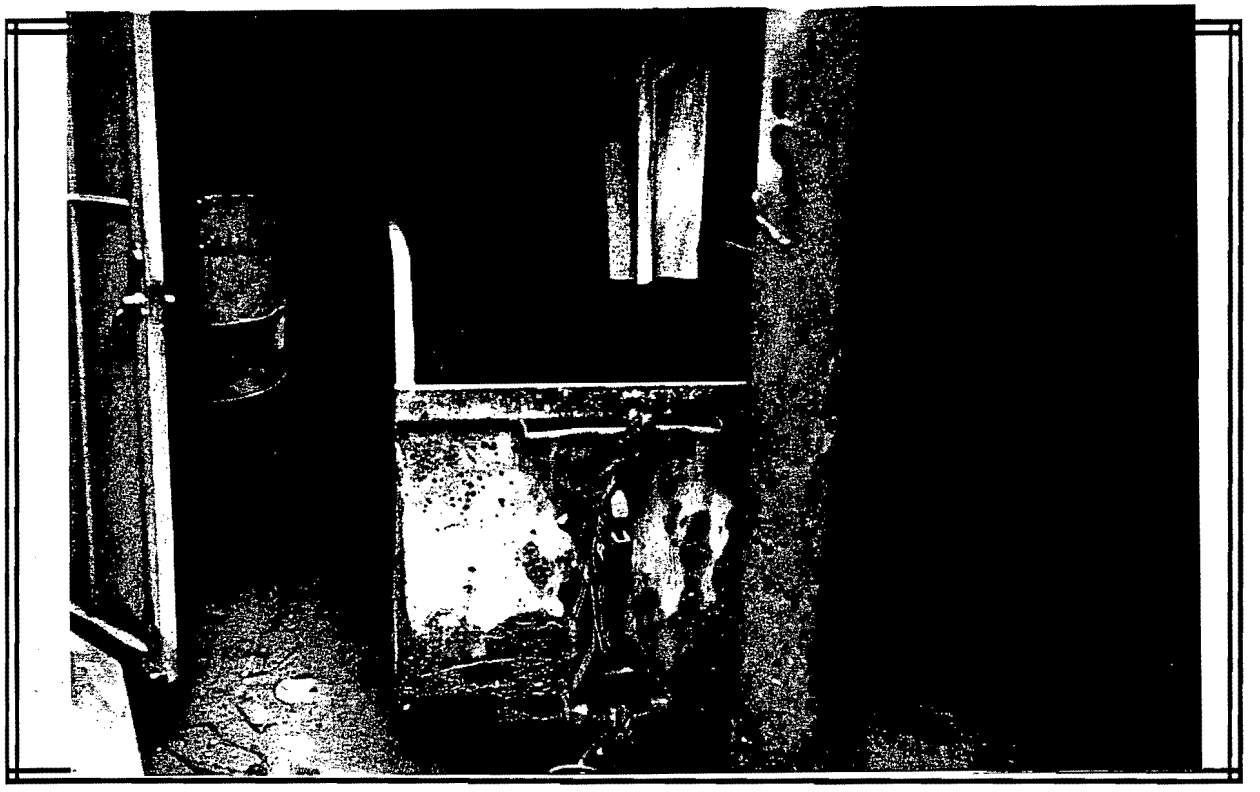


PHOTOGRAPH No.3 (AOC No. 3) The area inside the doorway to the raw material storage area. Note the motors that are stored in addition to storage tanks of oil.

PHOTOGRAPH No.4A (AOC No. 4) Area of sodium hydroxide transport conduit that failed releasing sodium hydroxide.

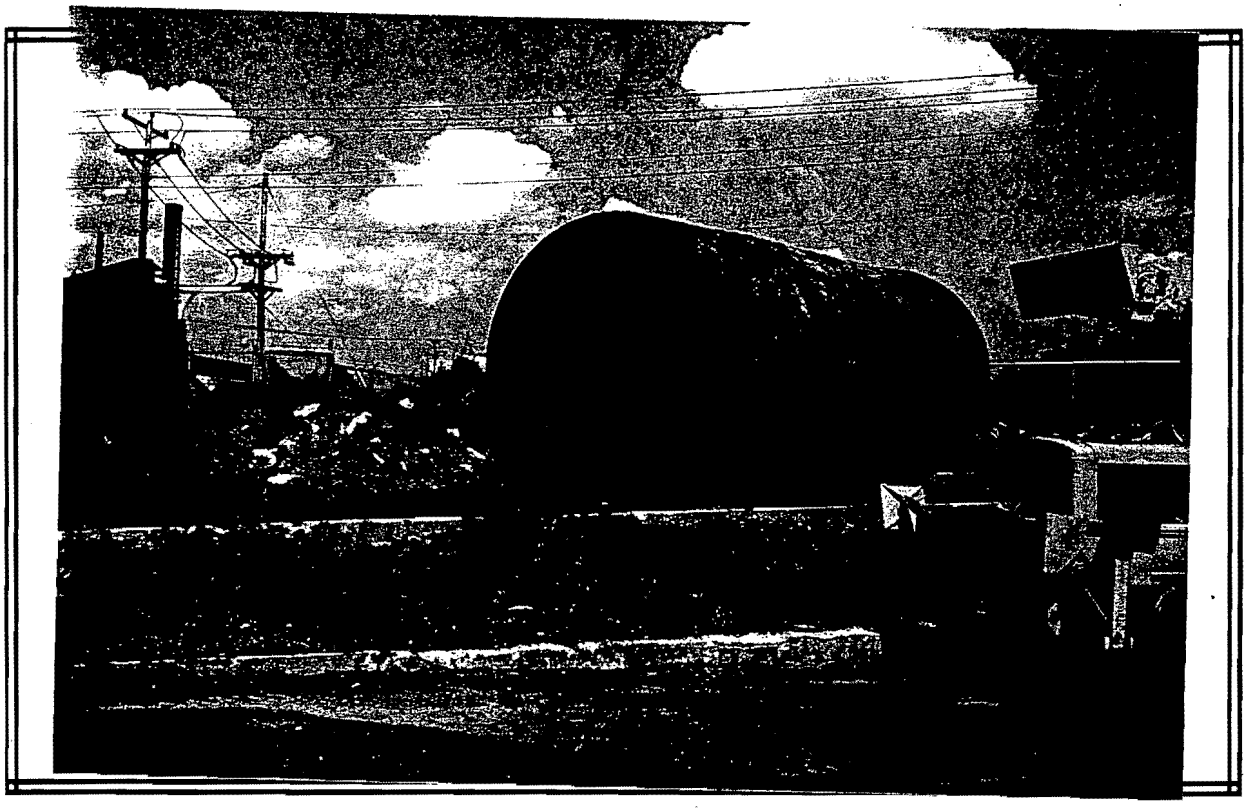
PHOTOGRAPH No.4B (AOC No. 4) Sodium hydroxide spill on the floor of the basement.

PHOTOGRAPH No.5 (SWMU No. 5) Roll on/Roll off dumpster used to dispose of general-type trash.

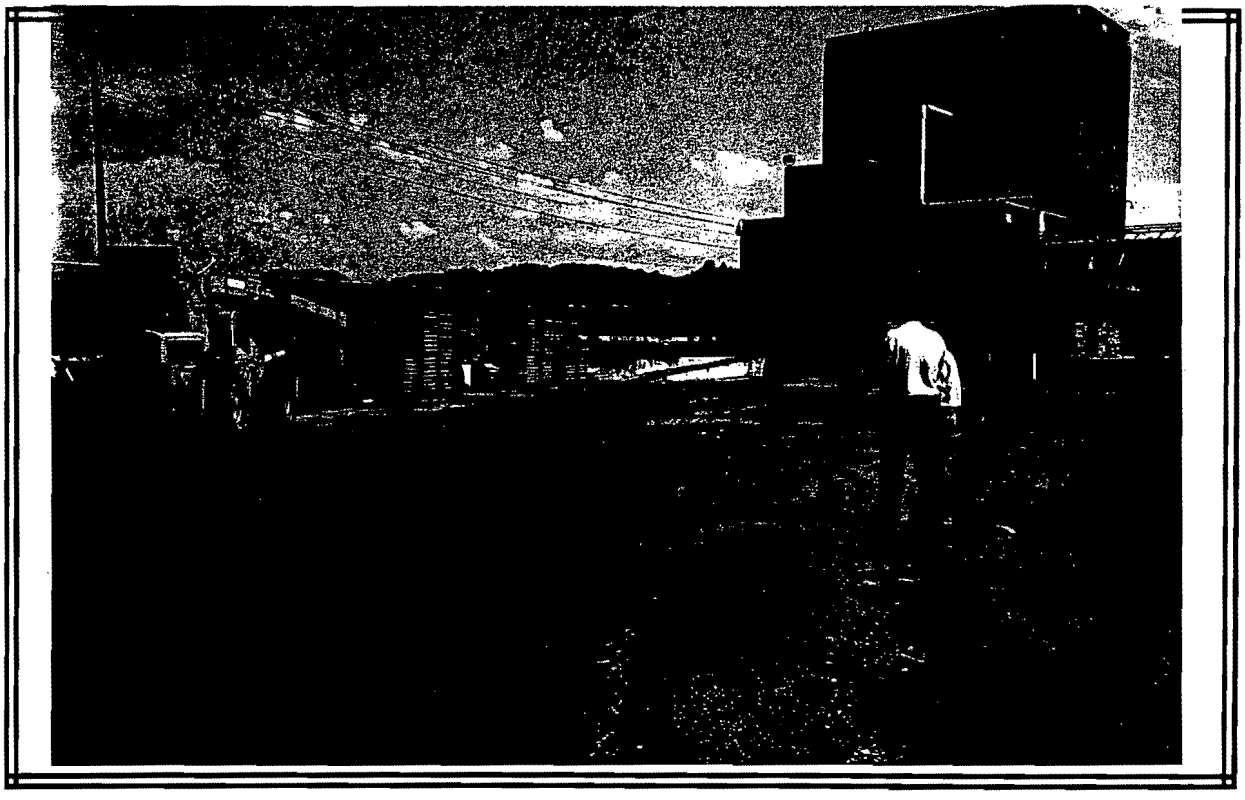


PHOTOGRAPH No.6 (SWMU No. 6) Bin used to store bag house dust at the sand blast unit.

PHOTOGRAPH No.8 (SWMU No. 8) Drum storage area with shelter and diking surrounding the concrete pad.

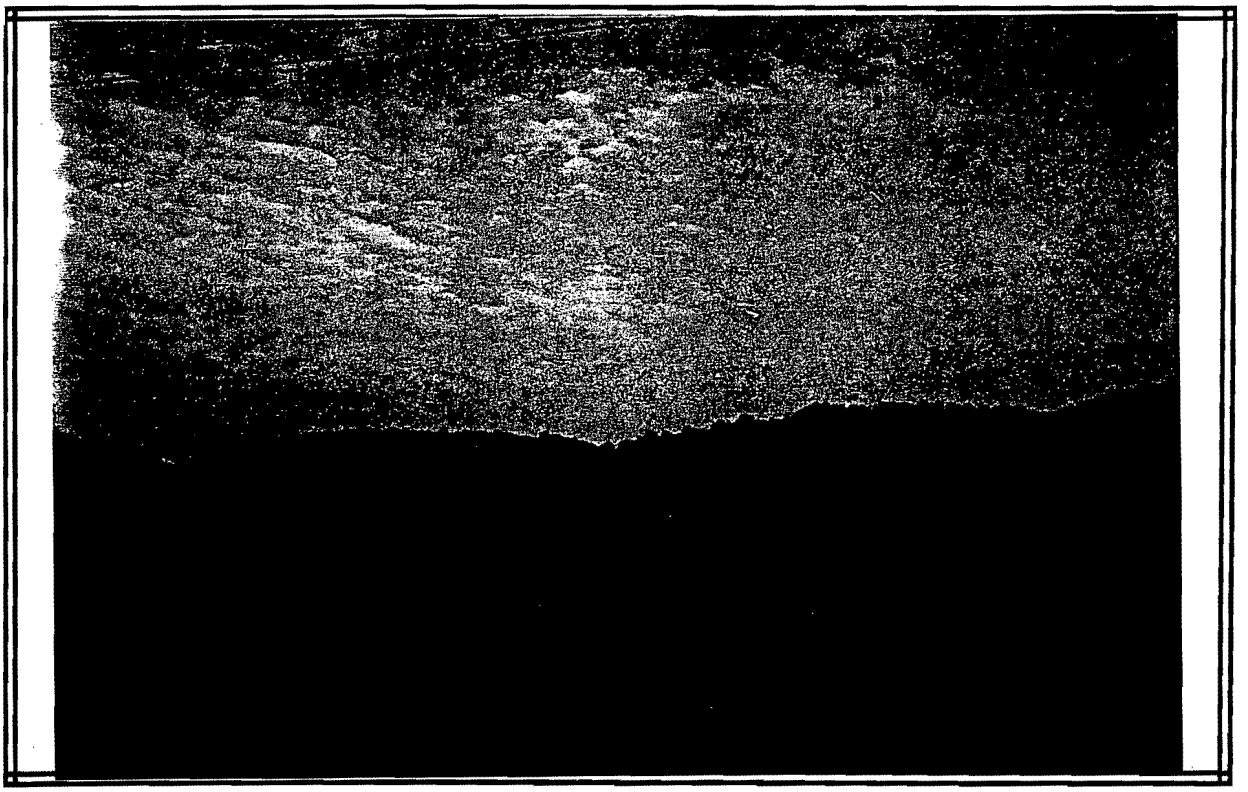


PHOTOGRAPH No.9 (SWMU No. 9) Underground oil storage tank and soil that was excavated and found to be contaminated by a leak in the tank.



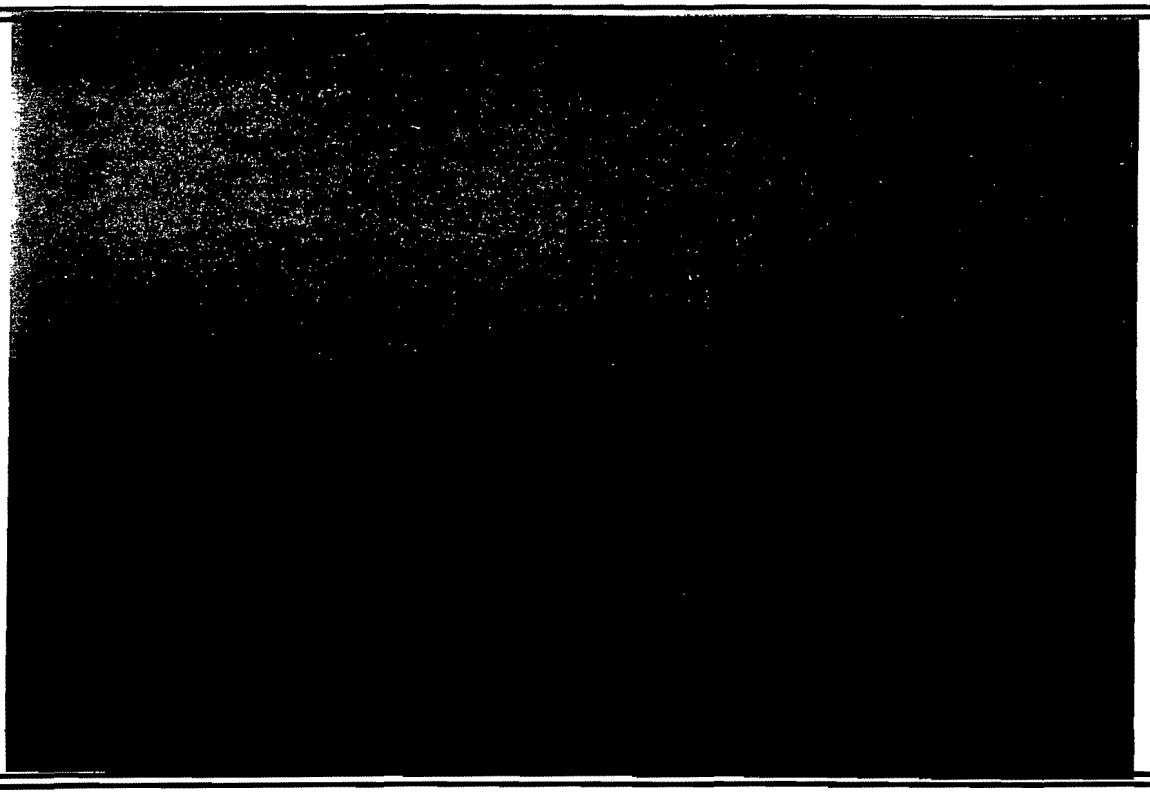
PHOTOGRAPH No.10 (SWMU No. 10) Area where lead debris and dross were stored.

PHOTOGRAPH No. 11 (AOC No. 11) Scrap yard where lumber, steel, iron and aluminum are stockpiled.



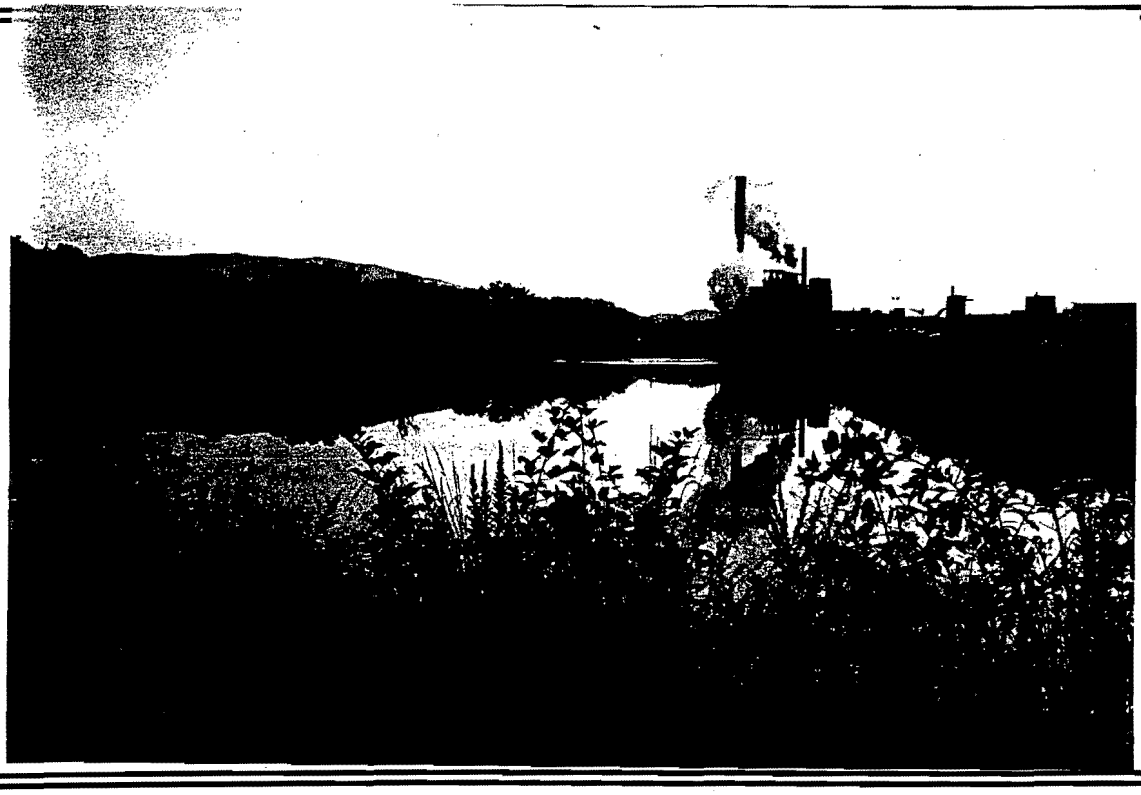
PHOTOGRAPH No. 12A (SWMU No. 12) Southwestern portion of panoramic view of landfill that was closed and is pending approval by the state.

PHOTOGRAPH No. 12B (SWMU No. 12) Western portion of panoramic view of landfill that was closed and is pending approval by the state.

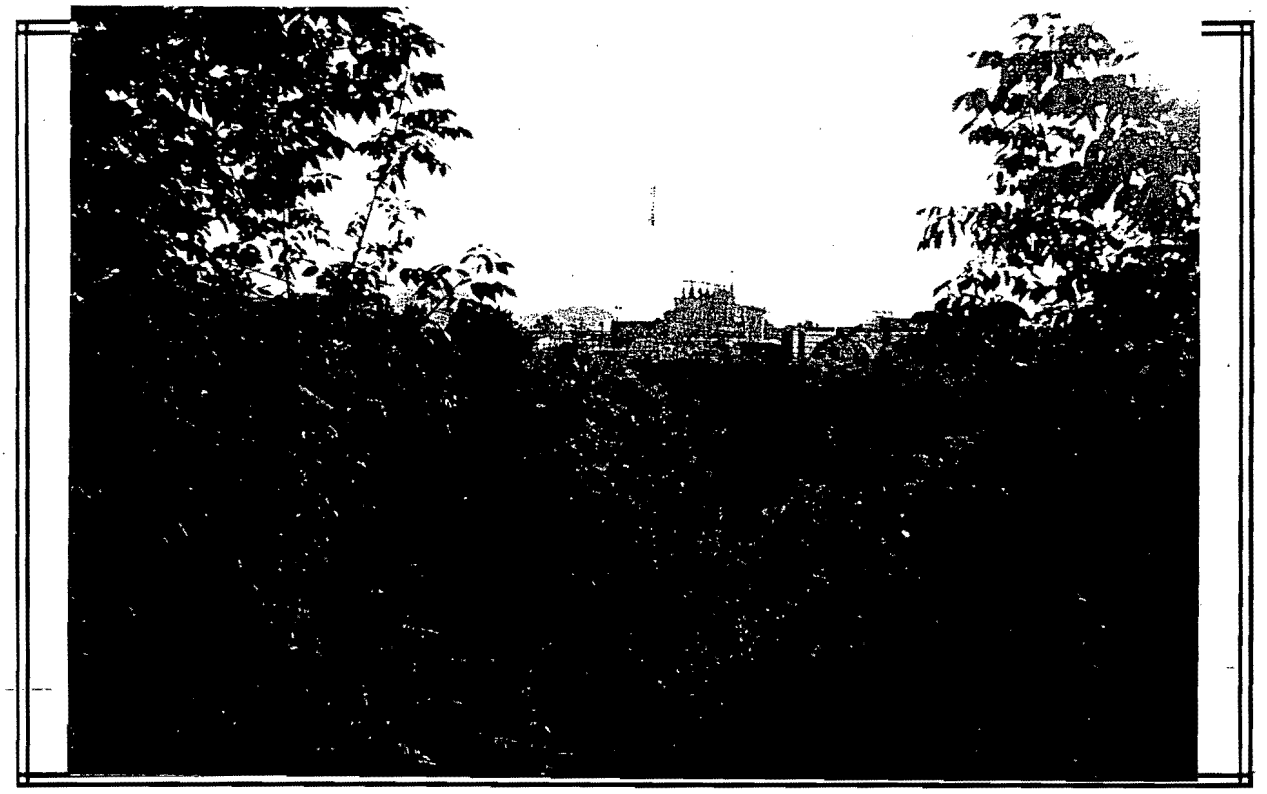


PHOTOGRAPH No. 12C (SWMU No. 12) Northwestern portion of panoramic view of landfill that was closed and is pending approval by the state.

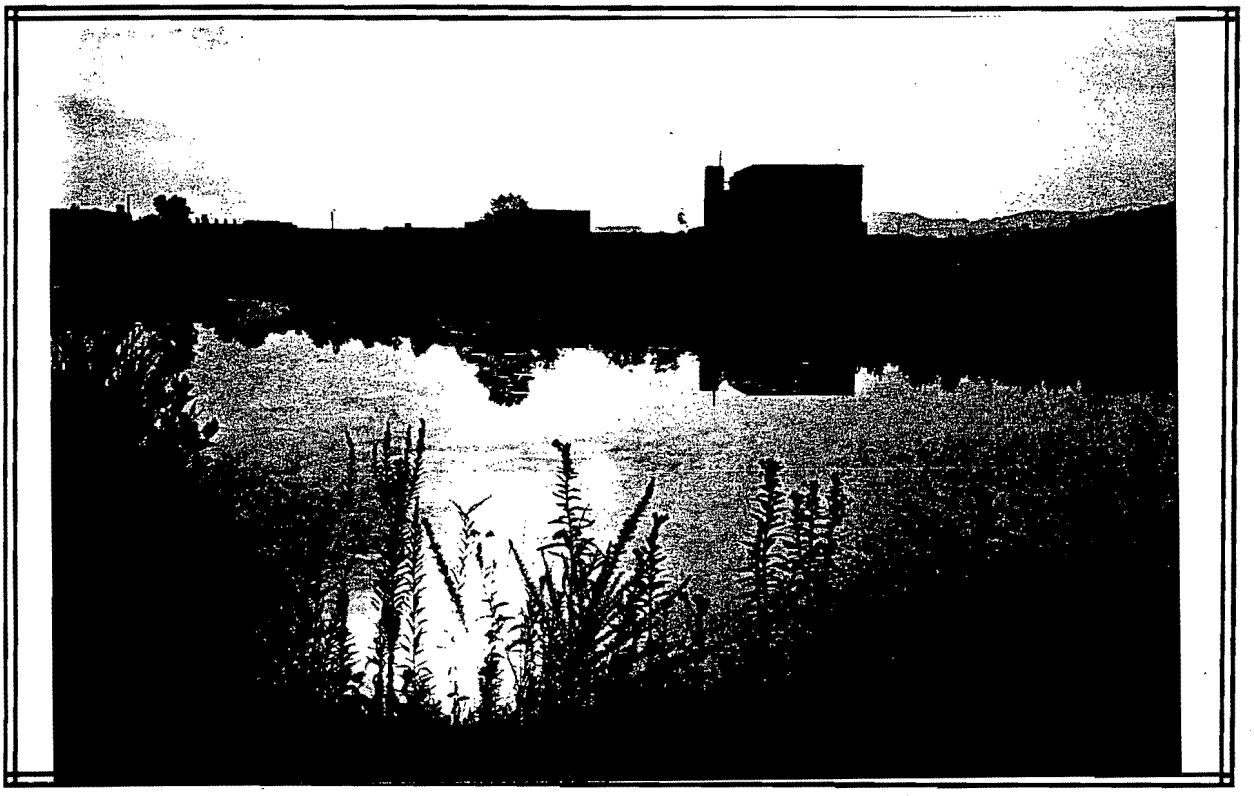
PHOTOGRAPH No.13 (SWMU No. 13) Holding basin that was designated as a RCRA unit after acid was released to the unit.



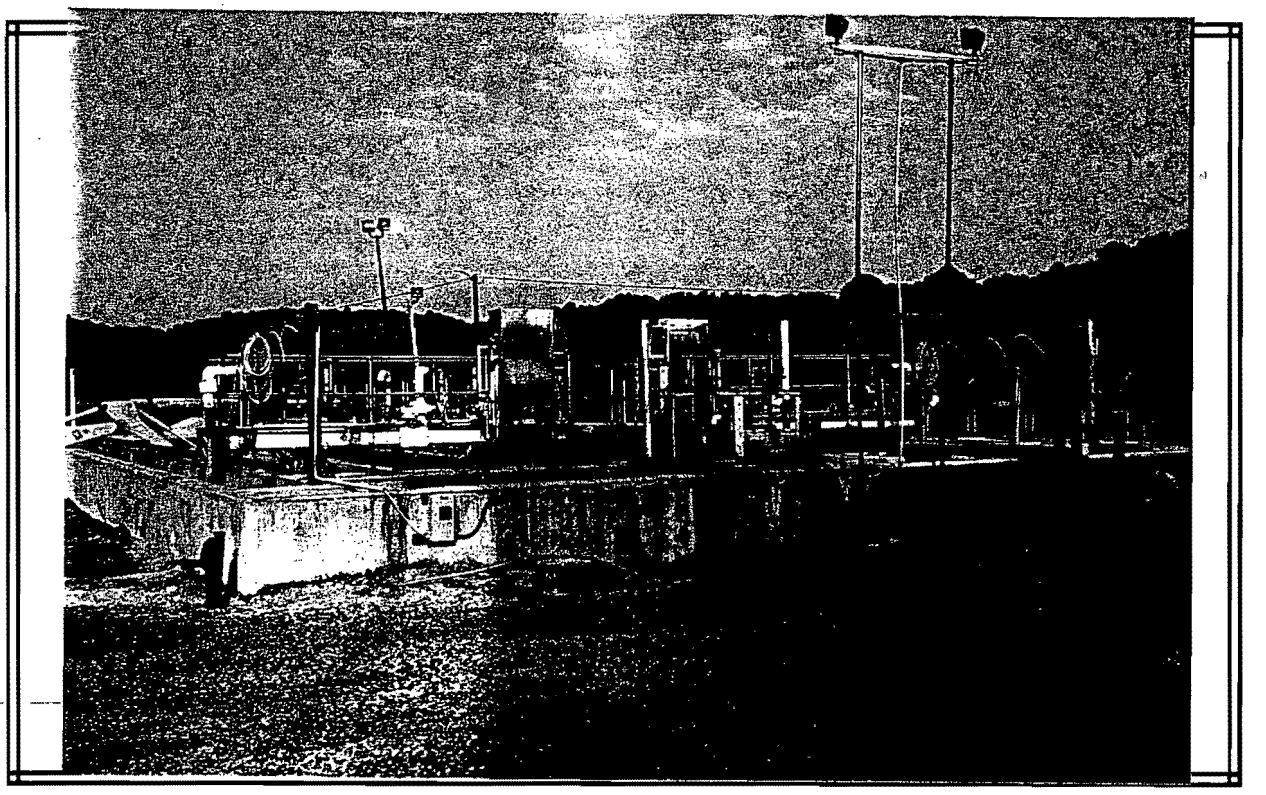
PHOTOGRAPH No.14A (SWMU No. 14) Sludge drying pond 14A that receives sludge from the wastewater treatment plant.



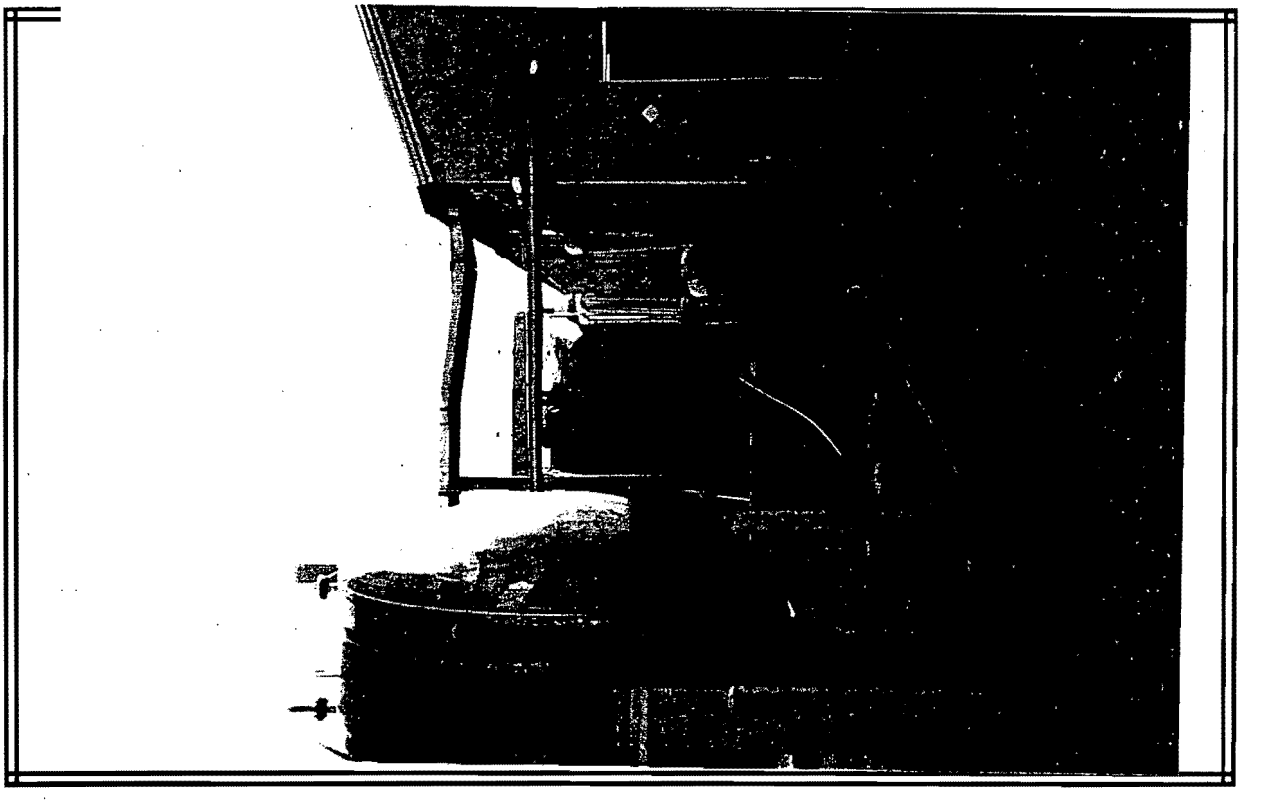
PHOTOGRAPH No.14B (SWMU No. 14) Sludge drying pond 14B that receives sludge from the wastewater treatment plant. Note that it is presently dry.



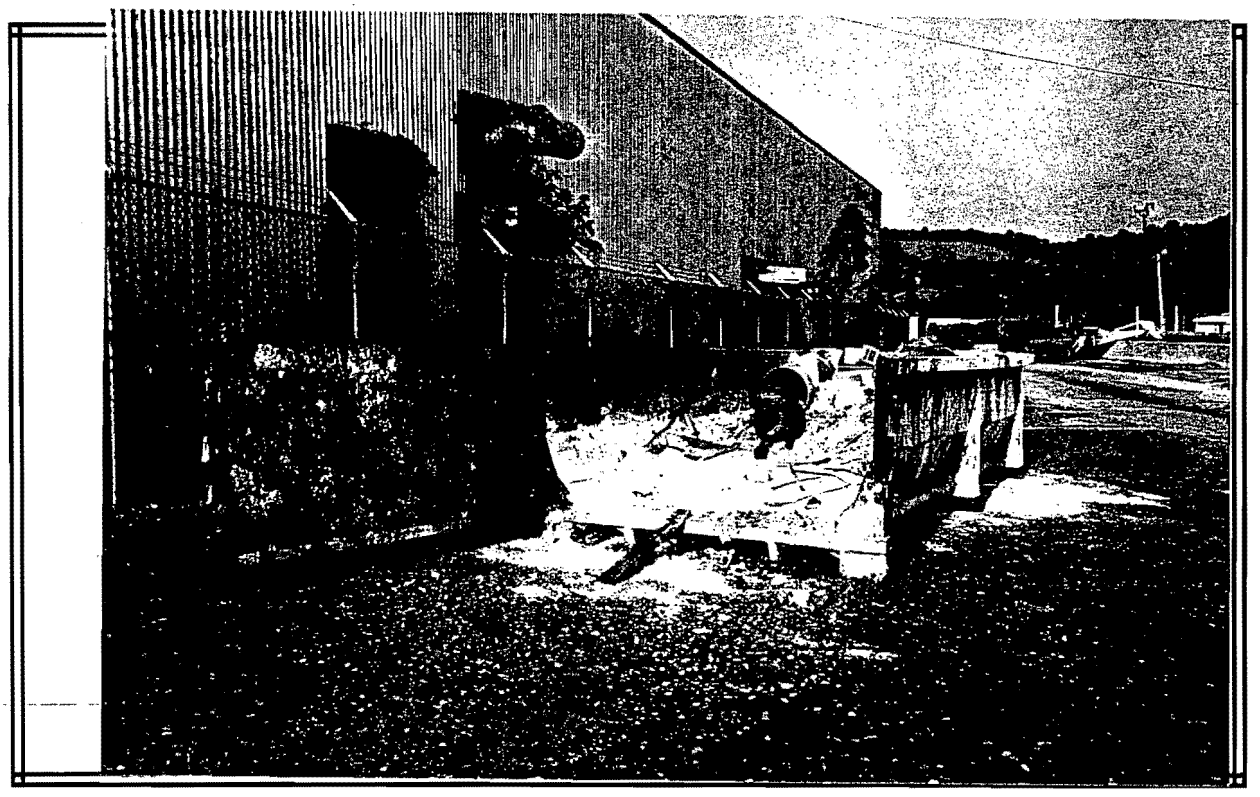
PHOTOGRAPH No.14C (SWMU No. 14) Sludge drying pond 14C that receives sludge from the wastewater treatment plant.



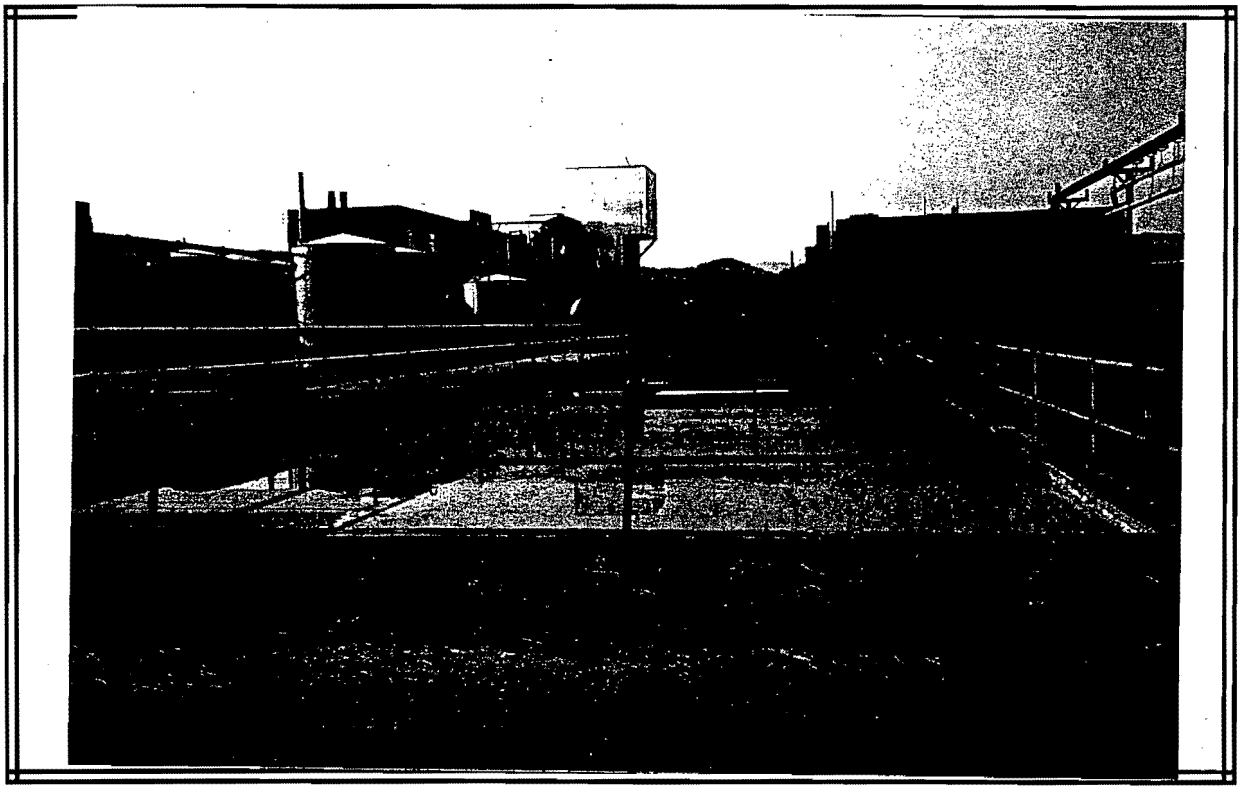
PHOTOGRAPH No.15A (SWMU No. 15) Westernmost portion of wastewater treatment plant.



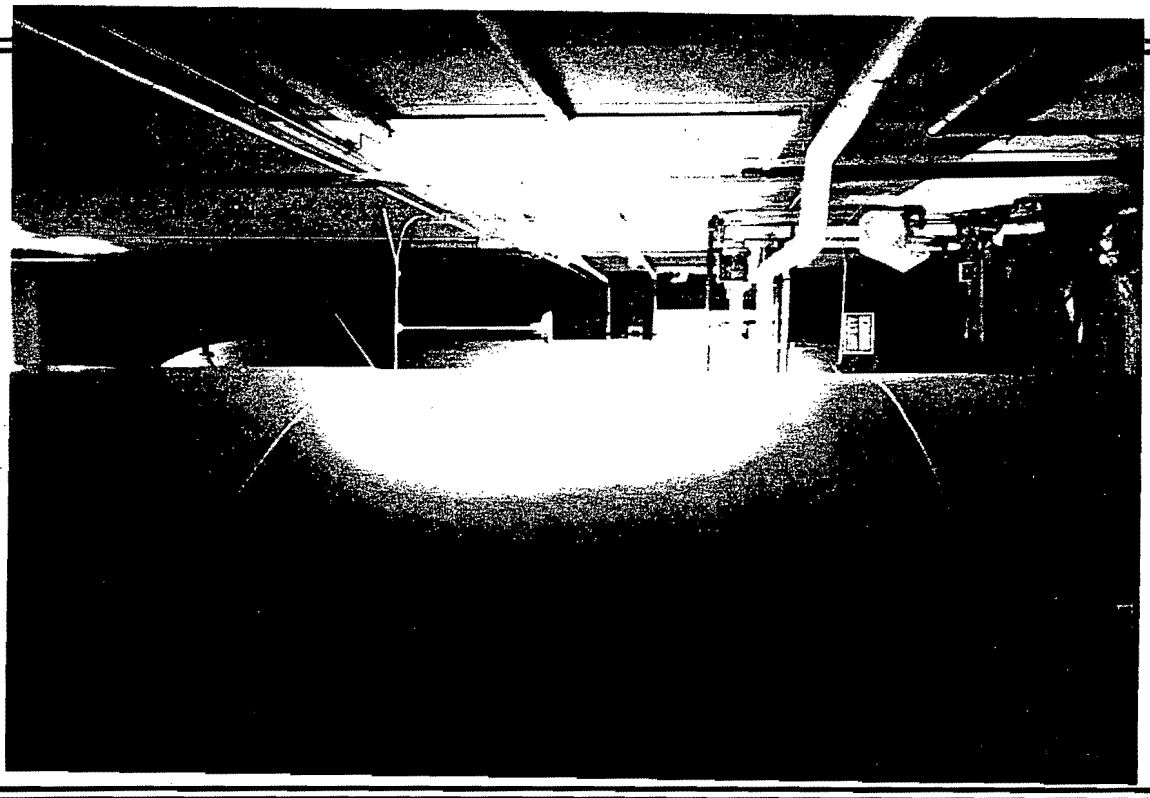
PHOTOGRAPH No.15B (SWMU No. 15) Auger screws used to transport wastewater to where sodium hydroxide and calcium hydroxide are added to raise pH.



PHOTOGRAPH No. 16 (SWMU No. 16) Dumpster that receives bar grit from wastewater treatment screens, cardboard and paper waste.

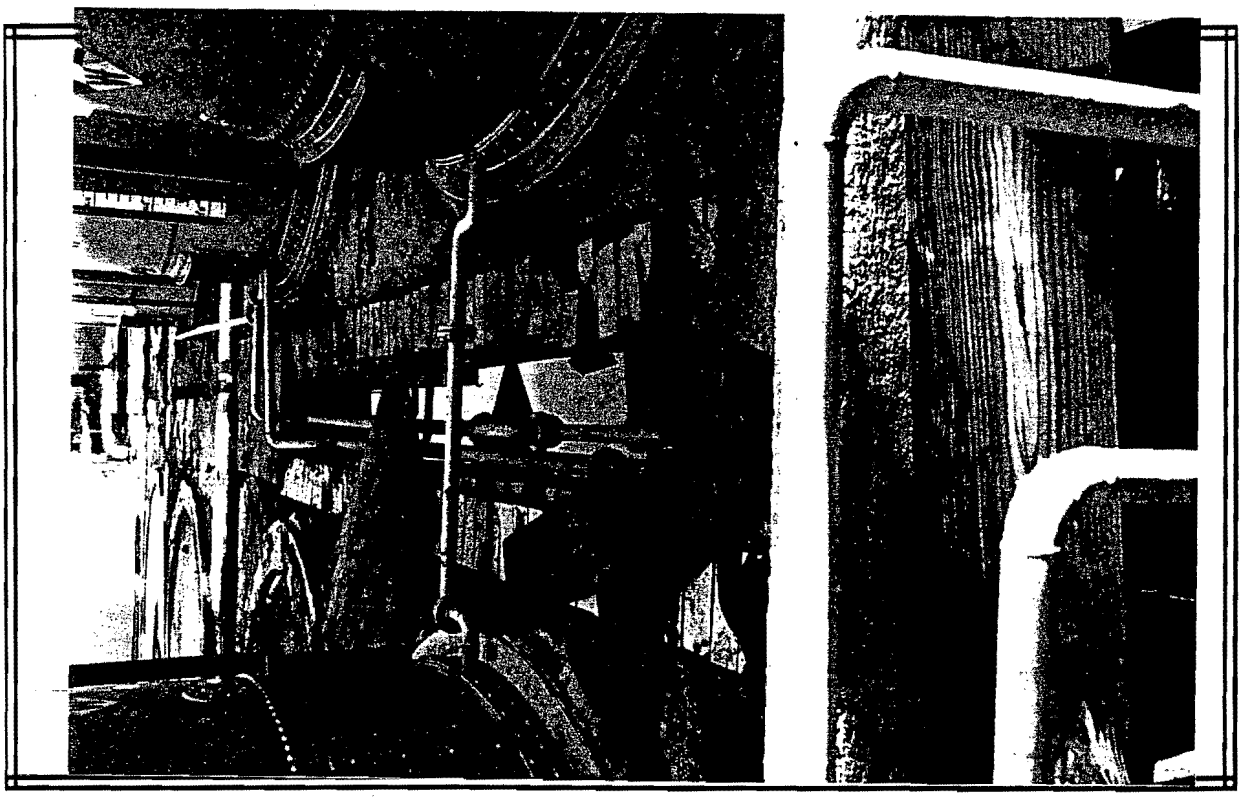


PHOTOGRAPH No. 17 (SWMU No. 17) Carbon disulfide storage ponds where storage tanks are submerged in water.



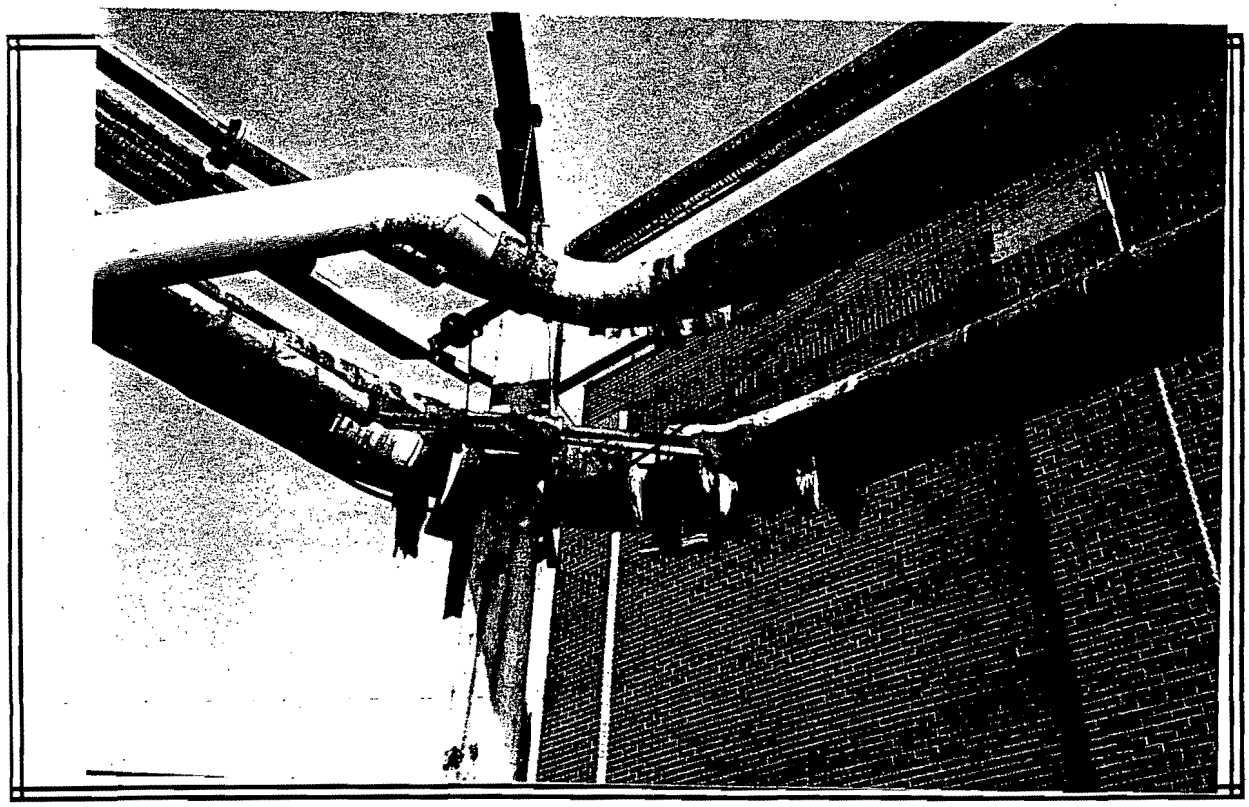
PHOTOGRAPH No. 18 (SWMU No. 18) Huge 90,000 gallon storage tanks for sodium hydroxide inside the caustic building.

PHOTOGRAPH No. 19A (SWMU No. 19) Portion of storage tank farm for sulfuric acid, ammonium sulfide and dimethyl amine.



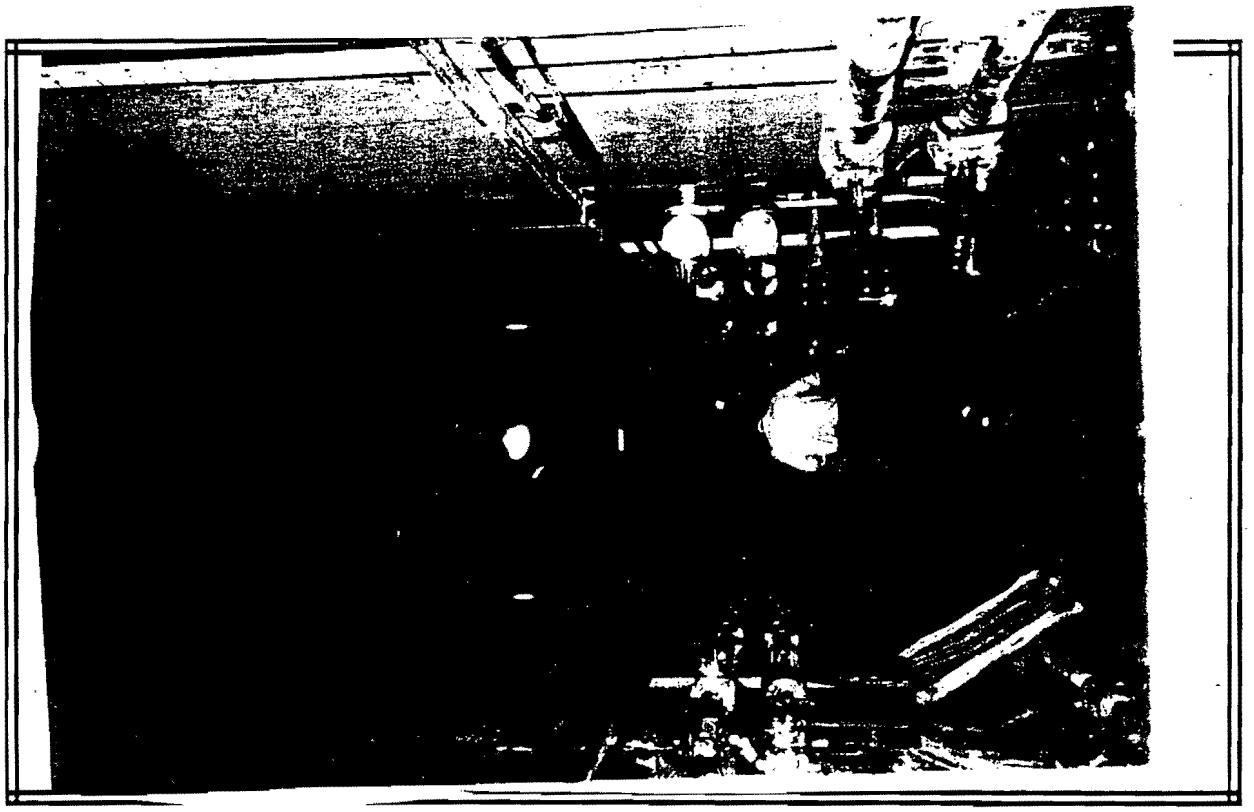
PHOTOGRAPH No.19B (SWMU No. 19) Storage tank farm; note the poor condition of the concrete deck.

PHOTOGRAPH No.20A (AOC No. 20) Steam line with friable asbestos insulation, located in the basement.

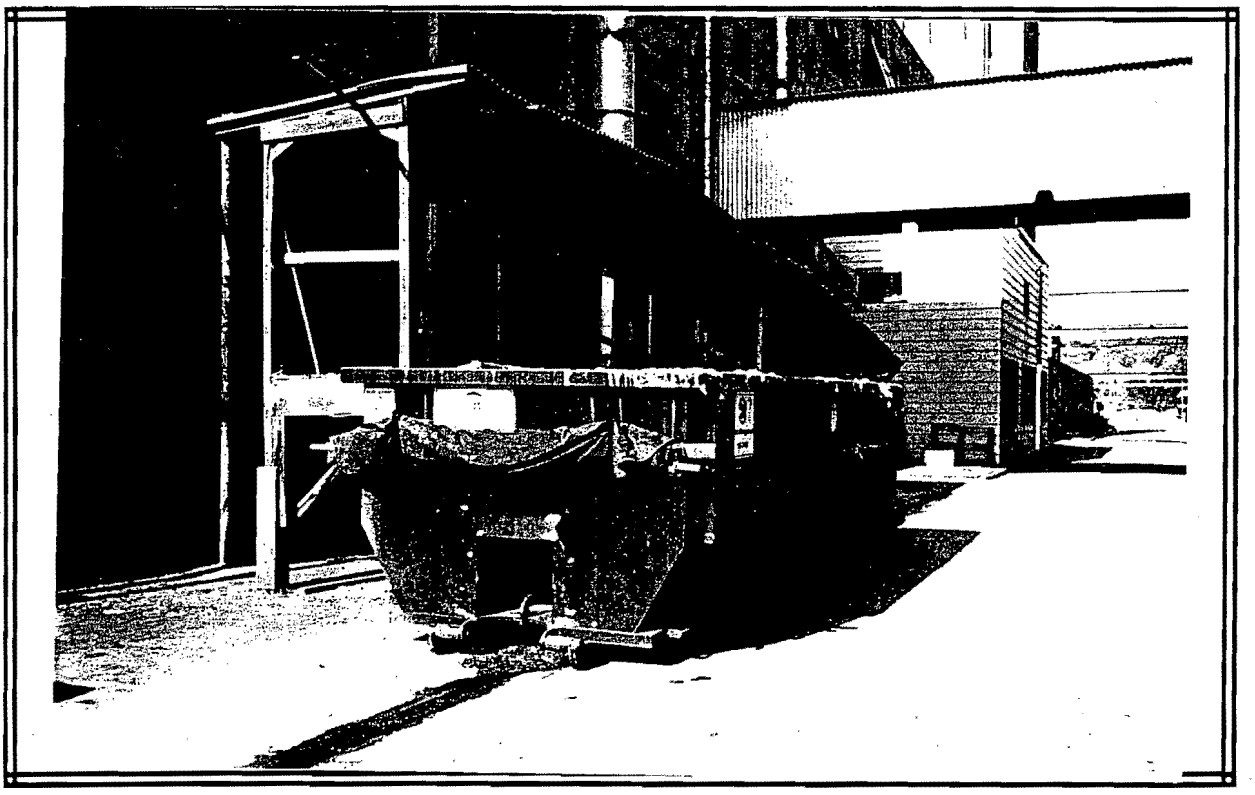


PHOTOGRAPH No.20B (AOC No. 20) Steam line with loose and friable asbestos insultation, located near the storage tank farm.

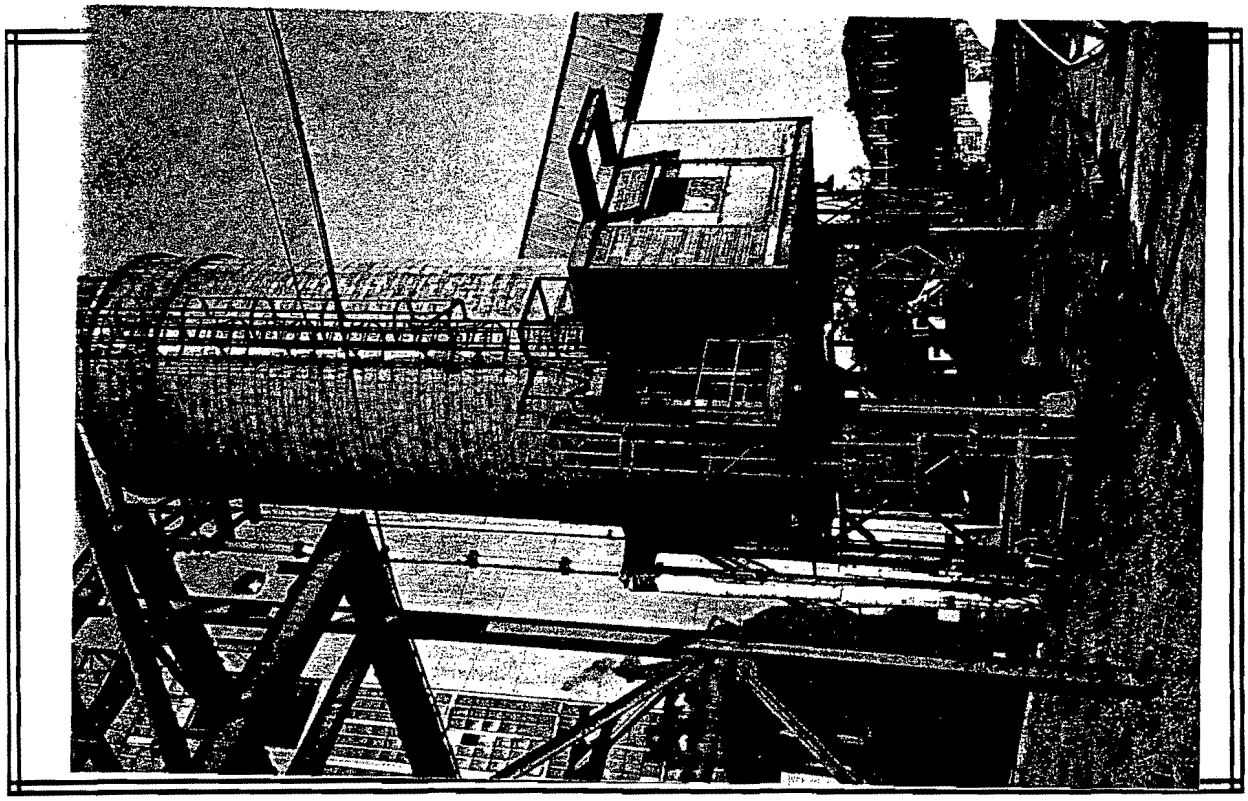
PHOTOGRAPH No.21 (SWMU No. 21) Dumpster used to dispose of miscellaneous waste such as rayon, plastic, and rubber.



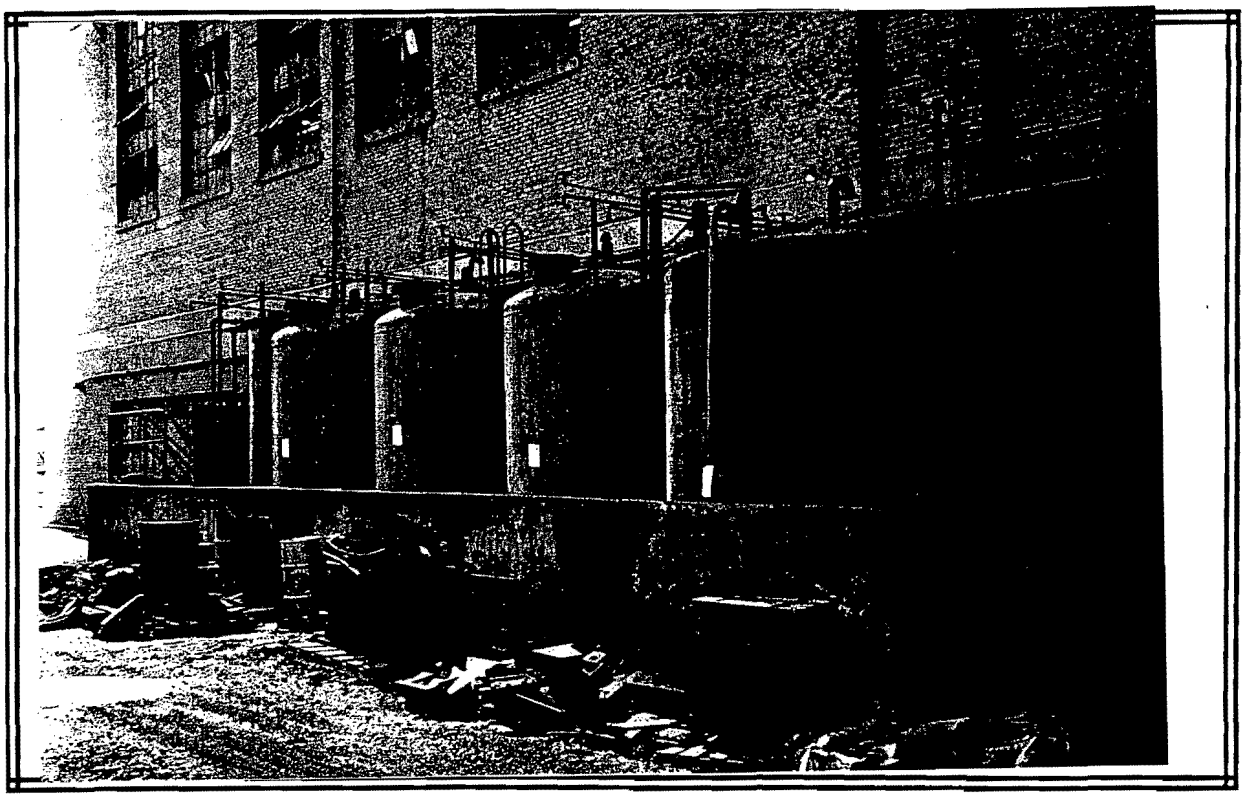
PHOTOGRAPH No.22 (SWMU No. 22) 20,000-gallon sodium hydroxide tanks located inside the plant building.



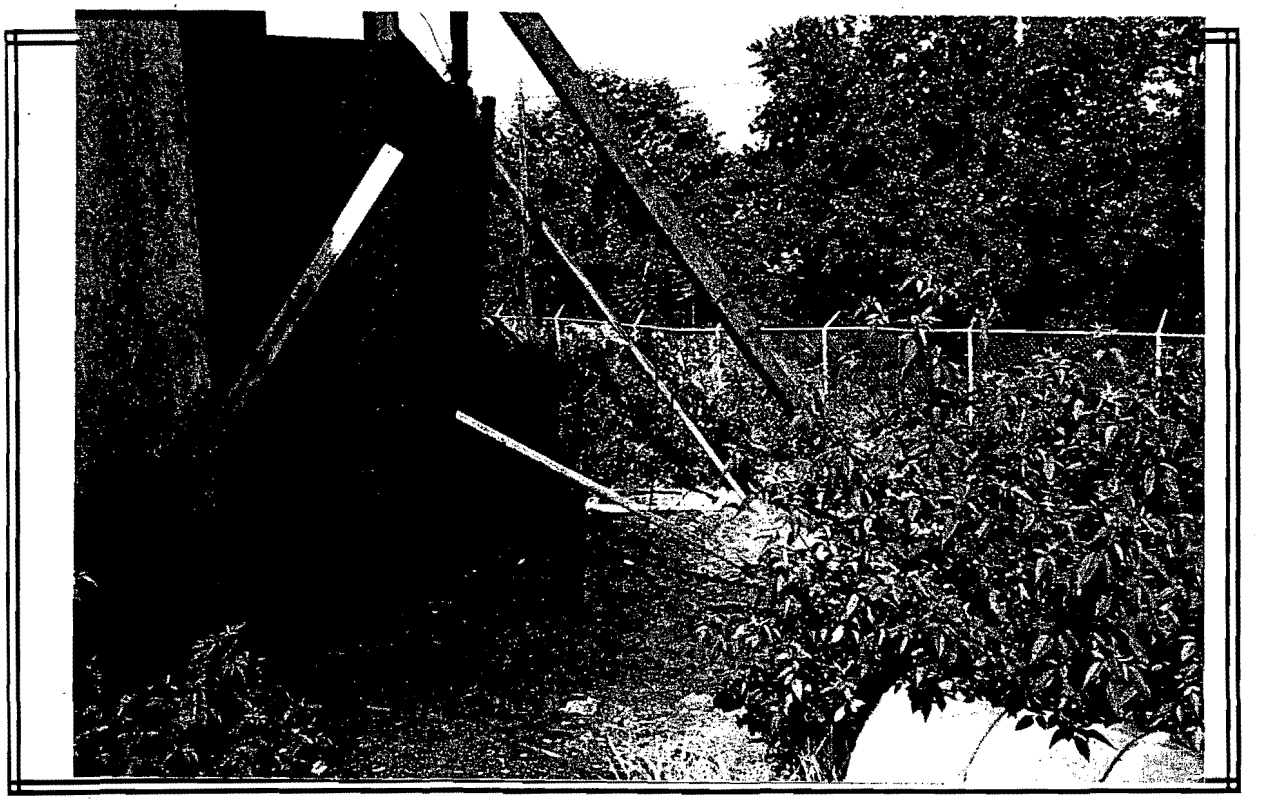
PHOTOGRAPH No.23 (SWMU No. 23) Dumpster used to dispose of miscellaneous trash such as cellulose xanthate skins, rayon, light bulbs, wood and paper.



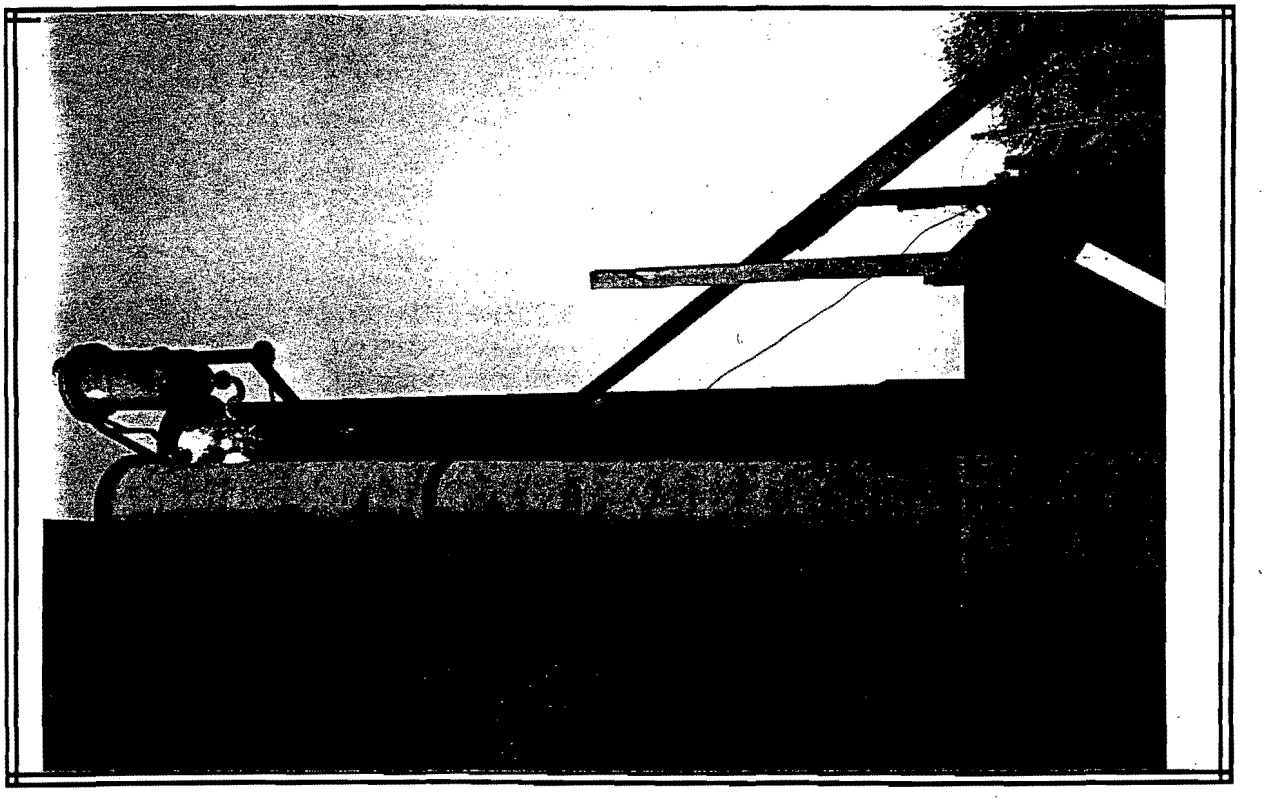
PHOTOGRAPH No.24 (SWMU No. 24) Fly ash silo used to store ash generated in the powerhouse. Note runoff flowing to storm drain.



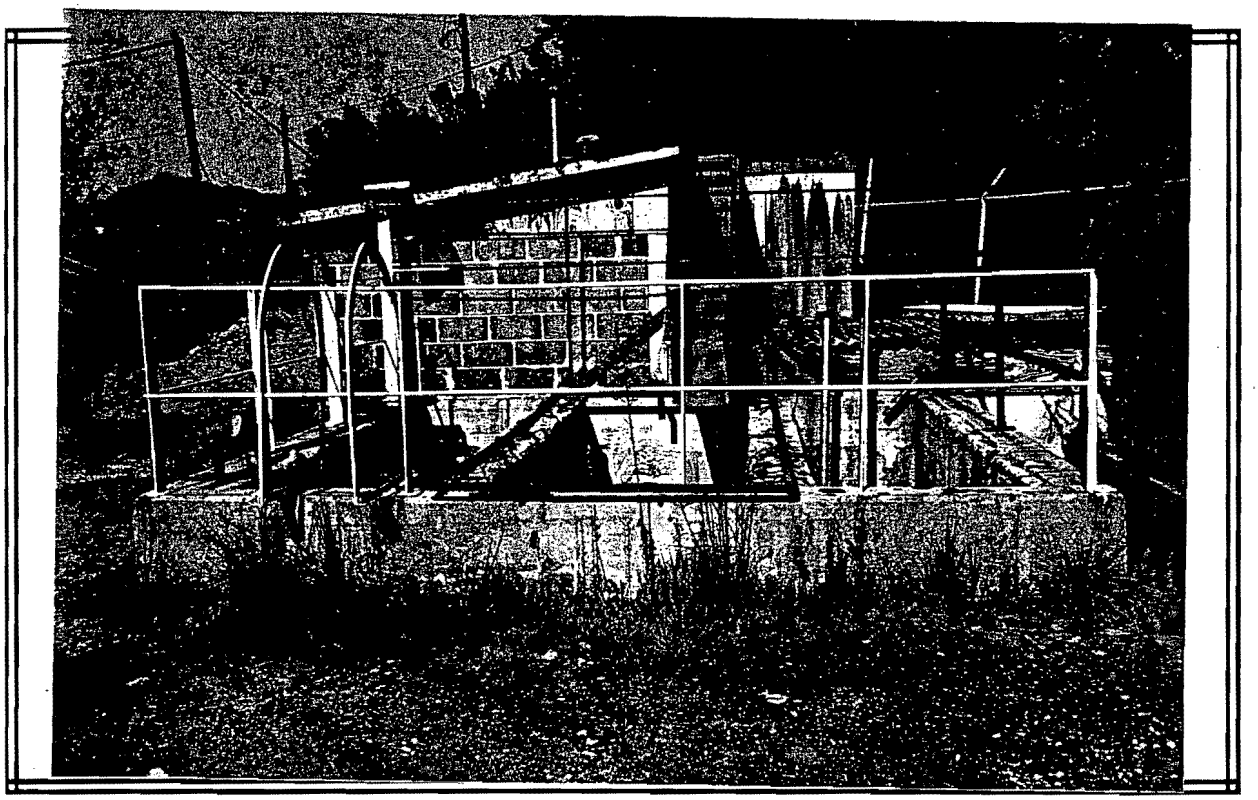
PHOTOGRAPH No.25 (SWMU No. 25) Steel tanks used to store oil as an alternate fuel source for powerhouse boilers.



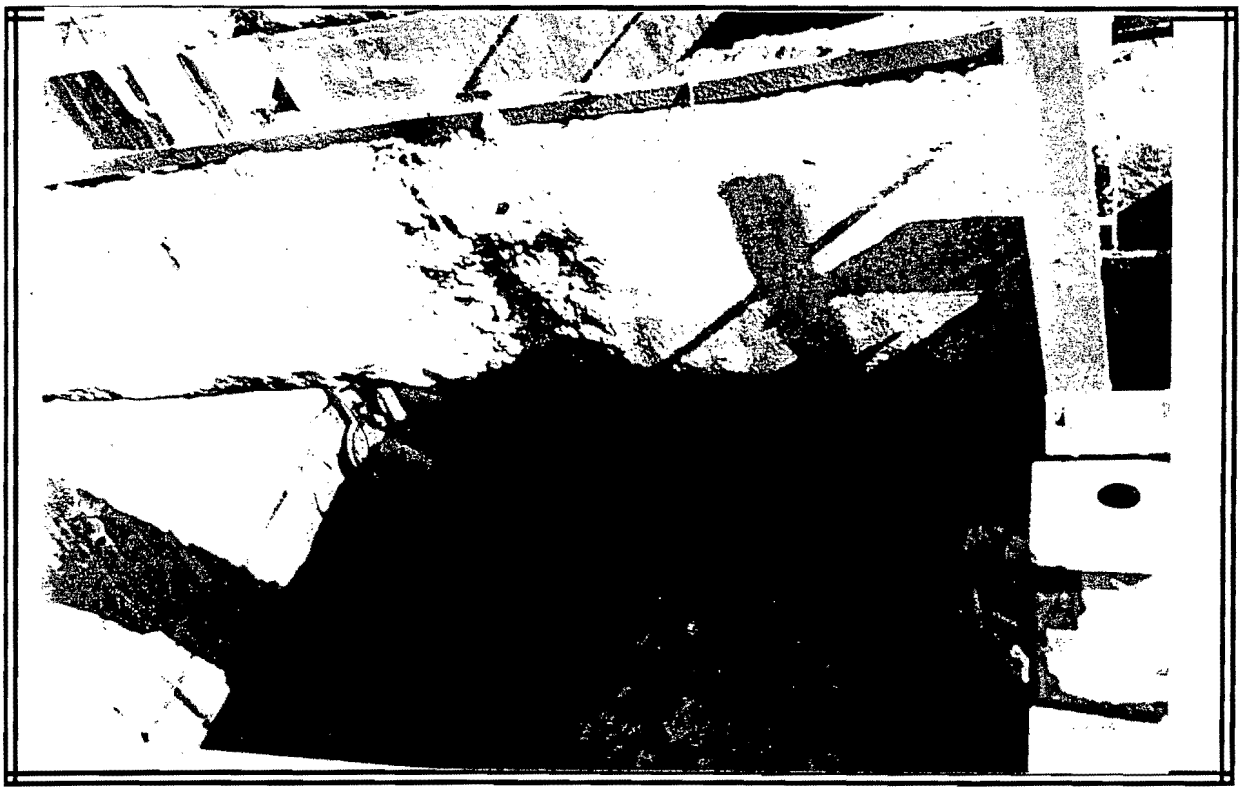
PHOTOGRAPH No.26A (AOC No. 26) Carbon disulfide recovery column. Note oil release at the base of the column.



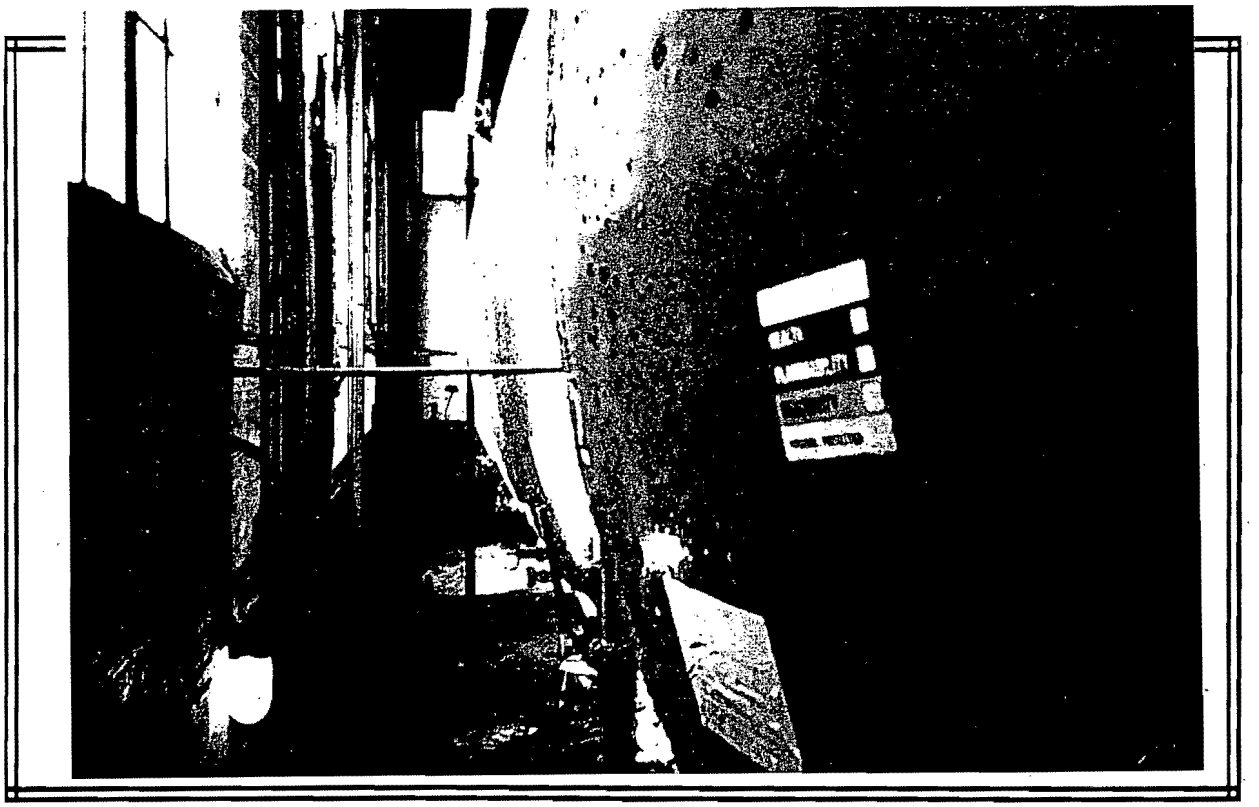
PHOTOGRAPH No.26B (AOC No. 26) Top portion of carbon disulfide column used to recover carbon disulfide.



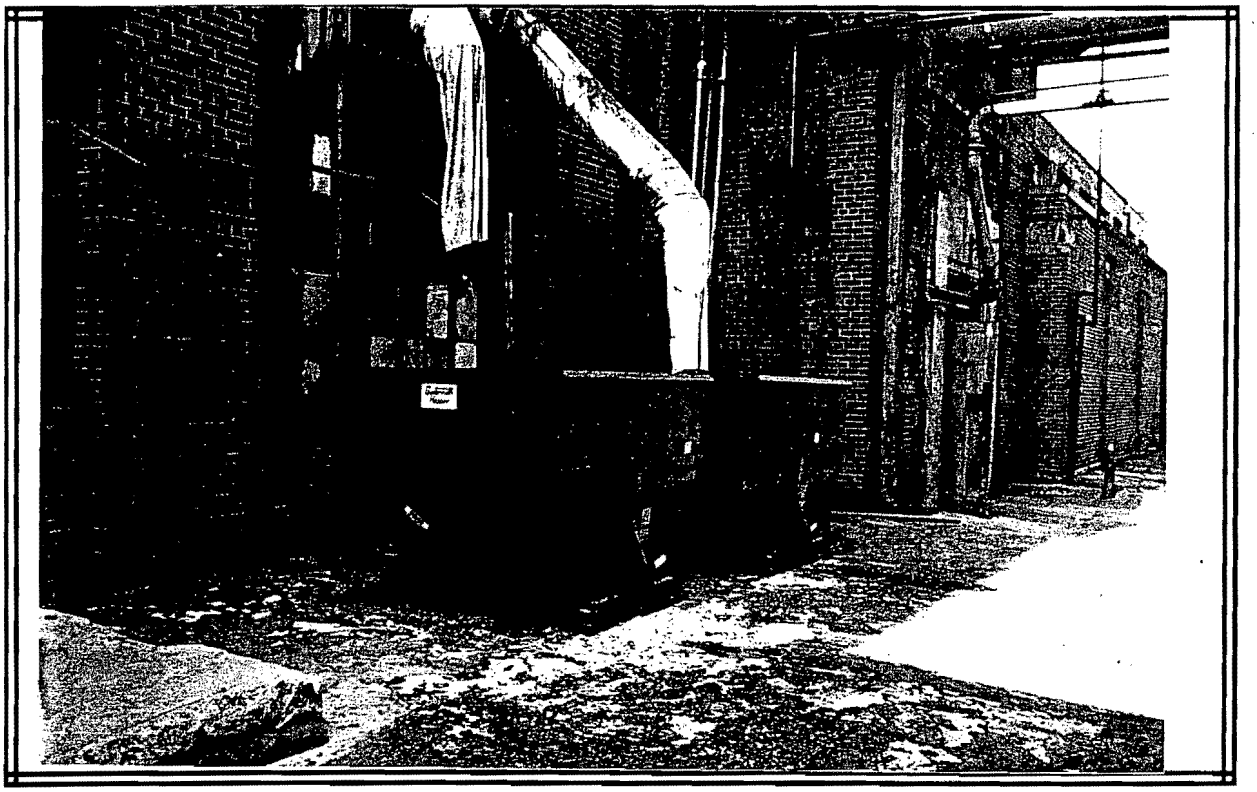
PHOTOGRAPH No.27A (SWMU No. 27) Wastewater lift station used to pump alkaline wastewater to the treatment plant.



PHOTOGRAPH No.27B (SWMU No. 27) Wastewater lift station; note the overflow that is to be sealed off.



PHOTOGRAPH No.28 (SWMU No. 28) 20,000 gallon storage tanks used to store sulfuric acid in the acid building. note pitted paint and dirty condition of the floor.



PHOTOGRAPH No.29 (SWMU No. 29) Bins used to dispose of alkali cellulose and cellulose xanthate.

REFERENCES

1. NUS Corporation Field Logbook No. F4-1581 for North American Rayon, TDD No. F4-8905-24. Documentation of Visual Site Inspection, August 21-22, 1989.

2. North American Rayon Corporation property plan map prepared by Tysinger, Hampton and Partners, Johnson City, Tennessee, 1987. Obtained from A. Lou Raasch, North American Rayon Corporation, August 21, 1989.

3. Block Diagram Viscose Rayon Production Schematic prepared by Beaunit Corporation Corporate Engineering Department, 1976. Obtained from Dr. Lou Raasch, North American Rayon Corporation, August 21, 1989.

4. EPA Notification of Hazardous Waste Site (EPA Form 8900-1) for North American Rayon Corporation, Elizabethton, Tennessee. Filed by Michael P. Hughes, past Director of Environmental Affairs, June 9, 1981.

5. NUS Corporation, Superfund Division, "Site Inspection Report, North American Rayon Corporation, Elizabethton, Tennessee," Prepared under TDD No. F4-8303-06 for the Air and Waste Management Division of the EPA (January 1985).

6. Paul E. Davis, manager, Permits Section, Division of Water Management, Tennessee Department of Health and Environment, letter and attachments to Mr. H.E. Britt, Vice-President of manufacturing, North American Rayon Corporation, August 1, 1984. Subject: NPDES permit for discharge to the Watauga River.

7. Harold E. Hodges, technical secretary, Tennessee Air Pollution Control Board, attached permits to North American Rayon Corporation, obtained from Lou Raasch, North American Rayon Corporation, August 21, 1989.

8. Darryl Hale, Tennessee Dept. of Health and Environment, telephone conversation with Mitch Cohen, NUS Corporation, September 21, 1989. Subject: RCRA Status for North American Rayon Corporation.

9. NUS Corporation Field Logbook No. F4-1428 for ITT North Telecom, TDD No. F4-8905-26. Documentation of offsite reconnaissance, May 23, 1989.

11. G.D. DeBuchananne and R.M. Richardson, Groundwater Resources of East Tennessee, State of Tennessee Department of Conservation Division of Geology, Bulletin No. 58, Part 1, (Nashville, Tennessee, 1956).

12. U.S. Department of Commerce, Climatic Atlas of the United States, Washington, D.C.: GPO, June 1968), Reprint: 1983, National Oceanic and Atmospheric Administration.

13. U.S. Department of Agriculture, Rainfall Frequency Atlas of the United States, Weather Bureau Technical Paper No. 40, (Washington, D.C.: GPO, 1961).

14. U.S. Fish and Wildlife Service Endangered and Threatened Species of the Southeastern United States, (Atlanta, Georgia: 1988).

15. Alyce R. Moore, Laboratory Manager, International Technology Corporation Analytical Services, letter to Dr. Lou Raasch, North American Rayon Corporation, March 1, 1988. Subject: Sample analytical results for baghouse dust.

16. Westinghouse Haztech, "Closure Plan for Waste Pile and Spill Diversion Basin at North American Rayon Corporation, Elizabethton, Tennessee," Prepared for Baker, Worthington, Crossley, Stansberry and Woolf, Johnson City, Tennessee, (April 1989).

17. Lou Raasch, North American Rayon Corporation, telephone conversation with Mitch Cohen, NUS Corporation, September 6, 1989. Subject: Status of closure plans and general information about the lead pile and holding basin.

18. EMPE, "Closure Plan - Phase I North American Rayon Corporation Solid Waste Disposal Site Elizabethton, Tennessee," prepared for North American Rayon Corporation (January 1987).

19. Randy Curtis, Tennessee Department of Health and Environment, telephone conversation with Mitch Cohen, September 11, 1989. Subject: Use of an acceptable upgradient well for groundwater monitoring at the North American Rayon Corporation facility.

20. Schematic of the Wastewater Treatment plant of North American Rayon Corporation, obtained from Dr. Lou Raasch, North American Rayon Corporation, August 21, 1989.

21. Special Waste Data Collection Form for North American Rayon Corporation, Elizabethton, Tennessee. Filed by Lou Raasch, Environmental Services Manager, obtained August 21, 1989.

SWMU NUMBER: 29

SWMU NAME: Waste Bins

SWMU DESCRIPTION: The two steel bins have a capacity of 10 to 12 cubic yards with chutes from the plant. Wastes from the top floor of the plant and from the drum room are disposed in the bins. A side-lift truck from Waste Management picks up the bins several times per week. The waste is disposed of at the Carter County Landfill. Approximately 22,000 pounds of waste is disposed of each year (Ref. 1, p. 13).

DATE OF START-UP: According to North American Rayon personnel, this unit is believed to have been placed in service in August 1928. In the past, different vessels were used.

DATE OF CLOSURE: This unit was active during the VSI.

WASTES MANAGED: Alkali cellulose and cellulose xanthate are disposed of in the bins (Ref. 1, p. 13).

RELEASE CONTROLS: There are no release controls for this unit.

RELEASE HISTORY: According to North American Rayon personnel, there have been no releases from this unit (Ref. 1, p. 13).

INTERIM RECOMMENDATIONS: No Further Action.

PHOTOGRAPH NO. 29

APPENDIX A

EPA

POTENTIAL HAZARDOUS WASTE SITE
PRELIMINARY ASSESSMENT
PART 1 - SITE INFORMATION AND ASSESSMENT

I. IDENTIFICATION
01 STATE: TND
02 SITE NUMBER: D09505207

II. SITE NAME AND LOCATION

01 SITE NAME (Legal, common, or descriptive name of site)	02 STREET, ROUTE NO., OR SPECIFIC LOCATION IDENTIFIER				
North American Rayon Corportion	West Elk Avenue				
03 CITY	04 STATE	05 ZIP CODE	06 COUNTY	07 COUNTY CODE	08 CONG DIST
Elizabethton	TN	37643	Carter		

09 COORDINATES LATITUDE: 36 21 02.0 LONGITUDE: 082 14 50.0

10 DIRECTIONS TO SITE (Starting from nearest public road)
From Johnson City, go about 5.0 miles east-northeast on Glanzstoff Highway (US 321). North American is on the left.

III. RESPONSIBLE PARTIES

01 OWNER (If known)	02 STREET (Business, mailing, residential)		
North American Rayon Corporation	West Elk Avenue		
03 CITY	04 STATE	05 ZIP CODE	06 TELEPHONE NUMBER
Elizabethton	TN	37643	615) 542-2141
07 OPERATOR (If known and different from owner)	08 STREET (Business, mailing, residential)		
09 CITY	10 STATE	11 ZIP CODE	12 TELEPHONE NUMBER
			( )

13 TYPE OF OWNERSHIP (Check one)
☐ A. PRIVATE ☐ B. FEDERAL: _____ (Agency name) ☐ C. STATE ☐ D. COUNTY ☐ E. MUNICIPAL
☒ F. OTHER: Employee stock ownership (Specify) ☐ G. UNKNOWN

14 OWNER/OPERATOR NOTIFICATION ON FILE (Check all that apply)
☐ A. RCRA 3001 DATE RECEIVED: ___ / ___ / ___ (MONTH DAY YEAR) ☒ B. UNCONTROLLED WASTE SITE (CERCLA 103 c) DATE RECEIVED: 6 / 9 / 81 (MONTH DAY YEAR) ☐ C. NONE

IV. CHARACTERIZATION OF POTENTIAL HAZARD

01 ON SITE INSPECTION
☒ YES DATE 8 / 21 / 89 (MONTH DAY YEAR)
☐ NO

BY (Check all that apply)
☐ A. EPA ☒ B. EPA CONTRACTOR ☐ C. STATE ☐ D. OTHER CONTRACTOR
☐ E. LOCAL HEALTH OFFICIAL ☐ F. OTHER: _____ (Specify)
CONTRACTOR NAME(S): NUS Corporation

02 SITE STATUS (Check one)
☒ A. ACTIVE ☐ B. INACTIVE ☐ C. UNKNOWN

03 YEARS OF OPERATION
1928 (BEGINNING YEAR) | Present (ENDING YEAR) ☐ UNKNOWN

04 DESCRIPTION OF SUBSTANCES POSSIBLY PRESENT, KNOWN, OR ALLEGED
Sodium hydroxide, sulfuric acid, carbon disulfide, zinc sulfate, sodium sulfate, that are used in the processing of viscose or are generated as waste.

05 DESCRIPTION OF POTENTIAL HAZARD TO ENVIRONMENT AND/OR POPULATION
The Watauga River is adjacent to the facility on the north and west boundaries. The facility uses seven outfalls to discharge treated wastewater and stormwater runoff directly into the river.

V. PRIORITY ASSESSMENT

01 PRIORITY FOR INSPECTION (Check one. If high or medium is checked, complete Part 2 - Waste Information and Part 3 - Description of Hazardous Conditions and Incidents)
☐ A. HIGH (Inspection required promptly) ☒ B. MEDIUM (Inspection required) ☐ C. LOW (Inspect on time available basis) ☐ D. NONE (No further action needed, complete current disposition form)

VI. INFORMATION AVAILABLE FROM

01 CONTACT	02 OF (Agency/Organization)			03 TELEPHONE NUMBER
Lou Raasch	North American Rayon Corporation			(615) 542-2141
04 PERSON RESPONSIBLE FOR ASSESSMENT	05 AGENCY	06 ORGANIZATION	07 TELEPHONE NUMBER	08 DATE
Mitch Cohen		NUS corporation	(800) 888-7710	9 / 26 / 89 (MONTH DAY YEAR)

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DOCKET NO. 000130

ENI T095051207

EPA

POTENTIAL HAZARDOUS WASTE SITE PRELIMINARY ASSESSMENT
PART 2 - WASTE INFORMATION

I. IDENTIFICATION

01 STATE	02 SITE NUMBER
TND	095051207

II. WASTE STATES, QUANTITIES, AND CHARACTERISTICS

01 PHYSICAL STATES (Check all that apply)

- [ ] A. SOLID
- [ ] B. POWDER, FINES
- [X] C. SLUDGE
- [ ] D. OTHER _____ (Specify)
- [ ] E. SLURRY
- [X] F. LIQUID
- [ ] G. GAS

02 WASTE QUANTITY AT SITE (Measures of waste quantities must be independent)

TONS _____

CUBIC YARDS 300,000

NO. OF DRUMS _____

03 WASTE CHARACTERISTICS (Check all that apply)

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

III. WASTE TYPE

CATEGORY	SUBSTANCE NAME	01 GROSS AMOUNT	02 UNIT OF MEASURE	03 COMMENTS
SLU	SLUDGE	300,000	YD^3	fly ash and waste water sludge
OLW	OILY WASTE			
SOL	SOLVENTS			
PSD	PESTICIDES			
OCC	OTHER ORGANIC CHEMICALS			
IOC	INORGANIC CHEMICALS			
ACD	ACIDS	360	Drums	released in 1975 to river and
BAS	BASES			in 1985, 86 to holding basin
MES	HEAVY METALS			

IV. HAZARDOUS SUBSTANCE (See Appendix for most frequently cited CAS Numbers)

01 CATEGORY	02 SUBSTANCE NAME	03 CAS NUMBER	04 STORAGE/DISPOSAL METHOD	05 CONCENTRATION	06 MEASURE OF CONCENTRATION
MES	Barium	7440-39-3	Sludge in landfill		
ACD	Sulfuric Acid		Released to river &	<2.0	PH
			holding basin		

V. FEEDSTOCKS (See Appendix for CAS Numbers)

CATEGORY	01 FEEDSTOCK NAME	02 CAS NUMBER	CATEGORY	01 FEEDSTOCK NAME	02 CAS NUMBER
FDS			FDS		
FDS			FDS		
FDS			FDS		
FDS			FDS		

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

Site Inspection Report - 1983
Lou Raasch - North Aberican Rayon

EPA FORM 2070-12 (7-81)

DOCKET NO. 2001
T095051207

EPA

POTENTIAL HAZARDOUS WASTE SITE
PRELIMINARY ASSESSMENT
PART 3 - DESCRIPTION OF HAZARDOUS CONDITIONS AND INCIDENTS

I. IDENTIFICATION
01 STATE: TND | 02 SITE NUMBER: D095051207

II. HAZARDOUS CONDITIONS AND INCIDENTS

01 X A. GROUNDWATER CONTAMINATION — 02 ☐ OBSERVED (DATE: 1989) ☐ POTENTIAL ☐ ALLEGED
03 POPULATION POTENTIALLY AFFECTED: _____ 04 NARRATIVE DESCRIPTION

Upgradient monitoring well location has not been acceptable to date. This violates the groundwater monitoring program for the landfill.

01 X B. SURFACE WATER CONTAMINATION — 02 X OBSERVED (DATE: 1975, 1986) ☐ POTENTIAL ☐ ALLEGED
03 POPULATION POTENTIALLY AFFECTED: _____ 04 NARRATIVE DESCRIPTION

20,000 gallons of acid was released to the river in 1975. During power outages, wastewater bypasses the treatment plant.

01 X C. CONTAMINATION OF AIR — 02 ☐ OBSERVED (DATE: _____) X POTENTIAL ☐ ALLEGED
03 POPULATION POTENTIALLY AFFECTED: _____ 04 NARRATIVE DESCRIPTION

A CARBON DISULFIDE OR SULFURIC RELEASE COULD POTENTIALLY AFFECT NEARBY POPULATION CENTERS

01 X D. FIRE/EXPLOSIVE CONDITIONS — 02 ☐ OBSERVED (DATE: _____) X POTENTIAL ☐ ALLEGED
03 POPULATION POTENTIALLY AFFECTED: _____ 04 NARRATIVE DESCRIPTION

Carbon disulfide has a very low flashpoint. Main storage is below water to prevent an ignition.

01 X E. DIRECT CONTACT — 02 ☐ OBSERVED (DATE: _____) X POTENTIAL ☐ ALLEGED
03 POPULATION POTENTIALLY AFFECTED: _____ 04 NARRATIVE DESCRIPTION

Large quantities of sodium hydroxide and sulfuric acid are stored in antiquated storage tanks with inadequate containment and a low capacity treatment plant in the event of release.

01 X F. CONTAMINATION OF SOIL — 02 ☐ OBSERVED (DATE: 8/1989) ☐ POTENTIAL ☐ ALLEGED
03 AREA POTENTIALLY AFFECTED: _____ (Acres) 04 NARRATIVE DESCRIPTION

Upon excavating an oil underground storage tank, a leak was detected. The tank and excavated soil are being stored pending direction from the state.

01 X G. DRINKING WATER CONTAMINATION — 02 ☐ OBSERVED (DATE: _____) X POTENTIAL ☐ ALLEGED
03 POPULATION POTENTIALLY AFFECTED: _____ 04 NARRATIVE DESCRIPTION

One source spring is located within 3 miles of the facility and a surface water intake is located about 4 miles downstream from the facility.

01 X H. WORKER EXPOSURE/INJURY — 02 ☐ OBSERVED (DATE: _____) X POTENTIAL ☐ ALLEGED
03 WORKERS POTENTIALLY AFFECTED: _____ 04 NARRATIVE DESCRIPTION

Poor housekeeping practices and chemical residues are potential hazards to workers.

01 X I. POPULATION EXPOSURE/INJURY — 02 ☐ OBSERVED (DATE: _____) X POTENTIAL ☐ ALLEGED
03 POPULATION POTENTIALLY AFFECTED: _____ 04 NARRATIVE DESCRIPTION

A release of carbon disulfide may affect the nearby population centers of Elizabethton or Johnson City.

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POTENTIAL HAZARDOUS WASTE SITE
PRELIMINARY ASSESSMENT
PART 3 - DESCRIPTION OF HAZARDOUS CONDITIONS AND INCIDENTS

I. IDENTIFICATION
01 STATE: TND | 02 SITE NUMBER: D095051207

II. HAZARDOUS CONDITIONS AND INCIDENTS *(Continued)*

01 ☒ J. DAMAGE TO FLORA — 02 ☐ OBSERVED (DATE: _____) ☒ POTENTIAL ☐ ALLEGED
04 NARRATIVE DESCRIPTION
Past releases of acid may have impacted the area nearby the Watauga River.

01 ☒ K. DAMAGE TO FAUNA — 02 ☐ OBSERVED (DATE: _____) ☒ POTENTIAL ☐ ALLEGED
04 NARRATIVE DESCRIPTION *(Include name(s) of species)*
Past releases of acid may have impacted fauna that thrive in or near the river.

01 ☒ L. CONTAMINATION OF FOOD CHAIN — 02 ☐ OBSERVED (DATE: _____) ☒ POTENTIAL ☐ ALLEGED
04 NARRATIVE DESCRIPTION
Releases of acid and metals from sludge may migrate to the food chain via fish caught in the river.

01 ☒ M. UNSTABLE CONTAINMENT OF WASTES *(Spills/runoff/standing liquids/leaking drums)* — 02 ☐ OBSERVED (DATE: 1975) ☐ POTENTIAL ☐ ALLEGED
03 POPULATION POTENTIALLY AFFECTED: _____ 04 NARRATIVE DESCRIPTION
20,000 gallons of sulfuric acid were released to the river. During periods of power outages, wastewater is released to the river.

01 ☒ N. DAMAGE TO OFFSITE PROPERTY — 02 ☐ OBSERVED (DATE: _____) ☒ POTENTIAL ☐ ALLEGED
04 NARRATIVE DESCRIPTION
Releases to the river may flow to adjoining , or downstream properties.

01 ☒ O. CONTAMINATION OF SEWERS, STORM DRAINS, WWTPs — 02 ☒ OBSERVED (DATE: 1989) ☒ POTENTIAL ☐ ALLEGED
04 NARRATIVE DESCRIPTION
Flyash and onsite storm runoff enters the storm drainage system which is discharged directly into the river.

01 ☐ P. ILLEGAL/UNAUTHORIZED DUMPING — 02 ☐ OBSERVED (DATE: _____) ☐ POTENTIAL ☐ ALLEGED
04 NARRATIVE DESCRIPTION
N/A

05 DESCRIPTION OF ANY OTHER KNOWN, POTENTIAL, OR ALLEGED HAZARDS
Hazards to onsite workers exist since crystallized sodium hydroxide and sulfuric acid residues were seen on the floors of storage areas, carbon disulfide levels were high in several areas of the plant.

III. TOTAL POPULATION POTENTIALLY AFFECTED: _____

IV. COMMENTS

V. SOURCES OF INFORMATION *(Cite specific references, e.g., state files, sample analysis, reports)*
Logbook for VSI - 8/21/89

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was pumped from the surface impoundment into the wastewater treatment plant as conditions allowed. The impoundment is approximately 840 feet long by 40 feet wide.

GEOLOGY:

Regional Geology:

The facility is located within the Valley and Ridge Physiographic Province. This is a province in which topography is a surficial expression of an underlying structural regime composed of low-angle thrust sheets. These thrust sheets are composed of bedrock of Cambrian to Silurian Age, which have been displaced from the southeast to the northwest. These thrusts erode into long valleys and ridges which trend NE-SW and dip SE, generally. Local overturning of beds, anticlinal and synclinal structures, and steep to vertical dip may also be found.

The Elizabethton area is near the eastern-most edge of the Valley and Ridge Physiographic Province. Nearby, to the NE and E, are older formations associated with the deformations of the Blue Ridge Province; an area dominated by more siliceous/clastic bedrock than the calcareous formation dominant in the Valley and Ridge. [See Figure 2].

Local Geology:

The site is located in an area of folded and faulted bedrock of Cambrian to Ordovician Age. The immediate area of the plant is mapped as the Honaker Dolomite of Cambrian Age. [See Figure 3]. The Honaker Dolomite is a formation which ranges from 2200 to 2500 feet thick (King and Ferguson, 1960). It is composed predominantly of dolomite, which weathers to a reddish orange clay soil. The formation contains some chert and has beds of a more shaly nature in the lower part of the section. Limestones are also present in some portions of the section.

Pugh (1966) recognized 329 feet of limestone between predominantly dolostone units in the Blountville area, to the north of Elizabethton.

Examination of the topographic map of the Elizabethton Quadrangle reveals the presence of Karst terrain to the south of the site, developed in rocks of the Honaker Dolomite and the Knox Formation (Cambro-Ordovician Age). [See Figure 4].

The nature of the bedrock surface in the area of the site is masked by the presence of alluvium brought in by the Watauga River system. Pinnacle development and sinks are not unlikely given the nature of the bedrock.

This masking, floodplain material, of Quaternary Age, is an important factor in the geology of the area, even though it is

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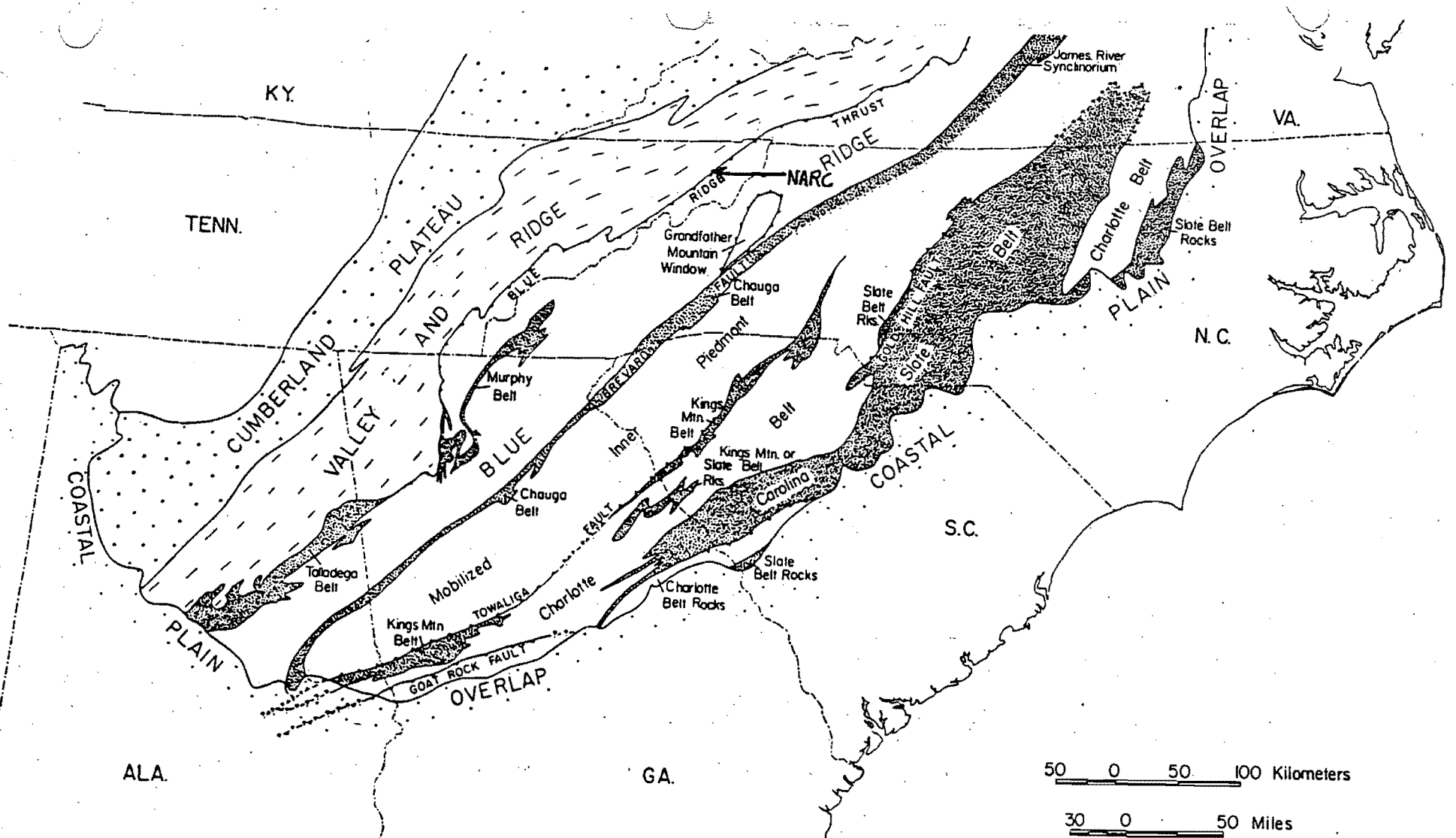

Figure 1. Map of the southern Appalachians showing the relative positions of the respective belts. The heavily stippled areas represent belts in the Blue Ridge and Piedmont thought by the writer to be composed predominantly of late and post-Precambrian sedimentary and volcanic rocks. (From Hatcher, 1972).

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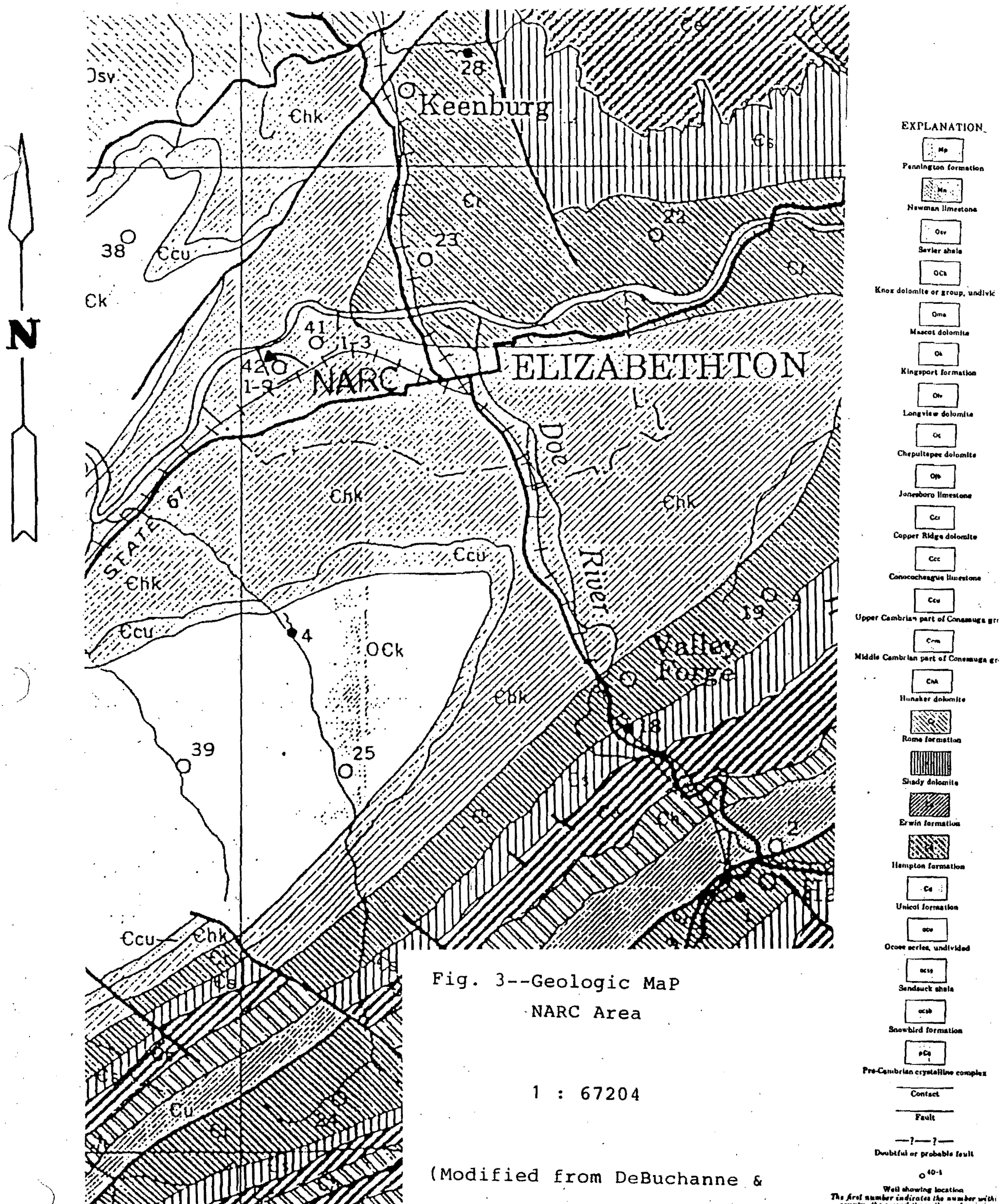


Fig. 3--Geologic MaP
NARC Area

1 : 67204

(Modified from DeBuchanne & Richardson, 1956)

Fig. 4-Physiographic Features, NARC Area

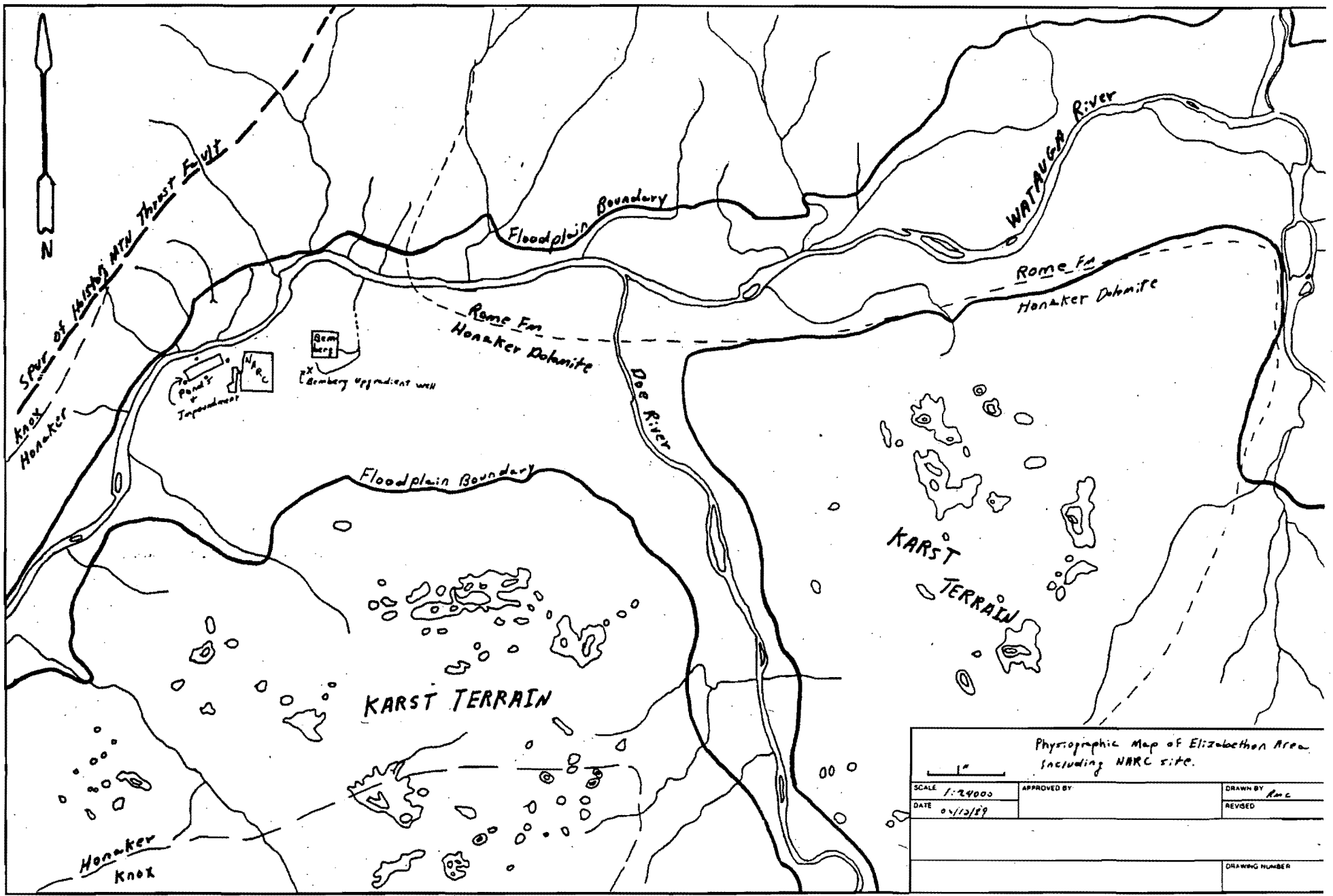


FIGURE 4

unconsolidated. The components of the floodplain deposits range in size from silt to large cobbles and have the mountainous terrain of the Blue Ridge Province as their primary source. The cobbles are predominantly quartzite, but many parent materials are represented.

Structurally, the NARC site is on the NW flank of an apparent anticlinal structure. This is borne out by the presence of a NW dip component in bedrock exposed in the hill slope across the river, and, in the general pattern of the formations mapped. [See Figure 3]. A spur of the Holston Mountain Thrust Fault occurs about 1/2 mile to the northwest. [See Figures 3 & 4].

Soils:

A soils map of the area and accompanying descriptive text are included as Appendix C (q.v.). The soils are developed on the river alluvium and terrace material. The nature of any deeper residual soils beneath the floodplain material is not gone into specifically. It is not unlikely that areas of residual soil, capped by terraces or protected by adjoining pinnacles or within deep crevices, exists beneath the site.

Hydrology:

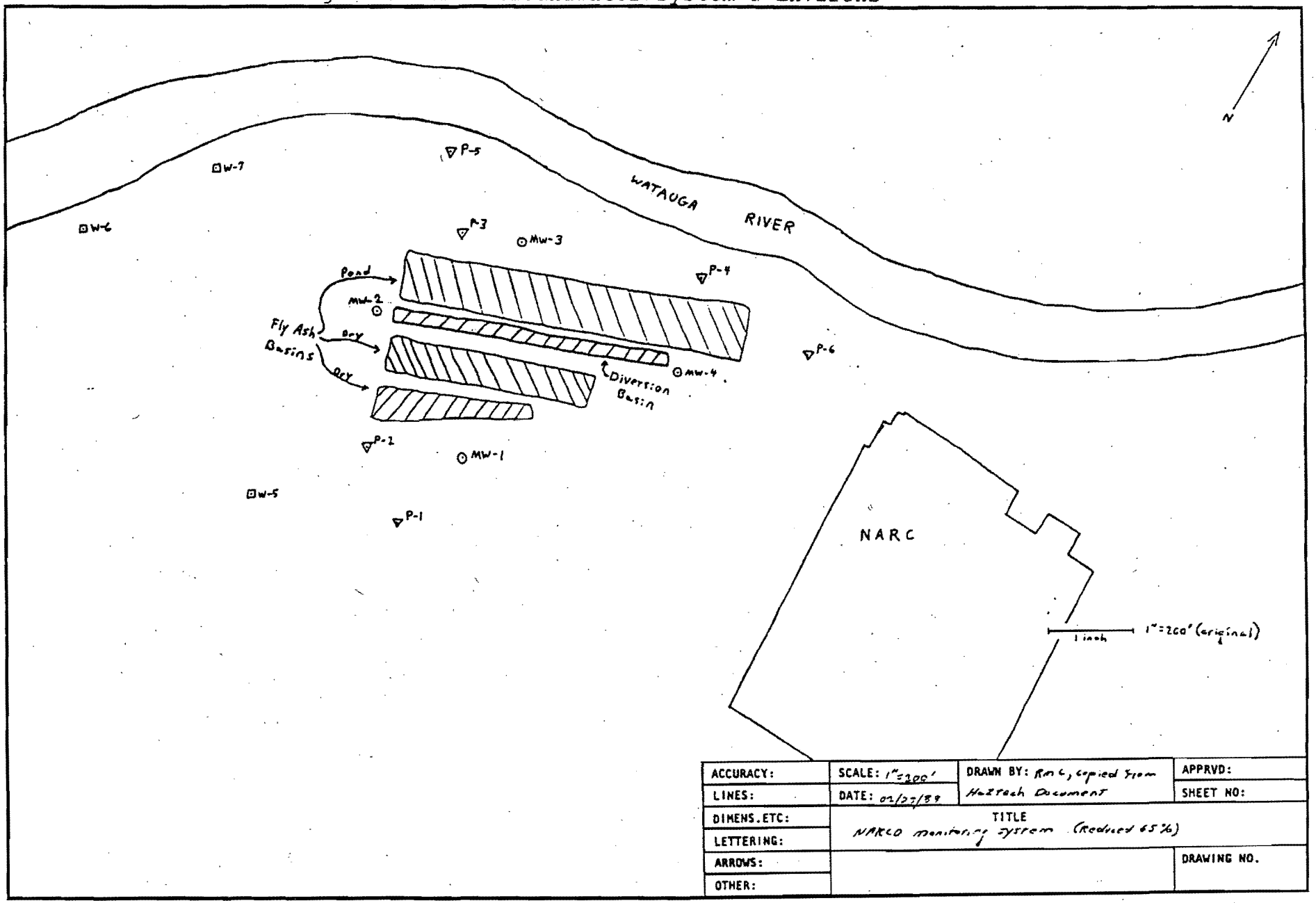
The hydrology of the site consists of an interplay between surface and subsurface components, among which are:

1. The Watauga River provides a groundwater regime of bedflow within the alluvium of its valley. The Watauga River is currently underfit and is flowing in a bed which is cut within older floodplain deposits. The older deposits include cobble layers which may represent terraces,and, as such, would provide areas of continuous cover over older alluvium and residual soils developed from the Honaker Dolomite. This bedflow within the alluvium interacts with water within solutional openings in the Honaker, as documented (as a probability) by Maclay (1962, p. 406-409). [See Appendix B]

2. The Honaker Dolomite is dominated by a regime of groundwater within solutional openings, typical of Karst areas.

3. Man-induced changes in the groundwater as a result of influx from any subsurface leakage, from the plant itself or from the fly-ash pond or basins.

Fig. 5 -- NARC Groundwater System & Environs



4. This portion of the Watauga River is located downstream of a hydro-electric/flood-control dam of the TVA system. Power generation requirements cause a regular small scale fluctuation of the river's flow. The minimum level of the river surface in this area is around 1486 feet above sea level. The river stage has reached record maximum of around 1507'. (USGS TN-81-1) [See Appendix B].

All of the components described above contribute a portion to the overall groundwater regime beneath this site.

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Applicability (Rule 1200-1-11-.05(6)(a)1 & 2):

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good shape. Water levels taken exactly 24 hours apart differed by -.15 feet. Purge water was turbid.

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<u>Location</u> (Rule 1200-1-11-.05(6)(b)1(i) and (ii):

The wells are located as close as is feasible to the limit of the waste management area. MW #3 is located on the other side of the fly-ash pond; a well on the near side of this pond would be desirable but it is not feasible due to the space limitations and drilling difficulties of the area. Any rig small enough to get on this road would probably not have the wherewithal to penetrate the Ubiquitous cobble zone. Given the potential for variations in the groundwater flow, a more concentrated placement pattern for the detection wells would not be practicable. MW #1 is rather far afield, owing to its intended use as an upgradient well. It can still serve as a long distance downgradient point. MW #2 is in an optimum position to detect any release from the unit that follows the expected groundwater gradient. The release of any high pH material into the groundwater within a solutional channel directly beneath the unit could conceivably escape detection, but there has been no indication of any unusual loss

of water from the bottom of the impoundment. A new upgradient point must be established.

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NARC has developed a groundwater sampling and analysis plan and has this plan on file at the facility. The plan has the appropriate provisions and procedures for sampling the groundwater for indicators of contamination and the drinking water standards and groundwater quality parameters. The plan received Department approval; however, it was not followed in all regards. The discrepancies were noted in the March 18, 1989, NOV letter. [See Appendix D]. There follows a discussion of the analytical data generated by the detection monitoring program to this point.

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Iron and manganese levels have exceeded secondary contaminent levels for public water systems in all the wells. This is not considered significant at this time. All wells except MW #1 exceeded the threshold of 250 mg/L for sulfate, the highest reading being 1200.39 mg/L for MW #2 on 03/09/89. This may be significant since sulfuric acid is the main parameter of concern and because zinc sulfate is used within the building.

Primary Drinking Water Standards (Rule 1200-1-11-.05(6)(c)2(i)):

During three quarters of sampling, primary drinking water standards were exceeded for arsenic, selenium, fluoride, nitrate and cadmium at various times. No consistent pattern has emerged, save for arsenic and selenium. These are addressed in a letter to the Division dated 02/07/89 in which the levels are attributed to the analytical method. [See Appendix D, 02/07/89 and 06/15/89].

Recordkeeping and Reporting (Rule 1200-1-11-.05(6)(e)):

NARC keeps on file all material provided by their consultant and all data generated by their program, as well as the documents required under the Hazardous Waste Regulations. All analytical results have been reported to the State in a timely manner.

Preparation, Evaluation, and Response (Rule 1200-1-11-.05(6)(d)):

A groundwater assessment outline is included in the Groundwater Monitoring Plan developed for NARC.

CONCLUSIONS AND RECOMMENDATIONS:

1. NARC must obtain data requisite for statistical comparisons from an upgradient, background sample source. The presence of the Bemberg Superfund site up river of NARC should be remembered when consideration is given to locating such a point.

2. The sampling and analysis plan developed for the facility must be followed. If NARC feels that strict adherence to the Plan is not justifiable, a new plan may be submitted for review or the current plan may be modified and the modifications submitted to the Division for review.

3. Surface modifications, subsurface dip, and surface hydrological input should all be considered when preparing maps of the potentiometric surface for this facility. Review of the data generated thus far indicate that MW #3 and MW #4 are not subject to the same degree of variance as MW #1 and MW #2. The groundwater data from this site must be utilized to the maximum extent possible in order to understand the interplay of all the factors involved in defining the potentiometric surface and the direction of flow.

4. The Bemberg site may be contributing to the sulfate component being seen in the NARC detection system.

Signed: Hardy M Curtis, R.P.G. Date: 06/28/89

RMC/13029179

APPENDIX A

Checklists

CEI GW Checklist

REGULATORY CITE	ITEM	INSPECTION FINDINGS
	The owner or operator of a surface impoundment, landfill, or land treatment facility which is used to manage hazardous waste must implement a ground water monitoring program capable of determining the facility's impact on the quality of ground water in the uppermost aquifer underlying the facility. In order to comply with the ground water monitoring requirements, the owner or operator must develop and maintain either the "Indicator Parameter Program and Assessments" or implement an "Alternate Ground-Water Monitoring Program", unless the ground-water monitoring requirements have been waived by the Commissioner.	
	I. INDICATOR PARAMETER PROGRAM AND ASSESSMENTS	
	A. Indicator Parameter Program	
	1. Date of Implementation	
(6)(a)1	a. The owner or operator must ground-water monitoring program by.	A* 2800 NA CP NC ____
	2. Ground-water Monitoring System	
(6)(b)1	a. The ground-water monitoring system must be capable of yielding ground water samples for analysis.	A* 2810 NA CP NC ____
	(Note: This means all wells not waived by the Commissioner are to be capable of yielding groundwater samples for analysis, at all times.)	
	b. The ground-water monitoring system must consist of:	
(6)(b)1(i)	I) Monitoring wells (at least one) installed hydraulically upgradient from the limit of the waste management area.	A* 2820 NA CP NC ____
	i) Their number, locations, and depths must be sufficient to yield ground-water samples that are:	
(6)(b)1(i)(I)	i. Representative of the background ground-water quality in the uppermost aquifer near the facility; and	A* 2830 NA CP NC ____
(6)(b)1(i)(II)	ii. Not affected by the facility.	A* 2840 NA CP NC ____
(6)(b)1(ii)	II) Monitoring wells (at least three) installed hydraulically downgradient at the limit of the waste management area.	A* 2850 NA CP NC ____
(6)(b)1(ii)	i) Their number, locations, and depths must ensure that they can immediately detect any statistically significant amounts of hazardous waste or hazardous waste constituents that migrate from the waste management area to the uppermost aquifer.	A* 2860 NA CP NC ____

REGULATORY CITE	ITEM	INSPECTION FINDINGS
(6)(b)2	(NOTE: Separate monitoring systems for each waste management component of a facility are not required provided that provisions for sampling upgradient and downgradient water quality will detect any discharge from the waste management area. For example, in the case of a facility consisting of: 1) only one surface impoundment, landfill, or land treatment area, the waste management area is described by the waste boundary (perimeter), and 2) more than one surface impoundment, landfill, or land treatment area, the waste management area is described by an imaginary boundary line which circumscribes the several waste management components.)	
	3. Monitoring Well Construction	
(6)(b)3	a. All monitoring wells must be cased in a manner that maintains the integrity of the monitoring well bore hole. The casing must be screened or perforated, and packed with gravel or sand where necessary, to enable sample collection at depths where appropriate aquifer flow zones exist. All monitoring wells must have the annular space above the sampling depth sealed with a suitable material to prevent contamination of samples and the ground water.	A* 2875 NA CP NC ____
	4. Department Approval	
(6)(b)4	a. The location and construction of all monitoring wells must be approved by a Department staff geologist.	A* 2890 NA CP NC ____
	5. Sampling and Analysis Plan	
(6)(c)1	a. The owner or operator must develop and follow a ground-water sampling and analysis plan and keep this plan at the facility.	A* 2900 NA CP NC ____
	b. The owner or operator must ensure that the ground-water sampling and analysis plan includes procedures and techniques for:	
(6)(c)1(i)	I) Sample collection;	A* 2910 CP NC ____
(6)(c)1(ii)	II) Sample preservation and shipment;	A* 2920 CP NC ____
(6)(c)1(iii)	III) Analytical procedures; and	A* 2930 CP NC ____
(6)(c)1(iv)	IV) Chain of custody control.	A* 2940 CP NC ____
	(NOTE: See "Procedures Manual for Ground-Water Monitoring at Solid Waste Disposal Facilities", EPA-530/SW-611, August 1977 and "Methods for Chemical Analysis of Water and Wastes," EPA-600/4-79-020, March 1979 for discussions of sampling and analysis procedures.)	
	6. First Year Sampling and Analysis	
	a. For all monitoring wells, the owner or operator must establish initial background concentrations or values of all parameters listed below, quarterly for one year:	

10-23 100

Groundwater Compliance Evaluation Inspection

and

Comprehensive Monitoring Evaluation

conducted at

North American Rayon Corporation

Elizabethton, Tennessee

TND 095051207

March 8-9, 1989

by

Randy M. Curtis, R.P.G.

Tennessee Division of Solid Waste Management

DOCKET NO. 000102 ENI

T095051207

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Groundwater CEI/CME for NARC

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- Facility Background

Geology

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- Local Geology
- Soils
- Hydrology

Groundwater Monitoring Program

- Applicability
  - Groundwater System Components and Construction
  - Groundwater System Location of Wells
- Sampling and Analysis
  - Indicators of Contamination
  - Parameters Establishing Water Quality
  - Primary Drinking Water Standards
- Recordkeeping and Reporting
- Preparation, Evaluation, and Response

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Conclusions and Recommendations

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Appendix B: Misc. Groundwater Information
Appendix C: Soils Information
Appendix D: Relevant Correspondence, Memos
Appendix E: Field Notes, Photos
Appendix F: Well Construction Report

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T095051207

CEI/CME Evaluation Inspection
of
North American Rayon Corporation
TND 095051207

INTRODUCTION:

North American Rayon Corporation (NARC) conducts viscose manufacturing of textile and industrial continuous filament type rayon fiber and vinyl coated fabric. A surface impoundment and a waste pile have been operated at this facility without interim status or a permit.

The facility is in interim status detection monitoring for the surface impoundment and, on March 8-9, 1989, a Comprehensive Monitoring Evaluation (CME) and a Groundwater Compliance Evaluation Inspection (CEI) was conducted on the groundwater monitoring system associated with this impoundment.

The CME/CEI was conducted by Randy M. Curtis, a geologist for the Tennessee Department of Health and Environment, Division of Solid Waste Management (out of the Johnson City Field Office). Present during the evaluation were Ms. Laura Harris and Mr. Eric Bruce of Westinghouse HAZTECH, and Mr. Jim Deaton of Environmental Affairs, NARC.

Facility Location:

The surface impoundment is located at about N 36°F 21' 01.59" and W 82°F 14' 55.71", on the south side of the Watauga River in Elizabethton, Carter County, Tennessee. [See Figure 1]. The site may be found on the Elizabethton (207 SW) and the Johnson City (189 SE) 7.5 minute series topographic quadrangles. The site is situated near a fly-ash landfill (closed) which adjoins the area of the fly-ash basins and the surface impoundment on the down river (western) side. To the east, up-river, there is a Superfund site, identified as the Bemberg site.

Facility Background:

North American Rayon Corporation was constructed in 1928. During a Hazardous Waste Generator Inspection on November 18, 1987, Mr. Darrell Hale, an Environmental Specialist with the Tennessee Department of Health and Environment, observed a surface impoundment located near NARC's on-site wastewater treatment plant. The surface impoundment was also adjacent to settling and drying basins associated with NARC's National Pollutant Discharge Elimination System. Mr. Hale was told that the surface impoundment received waste sulfuric acid generated from routine spills within the plant. The surface impoundment was used as a storage area to gain time to allow the wastewater treatment process to absorb the excess without being overloaded. The acid

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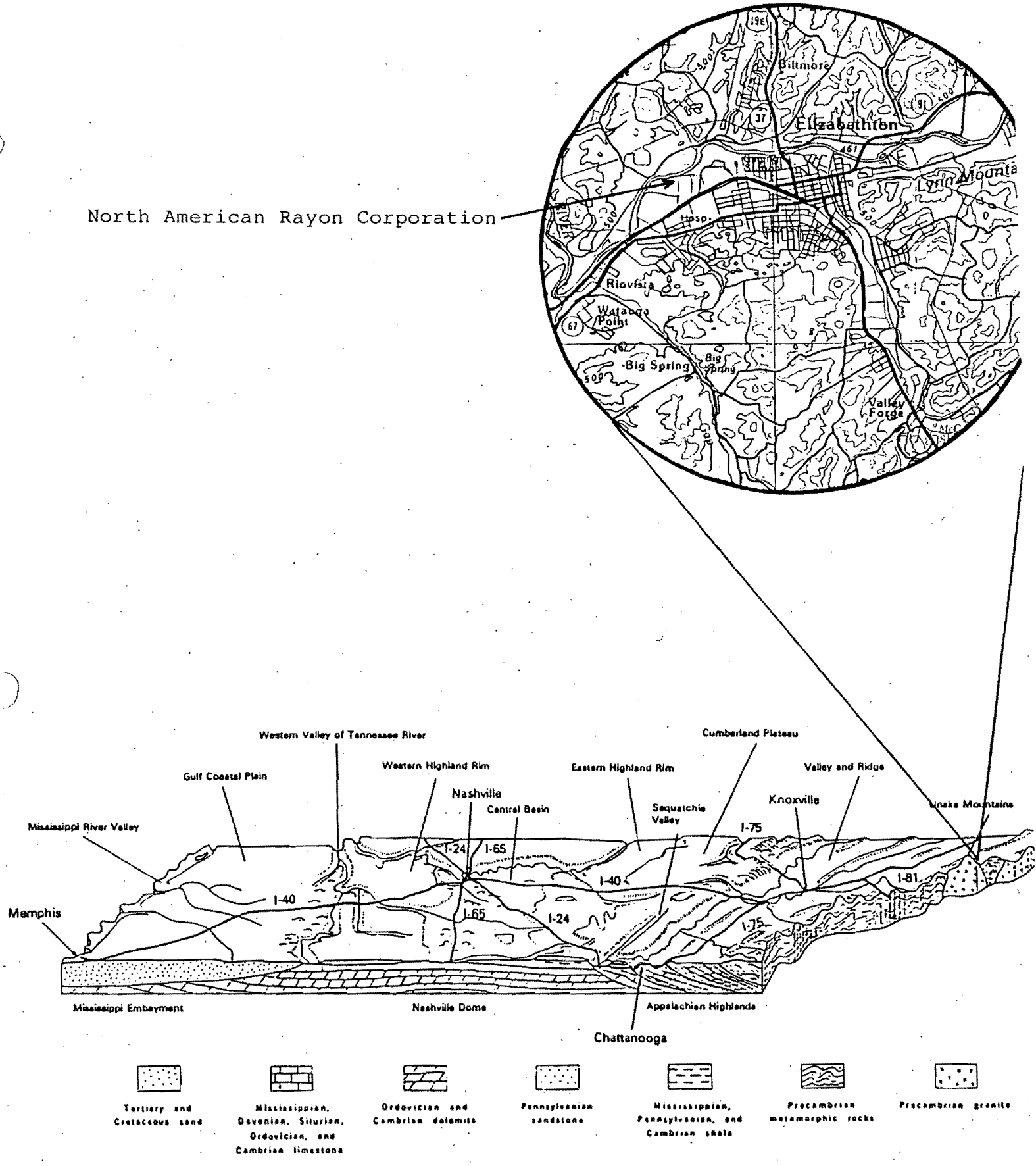

Fig. 1--General Location Map NARC.

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was pumped from the surface impoundment into the wastewater treatment plant as conditions allowed. The impoundment is approximately 840 feet long by 40 feet wide.

GEOLOGY:

Regional Geology:

The facility is located within the Valley and Ridge Physiographic Province. This is a province in which topography is a surficial expression of an underlying structural regime composed of low-angle thrust sheets. These thrust sheets are composed of bedrock of Cambrian to Silurian Age, which have been displaced from the southeast to the northwest. These thrusts erode into long valleys and ridges which trend NE-SW and dip SE, generally. Local overturning of beds, anticlinal and synclinal structures, and steep to vertical dip may also be found.

The Elizabethton area is near the eastern-most edge of the Valley and Ridge Physiographic Province. Nearby, to the NE and E, are older formations associated with the deformations of the Blue Ridge Province; an area dominated by more siliceous/clastic bedrock than the calcareous formation dominant in the Valley and Ridge. [See Figure 2].

Local Geology:

The site is located in an area of folded and faulted bedrock of Cambrian to Ordovician Age. The immediate area of the plant is mapped as the Honaker Dolomite of Cambrian Age. [See Figure 3]. The Honaker Dolomite is a formation which ranges from 2200 to 2500 feet thick (King and Ferguson, 1960). It is composed predominantly of dolomite, which weathers to a reddish orange clay soil. The formation contains some chert and has beds of a more shaly nature in the lower part of the section. Limestones are also present in some portions of the section.

Pugh (1966) recognized 329 feet of limestone between predominantly dolostone units in the Blountville area, to the north of Elizabethton.

Examination of the topographic map of the Elizabethton Quadrangle reveals the presence of Karst terrain to the south of the site, developed in rocks of the Honaker Dolomite and the Knox Formation (Cambro-Ordovician Age). [See Figure 4].

The nature of the bedrock surface in the area of the site is masked by the presence of alluvium brought in by the Watauga River system. Pinnacle development and sinks are not unlikely given the nature of the bedrock.

This masking, floodplain material, of Quaternary Age, is an important factor in the geology of the area, even though it is

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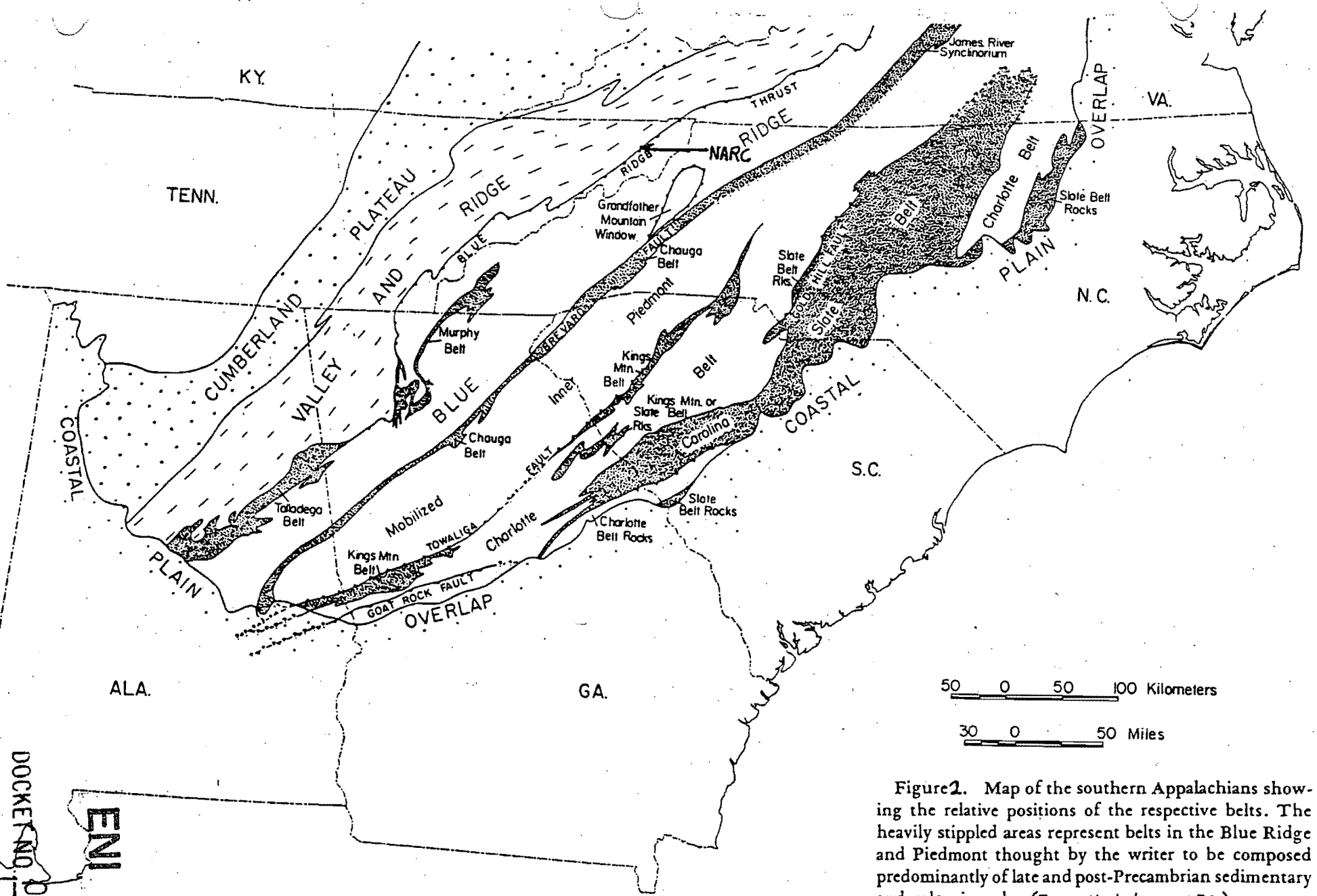

Figure 2. Map of the southern Appalachians showing the relative positions of the respective belts. The heavily stippled areas represent belts in the Blue Ridge and Piedmont thought by the writer to be composed predominantly of late and post-Precambrian sedimentary and volcanic rocks. (From Hatcher, 1972).

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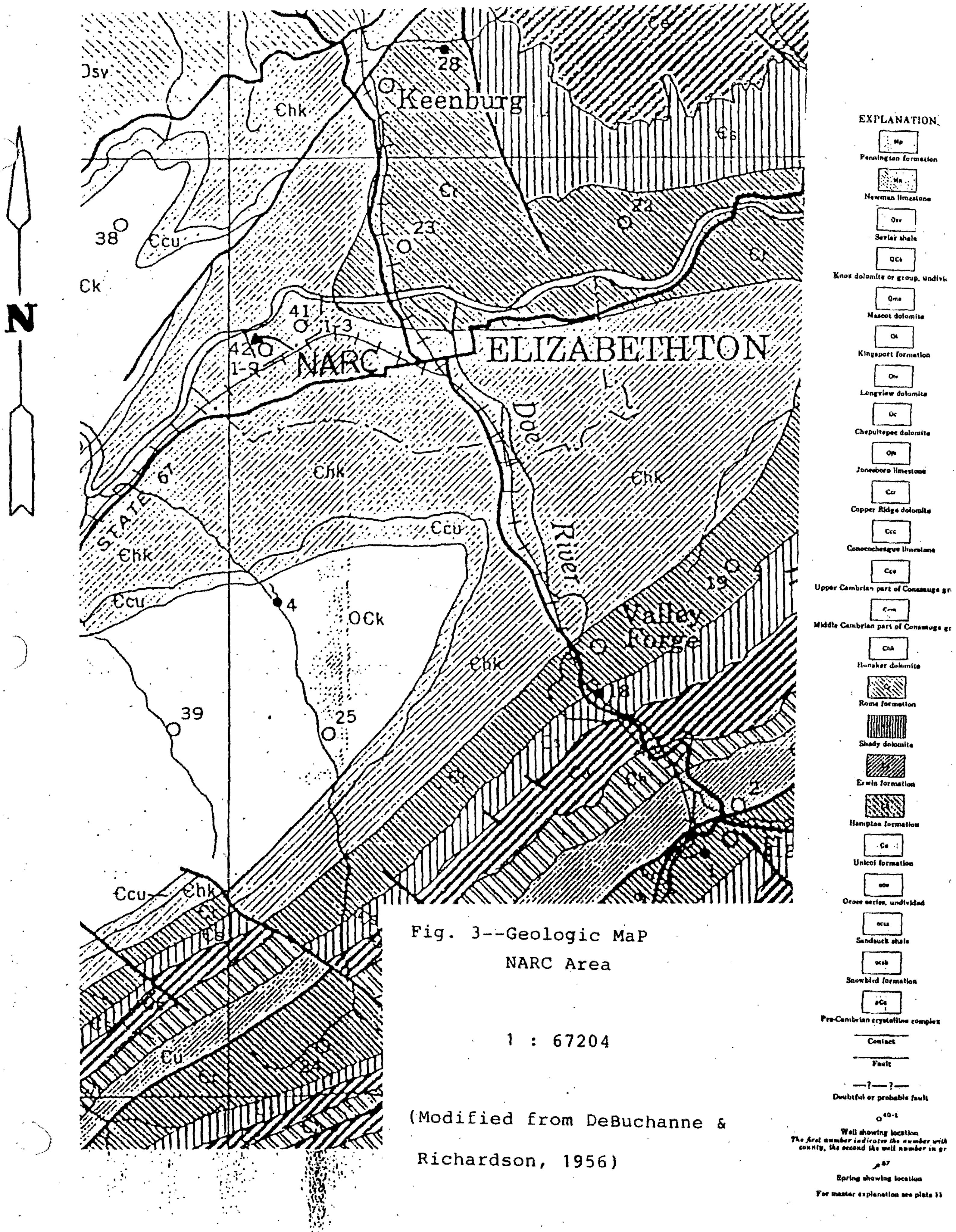


Fig. 3--Geologic MaP
NARC Area

1 : 67204

(Modified from DeBuchanne & Richardson, 1956)

Fig. 4-Physiographic Features, NARC Area

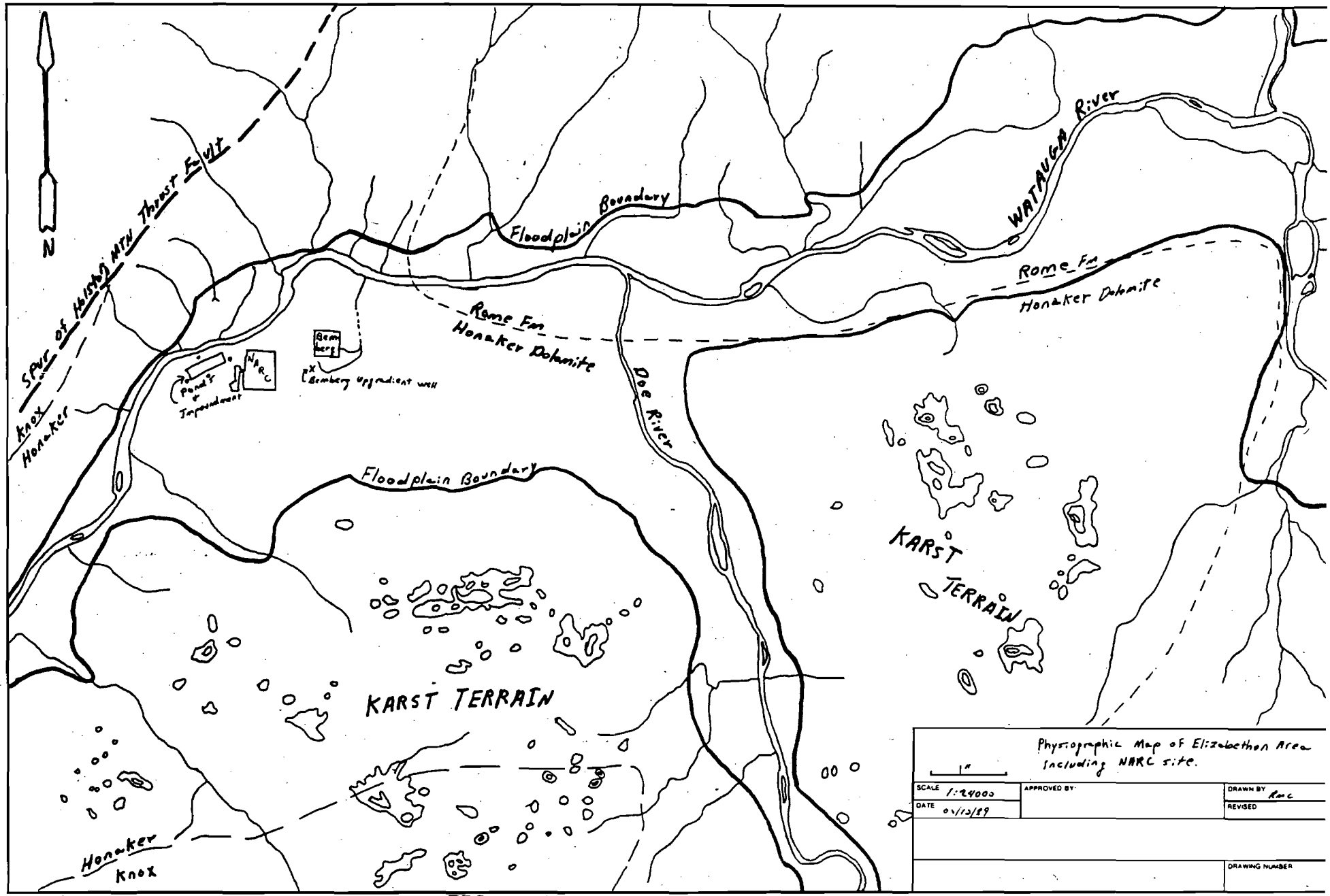


FIGURE 4

unconsolidated. The components of the floodplain deposits range in size from silt to large cobbles and have the mountainous terrain of the Blue Ridge Province as their primary source. The cobbles are predominantly quartzite, but many parent materials are represented.

Structurally, the NARC site is on the NW flank of an apparent anticlinal structure. This is borne out by the presence of a NW dip component in bedrock exposed in the hill slope across the river, and, in the general pattern of the formations mapped. [See Figure 3]. A spur of the Holston Mountain Thrust Fault occurs about 1/2 mile to the northwest. [See Figures 3 & 4].

Soils:

A soils map of the area and accompanying descriptive text are included as Appendix C (q.v.). The soils are developed on the river alluvium and terrace material. The nature of any deeper residual soils beneath the floodplain material is not gone into specifically. It is not unlikely that areas of residual soil, capped by terraces or protected by adjoining pinnacles or within deep crevices, exists beneath the site.

Hydrology:

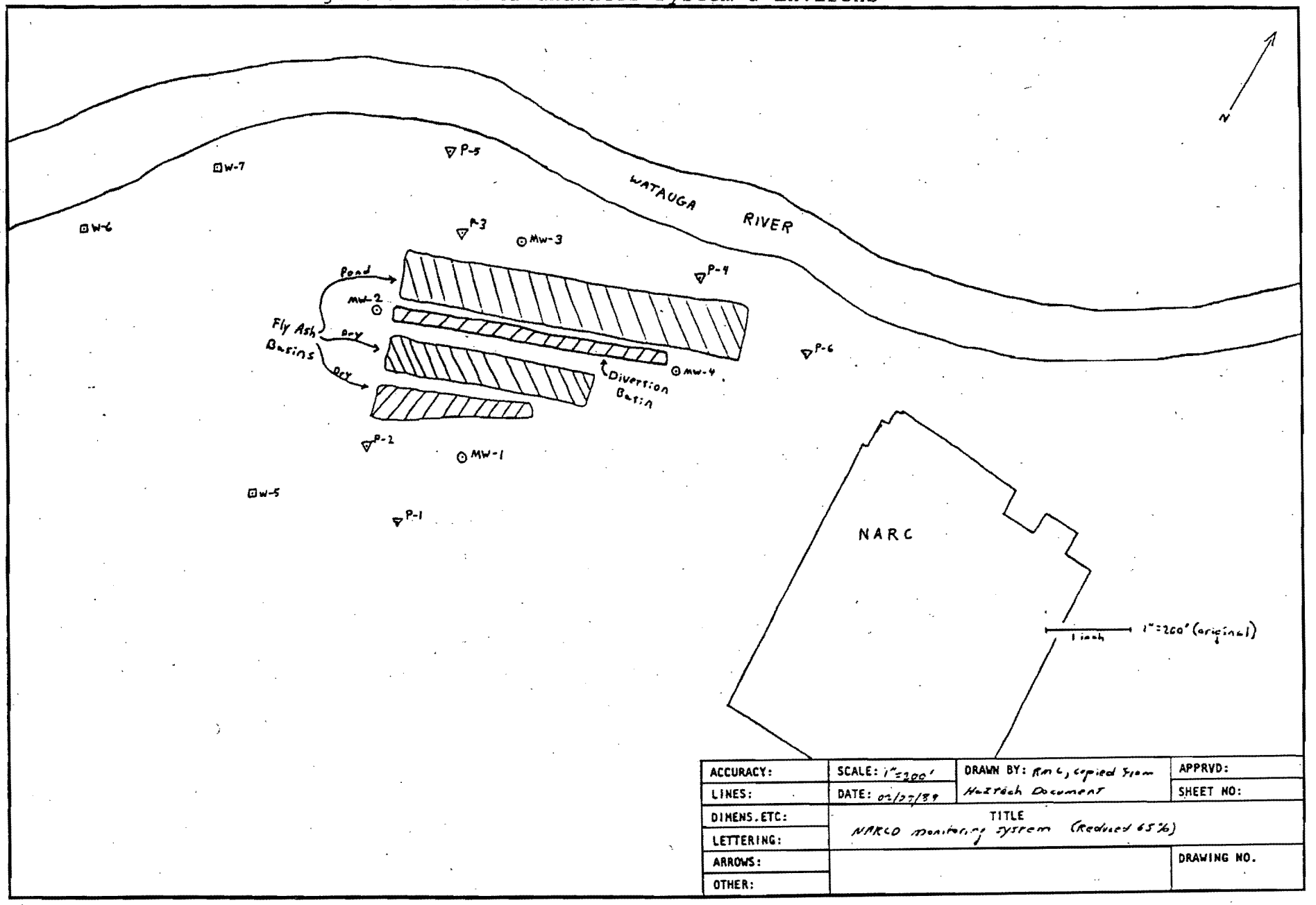
The hydrology of the site consists of an interplay between surface and subsurface components, among which are:

1. The Watauga River provides a groundwater regime of bedflow within the alluvium of its valley. The Watauga River is currently underfit and is flowing in a bed which is cut within older floodplain deposits. The older deposits include cobble layers which may represent terraces,and, as such, would provide areas of continuous cover over older alluvium and residual soils developed from the Honaker Dolomite. This bedflow within the alluvium interacts with water within solutional openings in the Honaker, as documented (as a probability) by Maclay (1962, p. 406-409). [See Appendix B]

2. The Honaker Dolomite is dominated by a regime of groundwater within solutional openings, typical of Karst areas.

3. Man-induced changes in the groundwater as a result of influx from any subsurface leakage, from the plant itself or from the fly-ash pond or basins.

Fig. 5 -- NARC Groundwater System & Environs



4. This portion of the Watauga River is located downstream of a hydro-electric/flood-control dam of the TVA system. Power generation requirements cause a regular small scale fluctuation of the river's flow. The minimum level of the river surface in this area is around 1486 feet above sea level. The river stage has reached record maximum of around 1507'. (USGS TN-81-1) [See Appendix B].

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Iron and manganese levels have exceeded secondary contaminent levels for public water systems in all the wells. This is not considered significant at this time. All wells except MW #1 exceeded the threshold of 250 mg/L for sulfate, the highest reading being 1200.39 mg/L for MW #2 on 03/09/89. This may be significant since sulfuric acid is the main parameter of concern and because zinc sulfate is used within the building.

Primary Drinking Water Standards (Rule 1200-1-11-.05(6)(c)2(i)):

During three quarters of sampling, primary drinking water standards were exceeded for arsenic, selenium, fluoride, nitrate and cadmium at various times. No consistent pattern has emerged, save for arsenic and selenium. These are addressed in a letter to the Division dated 02/07/89 in which the levels are attributed to the analytical method. [See Appendix D, 02/07/89 and 06/15/89].

Recordkeeping and Reporting (Rule 1200-1-11-.05(6)(e)):

NARC keeps on file all material provided by their consultant and all data generated by their program, as well as the documents required under the Hazardous Waste Regulations. All analytical results have been reported to the State in a timely manner.

Preparation, Evaluation, and Response (Rule 1200-1-11-.05(6)(d)):

A groundwater assessment outline is included in the Groundwater Monitoring Plan developed for NARC.

CONCLUSIONS AND RECOMMENDATIONS:

1. NARC must obtain data requisite for statistical comparisons from an upgradient, background sample source. The presence of the Bemberg Superfund site up river of NARC should be remembered when consideration is given to locating such a point.

2. The sampling and analysis plan developed for the facility must be followed. If NARC feels that strict adherence to the Plan is not justifiable, a new plan may be submitted for review or the current plan may be modified and the modifications submitted to the Division for review.

3. Surface modifications, subsurface dip, and surface hydrological input should all be considered when preparing maps of the potentiometric surface for this facility. Review of the data generated thus far indicate that MW #3 and MW #4 are not subject to the same degree of variance as MW #1 and MW #2. The groundwater data from this site must be utilized to the maximum extent possible in order to understand the interplay of all the factors involved in defining the potentiometric surface and the direction of flow.

4. The Bemberg site may be contributing to the sulfate component being seen in the NARC detection system.

Signed: Mandy M. Curtis, R.P.G. Date: 06/28/89

RMC/13029179

APPENDIX A

Checklists

CEI GW Checklist

REGULATORY CITE	ITEM	INSPECTION FINDINGS
	The owner or operator of a surface impoundment, landfill, or land treatment facility which is used to manage hazardous waste must implement a ground water monitoring program capable of determining the facility's impact on the quality of ground water in the uppermost aquifer underlying the facility. In order to comply with the ground water monitoring requirements, the owner or operator must develop and maintain either the "Indicator Parameter Program and Assessments" or implement an "Alternate Ground-Water Monitoring Program", unless the ground-water monitoring requirements have been waived by the Commissioner.	
	I. INDICATOR PARAMETER PROGRAM AND ASSESSMENTS	
	A. Indicator Parameter Program	
	1. Date of Implementation	
(6)(a)1	a. The owner or operator must ground-water monitoring program by.	A* 2800 NA CP NC ____
	2. Ground-water Monitoring System	
(6)(b)1	a. The ground-water monitoring system must be capable of yielding ground water samples for analysis.	A* 2810 NA CP NC ____
	(Note: This means all wells not waived by the Commissioner are to be capable of yielding groundwater samples for analysis, at all times.)	
	b. The ground-water monitoring system must consist of:	
(6)(b)1(i)	I) Monitoring wells (at least one) installed hydraulically upgradient from the limit of the waste management area.	A* 2820 NA CP NC ____
	i) Their number, locations, and depths must be sufficient to yield ground-water samples that are:	
(6)(b)1(i)(I)	i. Representative of the background ground-water quality in the uppermost aquifer near the facility; and	A* 2830 NA CP NC ____
(6)(b)1(i)(II)	ii. Not affected by the facility.	A* 2840 NA CP NC ____
(6)(b)1(ii)	II) Monitoring wells (at least three) installed hydraulically downgradient at the limit of the waste management area.	A* 2850 NA CP NC ____
(6)(b)1(ii)	i) Their number, locations, and depths must ensure that they can immediately detect any statistically significant amounts of hazardous waste or hazardous waste constituents that migrate from the waste management area to the uppermost aquifer.	A* 2860 NA CP NC ____

REGULATORY CITE	ITEM	INSPECTION FINDINGS
(6)(b)2	(NOTE: Separate monitoring systems for each waste management component of a facility are not required provided that provisions for sampling upgradient and downgradient water quality will detect any discharge from the waste management area. For example, in the case of a facility consisting of: 1) only one surface impoundment, landfill, or land treatment area, the waste management area is described by the waste boundary (perimeter), and 2) more than one surface impoundment, landfill, or land treatment area, the waste management area is described by an imaginary boundary line which circumscribes the several waste management components.)	
	3. Monitoring Well Construction	
(6)(b)3	a. All monitoring wells must be cased in a manner that maintains the integrity of the monitoring well bore hole. The casing must be screened or perforated, and packed with gravel or sand where necessary, to enable sample collection at depths where appropriate aquifer flow zones exist. All monitoring wells must have the annular space above the sampling depth sealed with a suitable material to prevent contamination of samples and the ground water.	A* 2875 NA CP NC ____
	4. Department Approval	
(6)(b)4	a. The location and construction of all monitoring wells must be approved by a Department staff geologist.	A* 2890 NA CP NC ____
	5. Sampling and Analysis Plan	
(6)(c)1	a. The owner or operator must develop and follow a ground-water sampling and analysis plan and keep this plan at the facility.	A* 2900 NA CP NC ____
	b. The owner or operator must ensure that the ground-water sampling and analysis plan includes procedures and techniques for:	
(6)(c)1(i)	I) Sample collection;	A* 2910 CP NC ____
(6)(c)1(ii)	II) Sample preservation and shipment;	A* 2920 CP NC ____
(6)(c)1(iii)	III) Analytical procedures; and	A* 2930 CP NC ____
(6)(c)1(iv)	IV) Chain of custody control.	A* 2940 CP NC ____
	(NOTE: See "Procedures Manual for Ground-Water Monitoring at Solid Waste Disposal Facilities", EPA-530/SW-611, August 1977 and "Methods for Chemical Analysis of Water and Wastes," EPA-600/4-79-020, March 1979 for discussions of sampling and analysis procedures.)	
	6. First Year Sampling and Analysis	
	a. For all monitoring wells, the owner or operator must establish initial background concentrations or values of all parameters listed below, quarterly for one year:	

REGULATORY CITE	ITEM	INSPECTION FINDINGS
(6)(c)3(i)	I) Parameters characterizing the suitability of the ground water as a drinking water supply, as specified below:	

	Parameter	Units
i)	Arsenic;	mg/l
ii)	Barium;	mg/l
iii)	Cadmium;	mg/l
iv)	Chromium;	mg/l
v)	Flouride;	mg/l
vi)	Lead;	mg/l
vii)	Mercury;	mg/l
viii)	Nitrate (as N);	mg/l
ix)	Selenium;	mg/l
x)	Silver;	mg/l
xi)	Endrin;	mg/l
xii)	Lindane;	mg/l
xiii)	Methoxychlor;	mg/l
xiv)	Toxaphene;	mg/l
xv)	2,4-D;	mg/l
xvi)	2,4,5-TP Silvex;	mg/l
xvii)	Radium;	pci/l
xviii)	Gross Alpha;	pCi/l
xix)	Gross Beta;	millirem/yr or pCi/l
xx)	Turbidity; and	TU
	(NOTE: Turbidity is applicable only to surface water supplies.)	
xxi)	Coliform Bacteria;	1/100 ml

A* 2950 NA (CP) NC ____

(6)(c)3( )

II) Parameters establishing ground-water quality, as specified below:

i) Chloride;
ii) Iron;
iii) Manganese;
iv) Phenols;
v) Sodium; and
vi) Sulfate;

A* 2960 NA (CP) NC ____

(NOTE: These parameters are to be used as a basis for comparison in the event a ground-water quality assessment is required.)

(6)( )3(i)

III) Parameters used as indicators of ground-water contamination, as specified below:

i) pH;
ii) Specific Conductance;
iii) Total Organic Carbon; and
iv) One of the following:

i. Total Organic Halogen (if approved by the Department); or

ii. Not more than three hazardous constituents or indicators thereof, found in the hazardous wastes handled by, or to be handled by the facility; to be selected by the owner or operator and approved by the Department considering such factors as quantity handled, degree of hazard, mobility, persistence, etc;

A* 2970 NA (CP) NC ____

REGULATORY CITE	ITEM	INSPECTION FINDINGS
(6)(c)3(ii)	b. The owner or operator must obtain at least four replicate measurements for each sample of the indicator parameters specified below: I) pH; II) Specific Conductance; III) Total Organic Carbon; and/or IV) Total Organic Halogen (see note). (NOTE: When the owner or operator chooses to analyze for the "not more than three hazardous constituents" instead of total organic halogen, replicates are not required for each of the constituents chosen per sample per well.)	A* 2980 NA (CP) NC _____
(6)(c)5	c. The owner or operator must determine the elevation of the ground water surface at each monitoring well each time a sample is obtained, but prior to any pumping of the well.	A* 2990 NA (CP) NC _____
	7. Outline of a Ground-water Quality Assessment Program	
(6)(d)1	a. The owner or operator must have an outline of a ground-water quality assessment program.	A* 3000 NA (CP) NC _____
	b. The owner or operator must have an outline of a ground-water quality assessment program which describes a more comprehensive ground-water monitoring program capable of determining:	
(6)(d)1(i)	I) Whether hazardous waste or hazardous waste constituents have entered the ground water;	A* 3010 (CP) NC _____
(6)(d)1(ii)	II) The rate and extent of migration of hazardous waste or hazardous waste constituents in the ground water; and	A* 3020 (CP) NC _____
(6)(d)1(iii)	III) The concentrations of hazardous waste or hazardous waste constituents in the ground water.	A* 3030 (CP) NC _____
	8. After the First Year Sampling and Analysis	
	a. After the first year, all monitoring wells must be sampled and analyzed with the following frequencies:	
(6)(c)4(i)	I) At least annually, the owner or operator must analyze the following parameters establishing ground-water quality: i) Chloride; ii) Iron; iii) Manganese; iv) Phenols; (v) Sodium; and (vi) Sulfate.	A* 3040 (NA) CP NC _____
(6)(c)4(ii)	II) At least every six months, the owner or operator must obtain at least four replicate measurements for each sample of the indicator parameters specified below: i) pH; ii) Specific Conductance; iii) Total Organic Carbon; and/or iv) Total Organic Halogen (see note).	A* 3050 (NA) CP NC _____

REGULATORY CITE	ITEM	INSPECTION FINDINGS
	(NOTE: When the owner or operator chooses to analyze for the "not more than three hazardous constituents" instead of total organic halogen, replicates are not required for each of the constituents chosen per sample per well.)	
	9. Comparisons for Upgradient Wells	
(6)(d)2	a. The owner or operator must compare the analytical results obtained for the "Indicator Parameters", for the samples taken after the first year, to the initial background data, obtained during the first year, in accordance with the "Procedures For Statistically Evaluating Ground-water Monitoring Data" (Appendix .05/C) in order to determine if any well exhibits statistically significant increases in parameter values (and decreases, in the case of pH) over the initial background values established for that upgradient well.	A* 3060 (NA) CP NC ____
(6)(d)3(i)	b. If the comparisons for the upgradient wells show a significant increase (or pH decrease), the owner or operator must note that fact in a cover letter attached to the annual report.	A* 3065 (NA) CP NC ____
	10. Comparisons for Downgradient Wells	
(6)(d)2	a. The owner or operator must compare the analytical results obtained for the "Indicator Parameters", for the samples taken after the first year, to the initial background data, obtained during the first year, in accordance with the "Procedures For Statistically Evaluating Ground-water Monitoring Data" (Appendix .05/C) in order to determine if any well exhibits statistically significant increases in parameter values (and decreases, in the case of pH) over the Initial background values established for that downgradient well.	A* 3070 (NA) CP NC ____
(6)(d)2	b. The owner or operator must compare the analytical results obtained for the "Indicator Parameters", for the samples taken after the first year, to the Initial background data, obtained during the first year, in accordance with the "Procedures For Statistically Evaluating Ground-water Monitoring Data" (Appendix .05/C) in order to determine if any downgradient well exhibits statistically significant increases in parameter values (and decreases, in the case of pH) over the Initial "pooled upgradient" background values established by pooling data from all upgradient wells.	A* 3080 (NA) CP NC ____
(6)(d)3(ii)	c. If the comparisons for the downgradient wells show a significant increase (or pH decrease), the owner or operator must then immediately obtain additional ground-water samples from these downgradient wells where a significant difference was detected, split the samples in two, and obtain analyses of all additional samples to determine whether the significant difference was a result of laboratory error.	A* 3090 (NA) CP NC ____
	(NOTE: If the additional analyses performed confirm the significant increase (or pH decrease) go to the "Ground-water Quality Assessment Program" Section of the manual.)	

REGULATORY CITE	ITEM	INSPECTION FINDINGS
	11. Monitoring Ground-water Surface Elevation	
(6)(d)6	a. At least annually, the owner or operator must evaluate the data on ground-water surface elevations obtained each time a well is sampled (prior to pumping) to determine whether the wells are properly located.	A* 3100 (NA) CP NC ____
(6)(d)6	b. If the evaluation of the data on ground-water surface elevations shows that the wells are not properly located (i.e. upgradient well not being in the direction of increasing static head), the owner or operator must immediately modify, with the approval of a Department staff geologist, the number, location, and depth of the monitoring wells to bring the ground-water monitoring system into compliance.	A* 3110 (NA) CP NC ____
	12. Recordkeeping	
	a. The owner or operator must keep the following records throughout the active life of the facility and, for disposal facilities, throughout the post-closure care period as well:	
(6)(e)1(i)	I) The analytical results establishing background data for each well, obtained during the first year;	A* 3120 NA CP NC ____
(6)(e)1(i)	II) The analytical results obtained for each well after the first year;	A* 3130 NA CP NC ____
(6)(e)1(i)	III) Ground-water surface elevations obtained for each well each sampling; and	A* 3140 NA CP NC ____
	IV) The evaluations made to determine if the facility is affecting ground-water quality when using the "Procedures For Statistically Evaluating Ground-water Monitoring Data" (Appendix .05/C).	A* 3150 NA CP NC ____
	13. Reporting	
	a. The owner or operator must report the following ground-water monitoring information to the Commissioner:	
	I) During the first year:	
(6)(e)1(ii)(I)	i) The concentrations or values of the parameters establishing background data (Parameters characterizing the suitability of the ground water as a drinking water supply; parameters establishing ground-water quality; and parameters used as indicators of ground-water contamination), for each ground-water monitoring well within 15 days after completing each quarterly analysis; and	A* 3160 NA CP NC ____
(6)(e)1(ii)(I)	ii) Separately identify for each monitoring well, any of the parameters, characterizing the suitability of the ground water as a drinking water supply, whose concentration or value has been found to exceed the maximum contaminant level listed for the "Interim Primary Drinking Water Standards" (Appendix .05/B).	A* 3170 NA CP NC ____

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REGULATORY CITE	ITEM	INSPECTION FINDINGS
	II) Annually:	
(6)(e)1(ii)(II)	i) Concentrations or values of the parameters establishing ground-water quality and the parameters used as indicators of ground-water contamination for each ground-water monitoring well, along with the required evaluations made to determine if the facility is statistically affecting ground-water quality;	A* 3180 (NA) CP NC _____
(6)(e)1(ii)(II)	ii) Separately identify any significant differences from initial background found in the upgradient wells by noting that fact in a cover letter; and	A* 3190 (NA) CP NC _____
(6)(e)1(ii)(II)	iii) Submit this information as a part of the annual report during the active life of the facility.	A* 3200 (NA) CP NC _____
(6)(e)1(ii)(III)	III) As a part of the annual report submit the results of the evaluation of ground-water surface elevations and a description of the response to that evaluation if applicable.	A* 3210 (NA) CP NC _____
	B. The Ground-water Quality Assessment	
	1. Date of Implementation	
	a. If the well comparisons show a significant increase (or pH decrease), and this significant change is confirmed by additional analyses, the owner or operator must:	
(6)(d)4(i)	I) Provide written notice to the Commissioner, within seven days of the date of the confirmation; that the facility may be affecting ground-water quality;	A* 3220 (NA) CP NC _____
(6)(d)4(ii)	II) Develop and submit a specific plan, within 15 days after notifying the Commissioner, which is based upon the "Outline of a Ground-Water Quality Assessment Program" (previously prepared by the owner or operator), certified by a qualifed geologist or engineer, for a ground-water quality assessment program at the facility.	A* 3230 (NA) CP NC _____
	2. The Ground-water Quality Assessment Plan	
	a. The plan outlining the ground-water assessment program must specify:	
(6)(d)4(iii)(I)	I) The number, location, and depth of wells;	A* 3240 (NA) CP NC _____
(6)(d)4(iii)(II)	II) Sampling and analytical methods for those hazardous wastes or hazardous waste constituents in the facility;	A* 3250 (NA) CP NC _____
(6)(d)4(iii)(III)	III) Evaluation procedures, including any use of previously gathered ground-water quality information; and	A* 3260 (NA) CP NC _____
(6)(d)4(iii)(IV)	IV) A schedule of implementation.	A* 3270 (NA) CP NC _____

REGULATORY CITE	ITEM	INSPECTION FINDINGS
	3. Implementing the Ground-Water Quality Assessment Program	
	a. The owner or operator must implement the approved ground-water quality assessment plan and, at a minimum, determine:	
(6)(d)4(iv)(I)	I) The rate and extent of migration of the hazardous waste or hazardous waste constituents in the ground water; and	A* 3280 (NA) CP NC ____
(6)(d)4(iv)(II)	II) The concentrations of the hazardous waste or hazardous waste constituents in the ground water.	A* 3290 (NA) CP NC ____
	4. The First Determination of the Ground-Water Quality	
(6)(d)4(v)	a. The owner or operator must make his first determination of the ground-water quality as soon as technically feasible, and, within 15 days after that determination, submit to the Commissioner a written report containing an assessment of the ground-water quality.	A* 3300 (NA) CP NC ____
	5. Determination Does Not Show Contamination	
(6)(d)4(vi)	a. If the owner or operator determines, based on the results of the first determination of the ground water quality, that no hazardous waste or hazardous waste constituents from the facility have entered the ground water, then he may reinstate the "Indicator Parameter Program", and if so, he must notify the Commissioner in the "Written Report Containing an Assessment of the Ground-Water Quality".	A* 3310 (NA) CP NC ____
	6. Determination Shows Contamination	
(6)(d)4(vii)(I)	a. If the owner or operator determines, based on the first determination of the ground-water quality, that hazardous wastes or hazardous waste constituents from the facility have entered the ground water, then he must continue to make the ground-water quality determinations on a quarterly basis until final closure of the facility, if the ground-water quality assessment plan was implemented prior to final closure of the facility; or may cease to make the determinations of the ground-water quality, if the ground-water quality assessment plan was implemented during the post-closure care period.	A* 3320 (NA) CP NC ____
	7. Requirements to Complete and Report Assessment Initiated Prior to Closure	
(6)(d)5	a. Any ground-water quality assessment initiated prior to final closure of the facility must be completed by the owner or operator and reported to the Commissioner within 15 days after the determination of the ground-water quality.	A* 3330 (NA) CP NC ____
	8. Recordkeeping	
(6)(e)2(i)	a. The owner or operator must keep records of the analyses and evaluations specified in the approved ground-water quality assessment plan, throughout the active life of the facility, and for disposal facilities, throughout the post-closure care period as well.	A* 3340 (NA) CP NC ____

REGULATORY CITE	ITEM	INSPECTION FINDINGS
	9. Reporting	
(6)(e)2(ii)	a. The owner or operator must submit, as a part of the annual report, until final closure of the facility, a report containing the results of his ground-water quality assessment program which includes, but is not limited to the calculated (or measured) rate of migration of hazardous waste or hazardous waste constituents in the ground water during the reporting period.	A* 3350 (NA) CP NC ____
	II. ALTERNATE GROUND-WATER MONITORING PROGRAM	
	If an owner or operator assumes (or knows) that ground-water monitoring of indicator parameters would show statistically significant increases (or pH decreases) when evaluated, he may, install, operate, and maintain an alternate ground-water monitoring system.	
	A. The Alternate Ground-Water Monitoring Program	
	1. Date of Implementation	
(6)(a)4(i)	a. The owner or operator must have submitted to the Commissioner a specific plan, certified by a qualified geologist or engineer.	A* 3360 (NA) CP NC ____
	I) The specific plan must specify the following:	
(6)(a)4(i)	i) The number, location, and depth of wells;	A* 3370 (NA) CP NC ____
(6)(a)4(i)	ii) Sampling and analytical methods for those hazardous wastes or hazardous waste constituents in the facility;	A* 3380 (NA) CP NC ____
(6)(a)4(i)	iii) Evaluation procedures, including any use of previously-gathered ground-water quality information; and	A* 3390 (NA) CP NC ____
(6)(a)4(i)	iv) A schedule of implementation.	A* 3400 (NA) CP NC ____
	b. No later than November 19, 1981, initiate the following determinations:	
(6)(a)4(ii)	I) The rate and extent of migration of the hazardous waste or hazardous waste constituents in the ground water; and	A* 3410 (NA) CP NC ____
(6)(a)4(ii)	II) The concentrations of the hazardous waste or hazardous waste constituents in the ground water.	A* 3420 (NA) CP NC ____
	2. Written Report	
(6)(a)4(iii)	a. The owner or operator must make his first determination as soon as technically feasible, and, within 15 days after that determination, submit to the Commissioner a written report containing an assessment of the ground water quality.	A* 3430 (NA) CP NC ____

REGULATORY CITE	ITEM	INSPECTION FINDINGS
	3. Determination Schedule	
(6)(a)4(iv)	a. The owner or operator must determine: the rate and extent of migration of the hazardous waste or hazardous waste constituents in the ground water; and the concentrations of the hazardous waste or hazardous waste constituents in the groundwater, on a quarterly basis until final closure of the facility.	A* 3440 (NA) CP NC ____
	4. Recordkeeping	
(6)(a)4(v)	a. The owner or operator must keep records of the analyses and evaluations specified in the approved plan, throughout the active life of the facility, and for disposal facilities, throughout the post-closure care period as well.	A* 3450 (NA) CP NC ____
	5. Reporting	
(6)(a)4(v)	a. The owner or operator must submit, as a part of the annual report, until final closure of the facility, a report containing the results of his alternate ground-water monitoring program which included, but is not limited to the calculated (or measured) rate of migration of hazardous waste or hazardous waste constituents in the ground water during the reporting period.	A* 3460 (NA) CP NC ____

III. GROUND-WATER MONITORING WAIVER

All ground-water monitoring waivers must be petitioned for by the owner or operator and will be evaluated separately.

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APPENDIX A

COMPREHENSIVE GROUND-WATER MONITORING EVALUATION WORKSHEET

The following worksheets have been designed to assist the enforcement officer/ technical reviewer in evaluating theground-water monitoring system an owner/operator uses to collect and analyze samples of ground water. The focus of the worksheets is technical adequacy as it relates to obtaining and analyzing representative samples of ground water. The basis of the worksheets is the final RCRA Ground Water Monitoring Technical Enforcement Guidance Document which describes in detail the aspects of ground-water monitoring which EPA deems essential to meet the goals of RCRA. Appendix A is not a regulatory checklist. Specific technical deficiencies in the monitoring system can, however, be related to the regulations as illustrated in Figure 4.3 taken from the RCRA Ground-Water Monitoring Compliance Order Guide (COG) (included at the end of the appendix). The enforcement officer, in developing an enforcement order, should relate the technical assessment from the worksheets to the regulations using Figure 4.3 from the COG as a guide.

Comprehensive Ground-Water Monitoring Evaluation	Y/N
I. Office Evaluation Technical Evaluation of the Design of the Ground-Water Monitoring System	
A. Review of Relevant Documents	
1. What documents were obtained prior to conducting the inspection:	
a. RCRA Part A permit application?	N
b. RCRA Part B permit application?	N
c. Correspondence between the owner/operator and appropriate agencies or citizen's groups?	Y
d. Previously conducted facility inspection reports?	Y
e. Facility's contractor reports?	Y
f. Regional hydrogeologic, geologic, or soil reports?	Y
g. The facility's Sampling and Analysis Plan?	Y
h. Ground-water Assessment Program Outline (or Plan, if thefacility is in assessment monitoring)?	Y
i. Other (specify) Ground-Water Monitoring Plan For Emergency Spill Diversion Basin.	Y

	Y/N
E valuation of the Owner/Operator's Hydrogeologic Assessment	
1. Did the owner/operator use the following direct techniques in the hydrogeologic assessment:	
a. Logs of the soil borings/rock corings (documented by a professional geologist, soil scientist, or geotechnical engineer)?	Y
b. Materials tests (e.g., grain size analyses, standard penetration tests, etc.)?	N
c. Piezometer installation for water level measurments at different depths?d. Slug tests? Piezometers were installed	
e. Pump tests?	N
f. Geochemical analyses of soil samples?	N
g. Other (specify) (e.g., hydrochemical diagrams and wash analysis)	N
2. Did the owner/operator use the following indirect technique to supplement direct techniques data:	N
a. Geophysical well logs?	↓
b. Tracer studies?	↓
c. Resistivity and/or electromagnetic conductance?	↓
d. Seismic Survey?	↓
e. Hydraulic conductivity measurements of cores?	↓
f. Aerial photography?	↓
g. Ground penetrating radar?	↓
h. Other (specify)	↓
3. Did the owner/operator document and present the raw data from the site hydrogeologic assessment? Report on Well & pz installation	Y
4. Did the owner/operator document methods (criteria) used to correlate and analyze the information?	N
5. The owner/operator prepare the following:	↓
a. Narrative description of geology?	↓
b. Geologic cross sections?	↓
c. Geologic and soil maps?	↓
d. Boring/coring logs?	↓
e. Structure contour maps of the differing water bearing zones and confining layer?	↓
f. Narrative description and calculation of ground-water flows?	↓

	Y/N
g. Water table/potentiometric map?	Y
h. Hydrologic cross sections?	N
6. Did the owner/operator obtain a regional map of the area and delineate the facility?	
If yes, does this map illustrate:	
a. Surficial geology features?	N
b. Streams, rivers, lakes, or wetlands near the facility?	Y
c. Discharging or recharging wells near the facility?	N
7. Did the owner/operator obtain a regional hydrogeologic map?	N
If yes, does this hydrogeologic map indicate:	
a. Major areas of recharge/discharge?	N
b. Regional ground-water flow direction?	N
c. Potentiometric contours which are consistent with observed water level elevations?	N
8. Did the owner/operator prepare a facility site map?	
If yes, does the site map show:	
a. Regulated units of the facility (e.g., landfill areas,impoundments)?	Y
b. Any seeps, springs, streams, ponds, or wetlands?	Y
c. Location of monitoring wells, soil borings, or test pits?	Y
d. How many regulated units does the facility have? 2	
If more than one regulated unit then,	
• Does the waste management area encompass all regulated units? waste pile to be clean/closed	N
• Is a waste management area delineated for each regulated unit?	N
C. Characterization of Subsurface Geology of Site	
1. Soil boring/test pit program:	
a. Were the soil borings/test pits performed under thesupervision of a qualified professional?	Y
b. Did the owner/operator provide documentation for selecting the spacing for borings?	Y
c. Were the borings drilled to the depth of the first confining unit below the uppermost zone of saturation or ten feet into bedrock?	Y
d. Indicate the method(s) of drilling: SHME contractual work for tank installation /foundation, site, but not unit, related Air rotary & Auger	

	Y/N
Auger (hollow or solid stem) ✓ Mud rotary ____ Reverse rotary ____ Cable tool ____ Jetting ____ Other (specify) Air rotary	
e. Were continuous sample corings taken?	✓
f. How were the samples obtained (checked method[s]) • Split spoon ____ • Shelby tube, or similar ____ • Rock coring ____ • Ditch sampling ____ • Other (explain) ____	
g. Were the continuous sample corings logged by a qualified professional in geology?	
h. Does the field boring log include the following information: • Hole name/number?	
• Date started and finished?	
• Driller's name?	
• Hole location (i.e., map and elevation)?	
• Drill rig type and bit/auger size?	
• Gross petrography (e.g., rock type) of each geologic unit?	
• Gross mineralogy of each geologic unit?	
• Gross structural interpretation of each geologic unit and structural features (e.g., fractures, gouge material, solution channels, buried streams or valleys, identification of depositional material)?	
• Development of soil zones and vertical extent and description of soil type?	
• Depth of water bearing unit(s) and vertical extent of each?	
• Depth and reason for termination of borehole?	
• Depth and location of any contaminant encountered in borehole?	
• Sample location/number?	
• Percent sample recovery?	
• Narrative descriptions of: —Geologic observations?	
—Drilling observations?	
i. Were the following analytical tests performedon the core samples: • Mineralogy (e.g., microscopic tests and x-ray diffraction)?	
• Petrographic analysis: —degree of crystallinity and cementation of matrix?	
—degree of sorting, size fraction (i.e., sieving), textural variations?	
—rock type(s)?	

	Y/N
—soil type?	✓
—approximate bulk geochemistry?	
—existence of microstructures that may effect or indicate fluid flow?	
• Falling head tests?	
• Static head tests?	
• Settling measurements?	
• Centrifuge tests?	
• Column drawings?	✓
D. Verification of Subsurface Geological Data	
1. Has the owner/operator used indirect geophysical methods to supplement geological conditions between borehole locations?	✓
2. Do the number of borings and analytical data indicate that the confining layer displays a low enough permeability to impede the migration of contaminants to any stratigraphically low water-bearing units?	
3. Is the confining layer laterally continuous across the entire site?	
4. Did the owner/operator consider the chemical compatibility of the site-specific waste types and the geologic materials of the confining layer?	
5. Did the geologic assessment address or provide means for resolution of any information gaps of geologic data?	
6. Do the laboratory data corroborate the field data for petrography?	
7. Do the laboratory data corroborate the field data for mineralogy and subsurface geochemistry?	✓
E. Presentation of Geologic Data	
1. Did the owner/operator present geologic cross sections of the site?	N
2. Do cross sections:	
a. identify the types and characteristics of the geologic materials present?	
b. define the contact zones between different geologic materials?	
c. note the zones of high permeability or fracture?	
d. give detailed borehole information including:	✓

	Y/N
• location of borehole?	N
• depth of termination?	↓
• location of screen (if applicable)?	↓
• depth of zone(s) of saturation?	↓
• backfill procedure?	↓
3. Did the owner/operator provide a topographic map which was constructed by a licensed surveyor?	
4. Does the topographic map provide:	
a. contours at a maximum interval of two-feet?	N
b. locations and illustrations of man-made features (e.g., parking lots, factory buildings, drainage ditches, storm drain, pipelines, etc.)? No pipelines	Y
c. descriptions of nearby water bodies?	Y
d. descriptions of off-site wells?	N
e. site boundaries?	Y
f. individual RCRA units?	
g. delineation of the waste management area(s)?	
h. well and boring locations?	Y
5. Did the owner/operator provide an aerial photograph depicting the site and adjacent off-site features?	N
6. Does the photograph clearly show surface water bodies, adjacent municipalities, and residences and are these clearly labelled?	N
F. Identification of Ground-Water Flowpaths	
1. Ground-water flow direction	
a. Was the well casing height measured by a licensed surveyor to the nearest 0.01 feet?	~~N~~ Y
b. Were the well water level measurements taken within a 24 hour period?	Y
c. Were the well water level measurements taken to the nearest 0.01 feet?	Y
d. Were the well water levels allowed to stabilize after construction and development for a minimum of 24 hours prior to measurements?	Y
e. Was the water level information obtained from (check appropriate one):	
• multiple piezometers placed in single borehole? ____	and individual piezometers
• vertically nested piezometers in closely spaced separate ____	
• boreholes? ____	
• monitoring wells? Y	

	Y/N
f. Did the owner/operator provide construction details for the piezometers?	Y
g. How were the static water levels measured (check method[s]). • Electric water sounder ✓ • Wetted tape ____ • Air line ____ • Other (explain) ____	
h. Was the well water level measured in wells with equivalent screened intervals at an equivalent depth below the saturated zone?	N/A
i. Has the owner/operator provided a site water table (potentiometric) contour map?	Y
If yes, • Do the potentiometric contours appear logical and accurate based on topography and presented data? (Consult water level data)	Y
• Are ground-water flow-lines indicated?	N
• Are static water levels shown?	Y
• Can hydraulic gradients be estimated?	Y
j. Did the owner/operator develop hydrologic cross sections of the vertical flow component across the site using measurements from all wells?	N
k. Do the owner/operator's flow nets include: • piezometer locations?	
• depth of screening?	
• width of screening?	
• measurements of water levels from all wells and piezometers?	
2. Seasonal and temporal fluctuations in ground-water a. Do fluctuations in static water levels occur? If yes, are the fluctuations caused by any of the following:	
—Off-site well pumping	
—Tidal processes or other intermittent natural variations (e.g., river stage, etc.)	Y
—On-site well pumping	
—Off-site, on-site construction or changing land use patterns	
—Deep well injection	
—Seasonal variations	Y
—Other (specify) ____	
b. Has the owner/operator documented sources and patterns that contribute to or affect the ground-water patterns below the waste management?	Y
c. Do water level fluctuations alter the general ground-water gradients and flow directions?	N/A
d. Based on water level data, do any head differentials occur that may indicate a vertical flow component in the saturated zone?	N/A

	Y/N
e. Did the owner/operator implement means for gauging long term effects on water movement that may result from on-site or off-site construction or changes in land-use patterns?	✓
3. Hydraulic conductivity a. How were hydraulic conductivities of the subsurface materials determined?	✓
• Single-well tests (slug tests)?	
• Multiple-well tests (pump tests)	
• Other (specify) _____	
b. If single-well tests were conducted, was it done by: • Adding or removing a known volume of water?	
• Pressurizing well casing?	
c. If single well tests were conducted in a highly permeable formation, were pressure transducers and high-speed recording equipment used to record the rapidly changing water levels?	
d. Since single well tests only measure hydraulic conductivity in a limited area, were enough tests run to ensure a representative measure of conductivity in each hydrogeologic unit?	
e. Is the owner/operator's slug test data (if applicable) consistent with existing geologic information (e.g., boring logs)?	
f. Were other hydraulic conductivity properties determined?	
g. If yes, provide any of the following data, if available: • Transmissivity _____ • Storage coefficient _____ • Leakage _____ • Permeability _____ • Porosity _____ • Specific capacity _____ • Other (specify) _____	✓
4. Identification of the uppermost aquifer a. Has the extent of the uppermost saturated zone (aquifer) in the facility area been defined? If yes,	✓
• Are soil boring/test pit logs included?	
• Are geologic cross-sections included?	
b. Is there evidence of confining (competent, unfractured, continuous, and low permeability) layers beneath the site? If yes,	
• how was continuity demonstrated? _____	
c. What is hydraulic conductivity of the confining unit (if present)? CM/Sec How was it determined?	✓

	Y/N
d. Does potential for other hydraulic communication exist (e.g., lateral incontinuity between geologic units, facies changes, fracture zones, cross cutting structures, or chemical corrosion/alteration of geologic units by leachage? If yes or no, what is the rationale?	y
G. Office Evaluation of the Facility's Ground-Water Monitoring System—Monitoring Well Design and Construction: These questions should be answered for each different well design present at the facility. 1. Drilling Methods a. What drilling method was used for the well? • Hollow-stem auger ☐ • Solid-stem auger ☐ • Mud rotary ☐ • Air rotary ☒ • Reverse rotary ☐ • Cable tool ☐ • Jetting ☐ • Air drill w/ casing hammer ☒ • Other (specify) _____	
b. Were any cutting fluids (including water) or additives used during drilling? If yes, specify: • Type of drilling fluid water from fire hydrant • Source of water used _____ • Foam _____ • Polymers _____ • Other _____	
c. Was the cutting fluid, or additive, identified?	
d. Was the drilling equipment steam-cleaned prior to drilling the well? • Other methods _____	y
e. Was compressed air used during drilling? If yes, • was the air filtered to remove oil?	y
f. Did the owner/operator document procedure for establishing the potentiometric surface? If yes, • how was the location established?	y
g. Formation samples	y

	Y/N
• Were formation samples collected initially during drilling?	Y
• Were any cores taken continuous?	Y
• If not, at what interval were samples taken?	n/a
• How were the samples obtained? —Split spoon —Shelby tube —Core drill —Other (specify)	
• Identify if any physical and/or chemical tests were performed on the formation samples (specify) _____ _____ _____	
2. Monitoring Well Construction Materials a. Identify construction materials (by number) and diameters (ID/OD) Material / Diameter • Primary Casing: PVC / 2" • Secondary or outside casing (doubleconstruction): steel / 6 5/8" • Screen: PVC / 2"	
b. How are the sections of casing and screen connected?	
• Pipe sections threaded	
• Couplings (friction) with adhesive or solvent	
• Couplings (friction) with retainer screws	
• Other (specify) threaded flush joint with "O" ring	
c. Were the materials steam-cleaned prior to installation?	
• If no, how were the materials cleaned? _____	Y
3. Well Intake Design and Well Development	Y
a. Was a well intake screen installed?	
• What is the length of the screen for the well? 10'	
• Is the screen manufactured?	Y
b. Was a filter pack installed?	
• What kind of filter pack was employed? Sand (must obtained from filter bed stockpile)	
• Is the filter pack compatible with formationmaterials?	Y
• How was the filter pack installed? by hand ~~was~~ as protective casing was pulled	

	Y/N
• What are the dimensions of the filter pack? 8¼ ±	
• Has a turbidity measurement of the well water ever been made?	N
• Have the filter pack and screen been designed for the insitu materials? .01 for sand material	Y
c. Well development • Was the well developed?	Y
• What technique was used for well development? —Surge block —Bailer —Air surging —Water pumping —Other (specify) _____	
4. Annular Space Seals a. What is the annular space in the saturated zone directlyabove the filter pack filled with: X Sodium bentonite (specify type and grit) pellet —Cement (specify neat or concrete) —Other (specify)	
b. Was the seal installed by: X Dropping material down the hole and ~~tamping~~ —Dropping material down the inside of hollow-stem auger —Tremie pipe method —Other (specify)	
c. Was a different seal used in the unsaturated zone? If yes,	Y
• Was this seal made with? —Sodium bentonite (specify type and grit) —Cement (specify neat or concrete)- Other (specify) cement/bentonit	
• Was this seal installed by? —Dropping material down the hole and tamping —Dropping material down the inside of hollow stem auger —Other (specify) grouting machine	
d. Is the upper portion of the borehole sealed with a concrete cap to prevent infiltration from the surface?	
e. Is the well fitted with an above-ground protectivedevice and bumper guards?	N
f. Has the protective cover been installed with locks to prevent tampering?	Y

	Y/N
H. Evaluation of the Facility's Detection Monitoring Program	
1. Placement of Downgradient Detection Monitoring Wells	
a. Are the ground-water monitoring wells or clusters located immediately adjacent to the waste management area?	Y
b. How far apart are the detection monitoring wells?	
c. Does the owner/operator provide a rationale for thelocation of each monitoring well or cluster?	
d. Does the owner/operator identified the well screenlengths of each monitoring well or clusters?	
e. Does the owner/operator provide an explanation for the well screen lengths of each monitoring well orcluster?	
f. Do the actual locations of monitoring wells orclusters correspond to those identified by the owner/operator?	
2. Placement of Upgradient Monitoring Wells	
a. Has the owner/operator documented the location ofeach upgradient monitoring well or cluster?	N
b. Does the owner/operator provide an explanation forthe location(s) of the upgradient monitoring wells?	NA
c. What length screen has the owner/operator employed inthe background monitoring well(s)?	NA
d. Does the owner/operator provide an explanation for the screen length(s) chosen?	NA
e. Does the actual location of each background monitoring well or cluster correspond to that identified by the owner/operator?	NA
I. Office Evaluation of the Facility's Assessment Monitoring Program	
1. Does the assessment plan specify:	
a. The number, location, and depth of wells?	
b. The rationale for their placement and identify the basis that will be used to select subsequent sampling locations and depths in later assessment phases?	
2. Does the list of monitoring parameters include all hazardous waste constituents from the facility?	

	Y/N
a. Does the water quality parameter list include other important indicators not classified as hazardous waste constituents?	
b. Does the owner/operator provide documentation for he listed wastes which are not included?	
3. Does the owner/operator's assessment plan specify the procedures to be used to determine the rate of constituent migration in the ground-water?	
4. Has the owner/operator specified a schedule of implementation in the assessment plan?	
5. Have the assessment monitoring objectives been clearly defined in the assessment plan?	
a. Does the plan include analysis and/or re-evaluation to determine if significant contamination has occurredin any of the detection monitoring wells?	
b. Does the plan provide for a comprehensive program of investigation to fully characterize the rate and extent of contaminant migration from the facility?	
c. Does the plan call for determining the concentrations of hazardous wastes and hazardous waste constituentsin the ground water?	
d. Does the plan employ a quarterly monitoring program?	
6. Does the assessment plan identify the investigatory methods that will be used in the assessment phase?	
a. Is the role of each method in the evaluation fully described?	
b. Does the plan provide sufficient descriptions of the direct methods to be used?	
c. Does the plan provide sufficient descriptions of the indirect methods to be used?	
d. Will the method contribute to the further characterization of the contaminant movement?	
7. Are the investigatory techniques utilized in the assessment program based on direct methods?	
a. Does the assessment approach incorporate indirect methods to further support direct methods?	
b. Will the planned methods called for in the assessment approach ultimately meet performance standards for assessment monitoring?	
c. Are the procedures well defined?	
d. Does the approach provide for monitoring wells similar in design and construction as the detectionmonitoring wells?	

	Y/N
e. Does the approach employ taking samples during drilling or collecting core samples for further analysis?	
8. Are the indirect methods to be used based on reliable and accepted geophysical techniques?	
a. Are they capable of detecting subsurface changesresulting from contaminant migration at the site?	
b. Is the measurement at an appropriate level of sensitivity to detect ground-water quality changes at the site?	
c. Is the method appropriate considering the nature of the subsurface materials?	
d. Does the approach consider the limitations of these methods?	
e. Will the extent of contamination and constituent concentration be based on direct methods and sound engineering judgment? (Using indirect methods tofurther substantiate the findings.)	
9. Does the assessment approach incorporate any mathe-matical modeling to predict contaminant movement?	
a. Will site specific measurements be utilized toaccurately portray the subsurface?	
b. Will the derived data be reliable?	
c. Have the assumptions been identified?	
d. Have the physical and chemical properties of the site-specific wastes and hazardous waste constituentsbeen identified?	
J. Conclusions	
1. Subsurface geology	
a. Has sufficient data been collected to adequately define petrography and petrographic variation?	
b. Has the subsurface geochemistry been adequately defined?	
c. Was the boring/coring program adequate to definesubsurface geologic variation?	
d. Was the owner/operator's narrative description complete and accurate in its interpretation of the data?	
e. Does the geologic assessment address or provide means to resolve any information gaps?	
2. Ground-water flowpaths	
a. Did the owner/operator adequately establish the hori-zontal and vertical components of ground-water flow?	

	Y/N
b. Were appropriate methods used to establish ground-water flowpaths?	
c. Did the owner/operator provide accurate documentation?	
d. Are the potentiometric surface measurements valid?	
e. Did the owner/operator adequately consider the seasonal and temporal effects on the ground-water?	
f. Were sufficient hydraulic conductivity tests performed to document lateral and vertical variationin hydraulic conductivity in the entire hydrogeologic subsurface below the site?	
3. Uppermost Aquifer a. Did the owner/operator adequately define the upper-most aquifer?	
4. Monitoring Well Construction and Design a. Do the design and construction of the owner/operator's ground-water monitoring wells permit depth discrete ground-water samples to be taken?	
b. Are the samples representative of ground-water quality?	
c. Are the ground-water monitoring wells structurally stable?	
d. Does the ground-water monitoring well's design and construction permit an accurate assessment of aquifer characteristics?	
5. Detection Monitoring a. Downgradient Wells • Do the location, and screen lengths of the ground-water monitoring wells or clusters in the detection monitoring system allow the immediate detection of a release of hazardous waste or constituents from the hazardous waste management area to the uppermost aquifer?	
b. Upgradient Wells • Do the location and screen lengths of the upgradient (background) ground-water monitoring wells ensure the capability of collecting ground-water samples representative of upgradient (background) ground-water quality including any ambient heterogenous chemical characteristics?	
6. Assessment Monitoring a. Has the owner/operator adequately characterized site hydrogeology to determine contaminant migration?	
b. Is the detection monitoring system adequately designed and constructed to immediately detect any contaminant release?	

	Y/N
c. Are the procedures used to make a first determinationof contamination adequate?	
d. Is the assessment plan adequate to detect, characterize, and track contaminant migration?	
e. Will the assessment monitoring wells, given site hydrogeologic conditions, define the extent and concentration of contamination in the horizontal and vertical planes?	
f. Are the assessment monitoring wells adequately designed and constructed?	
g. Are the sampling and analysis procedures adequate to provide true measures of contamination?	
h. Do the procedures used for evaluation of assessment monitoring data result in determinations of the rate of migration, extent of migration, and hazardous constituent composition of the contaminant plume?	
i. Are the data collected at sufficient frequency and duration to adequately determine the rate of migration?	
j. Is the schedule of implementation adequate?	
k. Is the owner/operator's assessment monitoring plan adequate?	
• If the owner/operator had to implement hisassessment monitoring plan, was it implemented satisfactorily?	
Field Evaluation **A. Ground-Water Monitoring System** 1. Are the numbers, depths, and locations of monitoring wells in agreement with those reported in the facility's monitoring plan? (See Section 3.2.3.)	Y
B. Monitoring Well Construction 1. Identify construction material material diameter a. Primary Casing steel b. Secondary or outside casing PVC	
2. Is the upper portion of the borehole sealed with conrete to prevent infiltration from the surface?	Y
3. Is the well fitted with an above-ground protective device?	
Is the protective cover fitted with locks to prevent tampering? If a facility utilizes more than a single well design, answer the above questions for each well design?	

	Y/N
III. Review of Sample Collection Procedures	
A. Measurement of Well Depths /Elevation	
1. Are measurements of both depth to standing water and depth to the bottom of the well made?	Y
2. Are measurements taken to the 0.01 feet?	Y
3. What device is used? Electronic depth sounder	Y
4. Is there a reference point established by a licensed surveyor?	Y
5. Is the measuring equipment properly cleaned betweenwll locations to prevent cross contamination?	Y
B. Detection of Immiscible Layers	
1. Are procedures used which will detect light phase immiscible layers?	N
2. Are procedures used which will detect heavy phase immiscible layers?	N
C. Sampling of Immiscible Layers	
1. Are the immiscible layers sampled separately prior to well evacuation?	N/A
2. Do the procedures used minimize mixing with watersoluble phases?	N/A
D. Well Evacuation	
1. Are low yielding wells evacuated to dryness?	N/A
2. Are high yielding wells evacuated so that at least three casing volumes are removed?	Y
3. What device is used to evacuate the wells? well wizard	
4. If any problems are encountered (e.g., equipmentmalfunction) are they noted in a field logbook?	Y

	Y/N
F ample Withdrawal	
1. For low yielding wells, are samples for volatiles, pH, and oxidation/reduction potential drawn first after the well recovers?	NA
2. Are samples withdrawn with either flurocarbon/resins or stainless steel (316, 304 or 2205) sampling devices?	NA
3. Are sampling devices either bottom valve bailers or positive gas displacement bladder pumps?	Y
4. If bailers are used, is fluorocarbon/resin coated wire, single strand stainless steel wire, or monofilament used to raise and lower the bailer?	N/A
5. If bladder pumps are used, are they operated in acontinuous manner to prevent aeration of the sample?	Y
6. If bailers are used, are they lowered slowly to prevent degassing of the water?	NA
If bailers are used, are the contents transferred to the sample container in a way that minimizes agitation and aeration?	NA
8. Is care taken to avoid placing clean sampling equipment on the ground or other contaminated surfaces prior to insertion into the well?	Y
9. If dedicated sampling equipment is not used, is equipment disassembled and thoroughly cleaned between samples?	NA
10. If samples are for inorganic analysis, does the cleaning procedure include the following sequential steps: a. Dilute acid rinse (HNO_3 or HC1)?11. If samples are for organic analysis, does the cleaning procedure include the following sequential steps:	NA
11. If samples are for inorganic analysis, does the cleaning procedure include the following sequential steps: a. Nonphosphate detergent wash?	NA
b. Tap water rinse?	
c. Distilled/deionized water rinse?	
d. Acetone rinse?	
e. Pesticide-grade hexane rinse?	

	Y/N
12. Is sampling equipment thoroughly dry before use?	N/A
13. Are equipment blanks taken to ensure that sample cross-contamination has not occurred?	Y
14. If volatile samples are taken with a positive gas displacement bladder pump, are pumping rates below 100 ml/min?	Y
F. In-situ or Field Analyses	
1. Are the following labile (chemically unstable) parameters determined in the field:	
a. pH?	Y
b. Temperature?	Y
c. Specific conductivity?	Y
d. Redox potential?	N
e. Chlorine?	
f. Dissolved oxygen?	
g. Turbidity?	
h. Other (specify) _____	
2. For in-situ determinations, are they made after well evacuation and sample removal?	Y
3. If sample is withdrawn from the well, is parameter measured from a split portion?	Y
4. Is monitoring equipment calibrated according to mannufacturers' specifications and consistent with SW-846?	Y
5. Is the date, procedure, and maintenance for equipment calibration documented in the field logbook?	N
IV. Review of Sample Preservation and Handling Procedures	
A. Sample Containers	
1. Are samples transferred from the sampling device directly to their compatible containers?	Y

	Y/N
2. Are sample containers for metals (inorganics) analyses polyethylene with polypropylene caps?	Y
3. Are sample containers for organics analysis glass bottles with fluorocarbonresin-lined caps?	N
4. If glass bottles are used for metals samples are the caps fluorocarbonresin-lined?	Y
5. Are the sample containers for metal analyses cleanedusing these sequential steps:	lab protocol
a. Nonphosphate detergent wash?	
b. 1:1 nitric acid rinse?	
c. Tap water rinse?	
d. 1:1 hydrochloric acid rinse?	
e. Tap water rinse?	
f. Distilled/deionized water rinse?	
6. Are the sample containers for organic analyses cleaned using these sequential steps:	
a. Nonphosphate detergent/hot water wash?	
b. Tap water rinse?	
c. Distilled/deionized water rinse?	
d. Acetone rinse?	
e. Pesticide-grade hexane rinse?	
7. Are trip blanks used for each sample container type to verify cleanliness?	Y
B. Sample Preservation Procedures	Y
1. Are samples for the following analyses cooled to 4°C:	
a. TOC?	
b. TOX?	
c. Chloride?	
d. Phenols?	
e. Sulfate?	
f. Nitrate?	
g. Coliform bacteria?	
h. Cyanide?	
i. Oil and grease?	
j. Hazardous constituents (}261, Appendix VIII)?	Y

	Y/N
2. Are samples for the following analyses field acidified to pH <2 with HNO_3:	
a. Iron?	Y
b. Manganese?	
c. Sodium?	
d. Total metals?	
e. Dissolved metals?	
f. Fluoride?	
g. Endrin?	
h. Lindane?	
i. Methoxychlor?	
j. Toxaphene?	
k. 2,4, D?	
l. 2,4,5 TP Silvex?	
m. Radium?	
n. Gross alpha?	
o. Gross beta?	
3. Are samples for the following analyses field acidfied to pH <2 with H_2SO_4:	
a. Phenols?	Y
b. Oil and grease?	
4. Is the sample for TOC analyses field acified to pH <2 with HCl?	
5. Is the sample for TOX analysis preserved with 1 ml of 1.1 M sodium sulfite?	N
6. Is the sample for cyanide analysis preserved with NaOH to pH >12?	N/A
C. Special Handling Considerations	
1. Are organic samples handled without filtering?	Y
2. Are samples for volatile organics transfered to the appropriate vials to eliminate headspace over the sample?	N/A
3. Are samples for metal analysis split into two portions?	
4. Is the sample for dissolved metals filtered through a 0.45 micron filter?	N
5. Is the second portion not filtered and analyzed for total metals?	
6. Is one equipment blank prepared each day of ground-water sampling?	N

	Y/N
V Review of Chain-of-Custody Procedures	
A. Sample Labels	
1. Are sample labels used?	Y
2. Do they provide the following information:	
a. Sample identification number?	Y
b. Name of collector?	↓
c. Date and time of collection?	↓
d. Place of collection?	↓
e. Parameter(s) requested and preservitives used? NO listing of preservatives	N
3. Do they remain legible even if wet?	Y
B. Sample Seals	
1. Are sample seals placed on those containers to ensure samples are not altered? on cooler only Not on individual bottles	
C ield Logbook	
1. Is a field logbook maintained?	Y
2. Does it document the following:	
a. Purpose of sampling (e.g., detection or assesment)?	
b. Location of well(s)?	Y
c. Total depth of each well?	Y
d. Static water level depth and measurement technique?	X
e. Presence of immiscible layers and detection method?	
f. Collection method for immiscible layers and sample identification numbers?	
g. Well evacuation procedures?	
h. Sample withdrawal procedure?	
i. Date and time of collection?	Y
j. Well sampling sequence?	
k. Types of sample containers and sample identification number(s)?	
l. Preservative(s) used?	
m. Parameters requested?	
n. Field analysis data and method(s)?	Y
o. Sample distribution and transporter?	
p. Field observations?	Y

	Y/N
—Unusual well recharge rates?	
—Equipment malfunction(s)?	
—Possible sample contamination?	
—Sampling rate?	
D. Chain-of-Custody Record	
1. Is a chain-of-custody record included with each sample?	Y
2. Does it document the following:	Y
a. Sample number?	
b. Signiture of collector?	
c. Date and time of collection?	
d. Sample type?	
e. Station location?	
f. Number of containers?	
g. Parameters requested?	
h. Signatures of persons involved in chain-of-custody?	
i. Inclusive dates of custody?	
E. Sample Analysis Request Sheet	
1. Does a sample analysis request sheet accompany each sample?	
2. Does the request sheet document the following:	
a. Name of person receiving the sample?	
b. Date of sample receipt?	
c. Duplicates?	
d. Analysis to be performed?	
IV. Review of Quality Assurance/Quality Control	
A. Is the validity and reliability of the laboratory and field generated data ensured by a QA/QC program?	Y
B. Does the QA/QC program include:	
1. Documentation of any deviation from approved procedures?	

	Y/N
2. Documentation of analytical results for:	
a. Blanks?	Y
b. Standards?	
c. Duplicates?	
d. Spiked samples?	
e. Detectable limits for each parameter being analyzed?	
C. Are approved statistical methods used?	
D. Are QC samples used to correct data?	
E. Are all data critically examined to ensure it has been properly calculated and reported?	
VII. Surficial Well Inspection and Field Observation	
A. Are the wells adequately maintained? Concrete pad develop cracks	Y
. Are the monitoring wells protected and secure?	Y
C. Do the wells have surveyed casing elevations?	Y
D. Are the ground-water samples turbid?	2/4 Y
E. Have all physical characteristics of the site been noted in the inspector's field notes (i.e., surface waters, topography, surface features)?	Y
F. Has a site sketch been prepared by the field inspector with scale, north arrow, location(s) of buildings, location(s) of regulated units, locations of monitoring wells, and a rough depiction of the site drainage pattern?	Y

	Y/N
III. Conclusions	
A. Is the facilitycurrently operating under the correct monitoring progaram according to the statistical analyses performed by the current operator?	N/A
B. Does the ground-water monitoring system, as designed and operated, allow for detection or assessment of any possible ground-water contamination caused by the facility?	Y
C. Does the sampling and analysis procedures permit the owner/operator to detect and, where possible, assess the nature and extent of a release of hazardous constituents to ground water from the monitored hazardous waste management facility?	Y

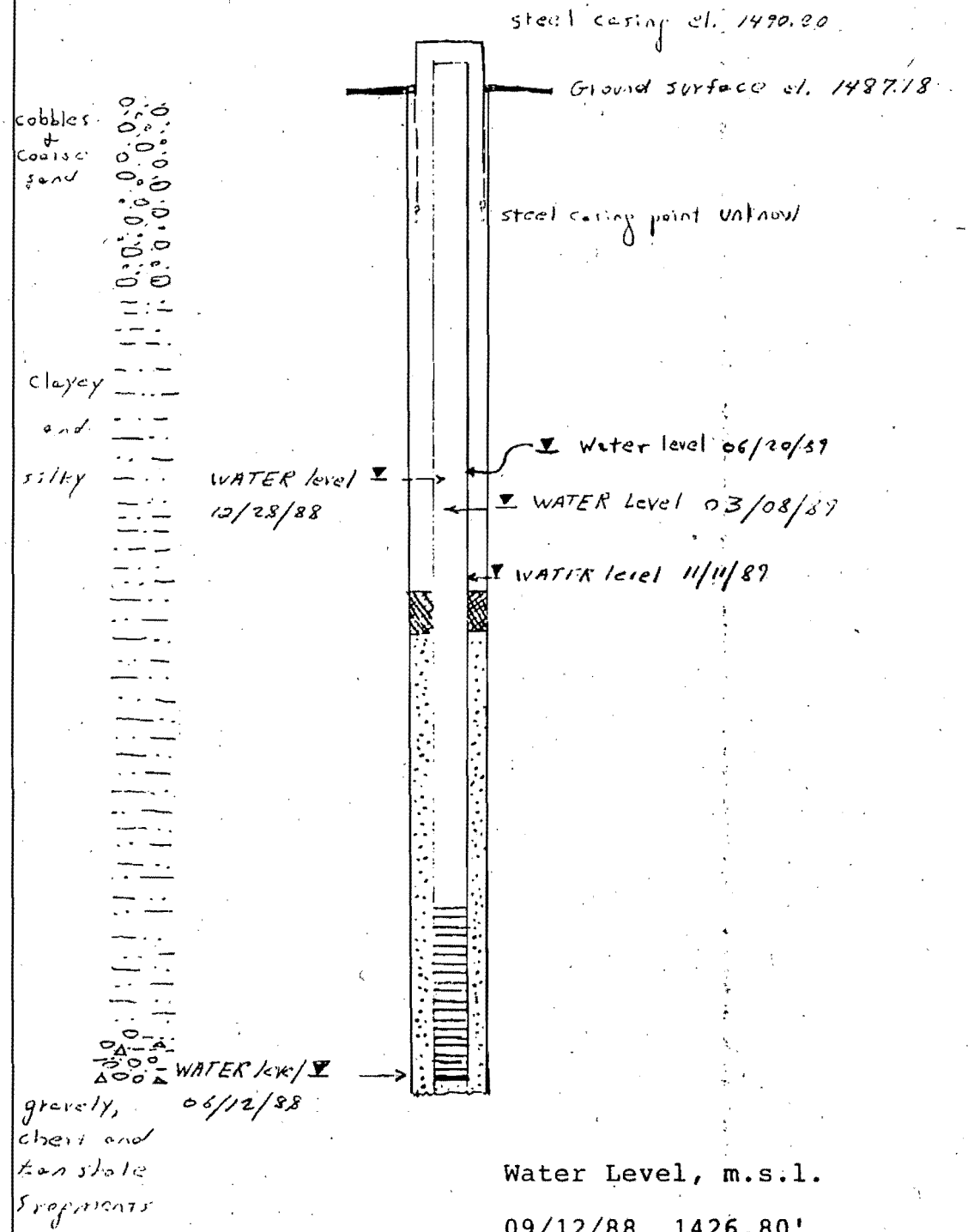
Figure 4.3
Relationship of Technical Inadequacies to Ground-Water Performance Standards

Examples of Basic Elements Required by Performance Standards	Examples of Technical Inadequacies that may Constitute Violations	Regulatory Citations
1. Uppermost Aquifer must be correctly identified.	• failure to consider aquifers hydraulically interconnected to the uppermost aquifer.	§265.90(a) §265.91(a)(1, 2) §270.14(c)(2)
	• incorrect identification of certain formations as confining layers or aquitards.	§265.90(a) §265.91(a)(1, 2) §270.14(c)(2)
	• failure to use test drilling and/or soil borings to characterize subsurface hydrogeology.	§265.90(a) §265.91(a)(1, 2) §270.14(c)(2)
2. Ground-water flow directions and rates must be properly determined.	• failure to use piezometers or wells to determine ground-water flow rates and directions (or failure to use a sufficient number of them).	§265.90(a) §265.91(a)(1, 2) §270.14(c)(2)
	• failure to consider temporal variations in water levels when establishing flow directions (e.g., seasonal variations, short-term fluctuations due to pumping).	§265.90(a) §265.91(a)(1, 2) §270.14(c)(2)
	• failure to assess significance of vertical gradients when evaluating flow rates and directions.	§265.90(a) §265.91(a)(1, 2) §270.14(c)(2)
	• failure to use standard/consistent benchmarks when establishing water level elevations.	§265.90(a) §265.91(a)(1, 2) §270.14(c)(2)
	• failure of the owner/operator (o/o) to consider the effect of local withdrawal wells on ground-water flow direction.	§265.90(a) §265.91(a)(1)
	• failure of the o/o to obtain sufficient water level measurements.	§265.90(a) §265.91(a)(1)

APPENDIX B

Miscellaneous Groundwater Information

MW 1

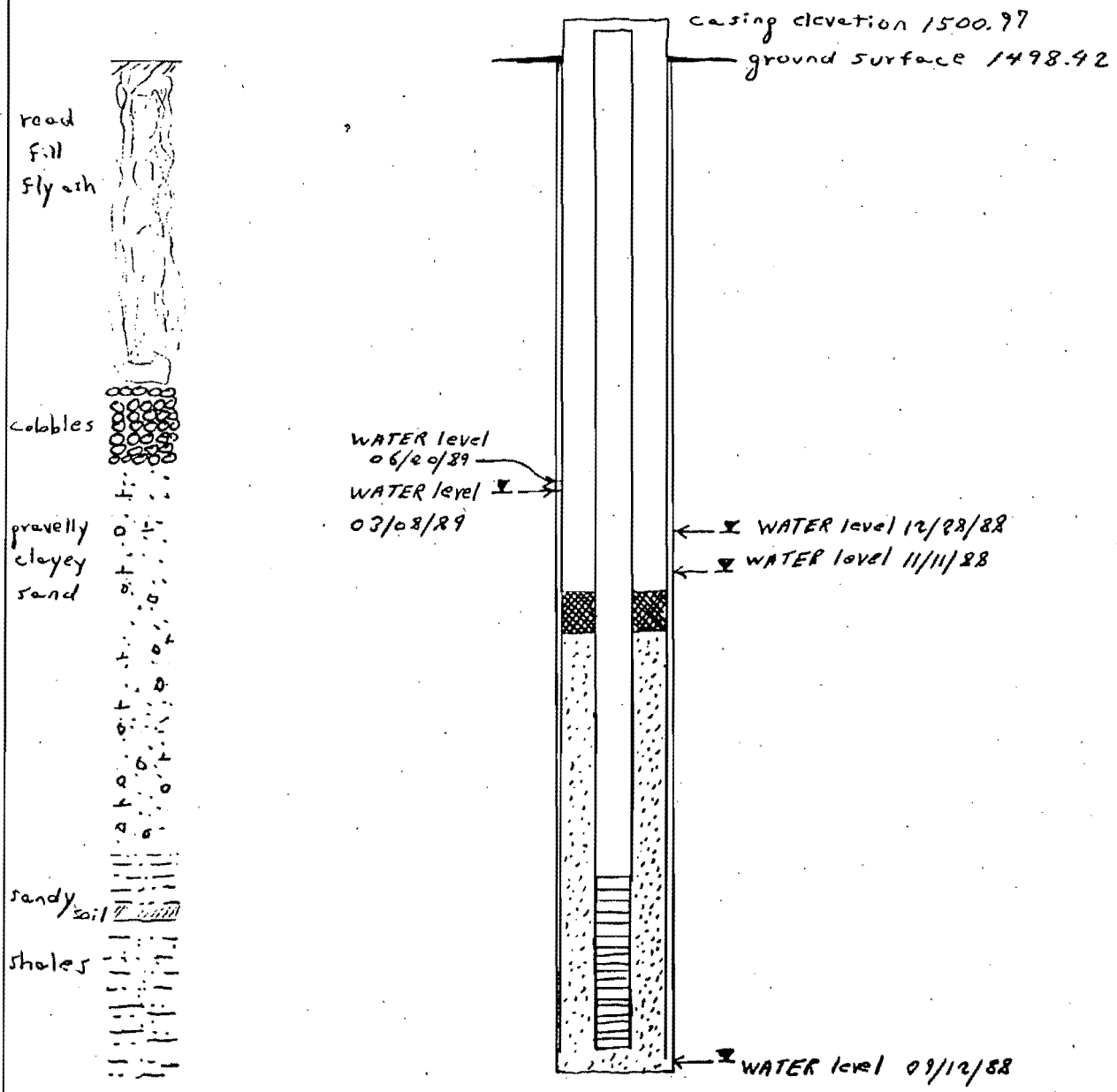


Water Level, m.s.l.

09/12/88	1426.80'	
11/11/88	1457.7 '	
12/28/88	1463.43'	
03/08/88	1462.00'	(1461.85' 24 hrs. later exactly)
06/20/89	1463.70'	

RMC

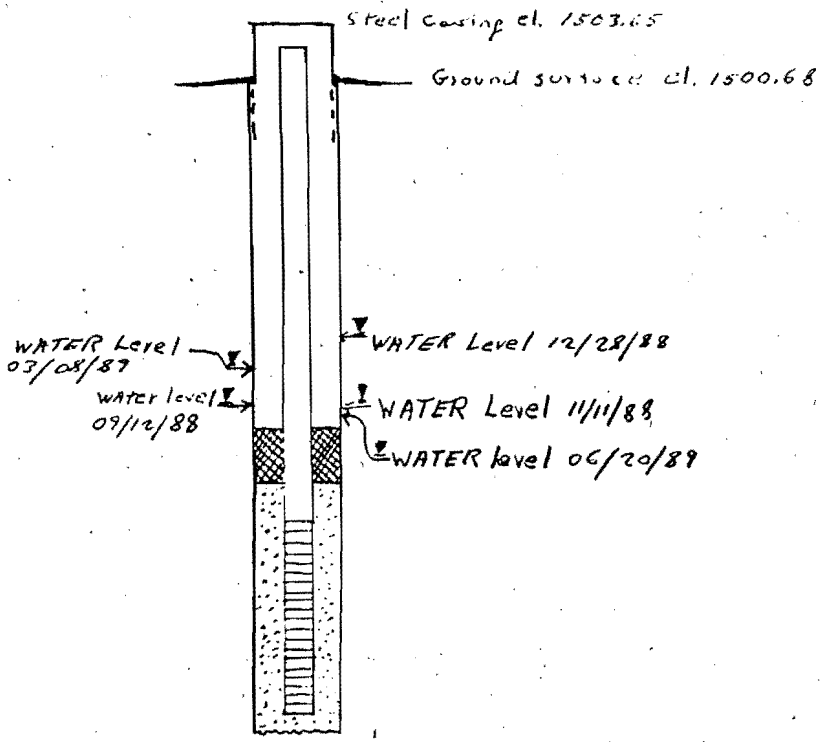
MW 2



Water Level, m.s.l.

09/12/88	1438.67'
11/11/88	1468.0 '
12/28/88	1470.39'
03/08/89	1472.76'
06/20/89	1473.42'

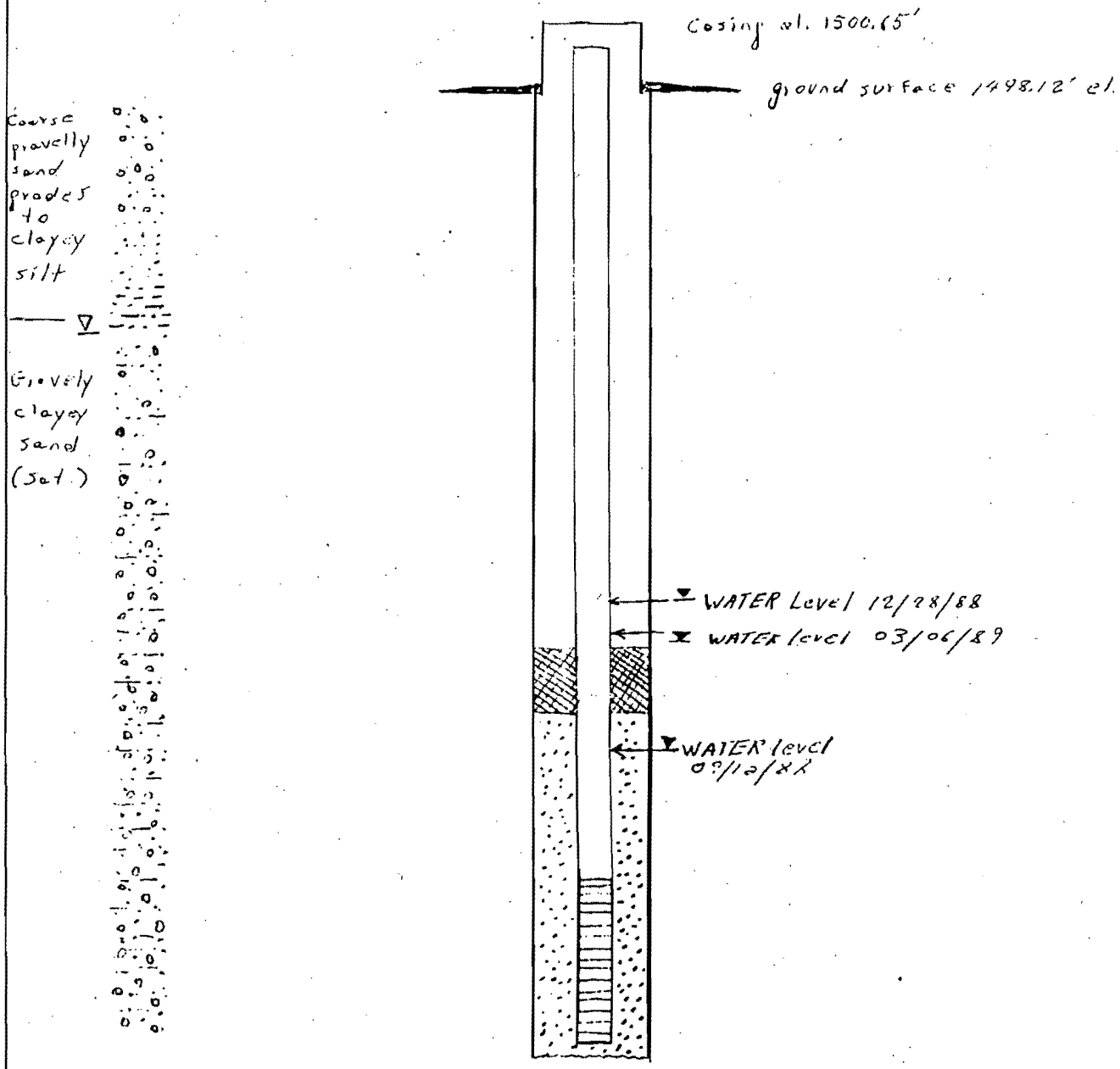
MW 3



Water Level, m.s.l.

09/12/88	1482.85'
11/11/88	1482.4 '
12/28/88	1487.51'
03/08/89	1484.87'
06/20/87	1482.05'

MW 4



Water Level, m.s.l.

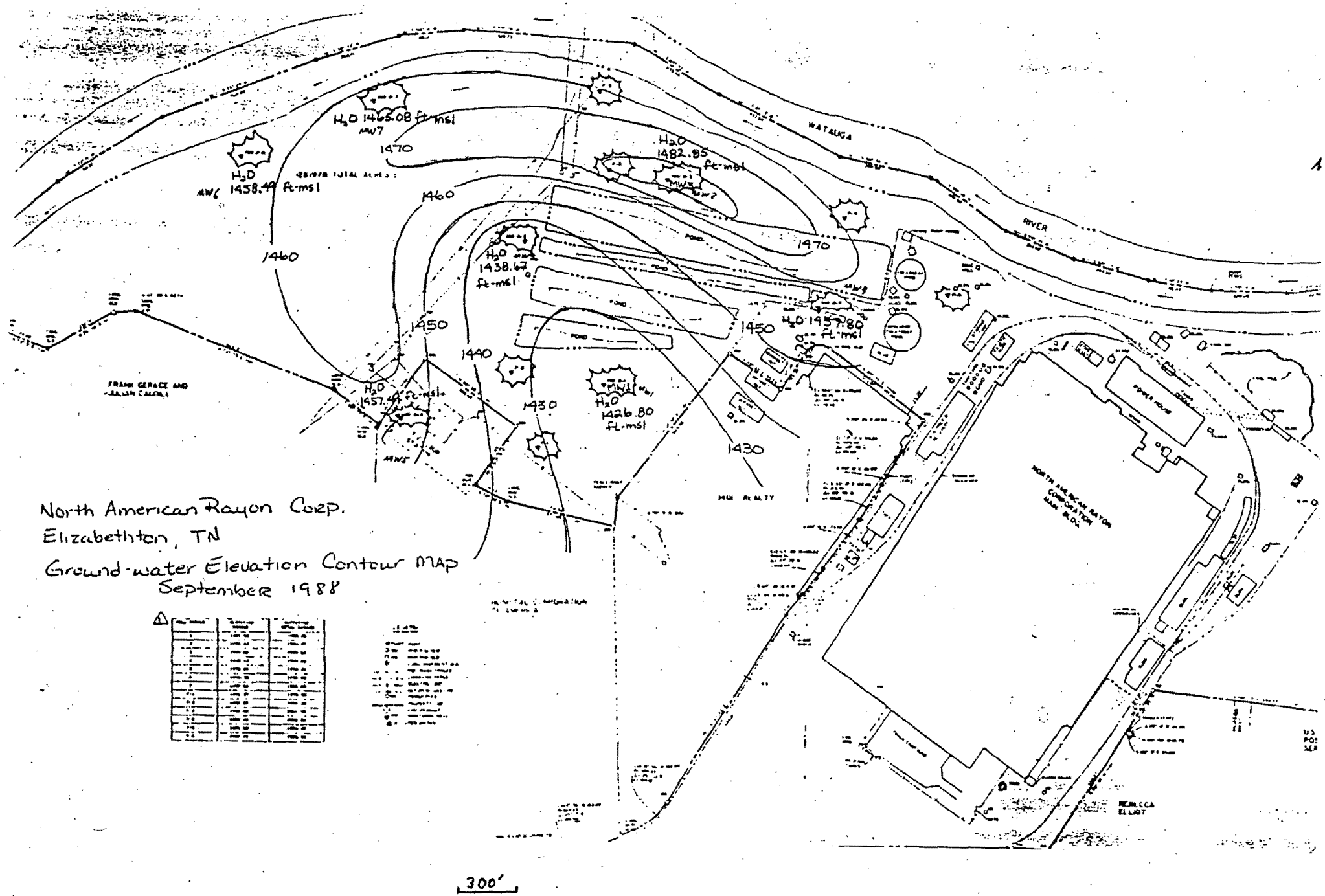
09/12/88	1457.80'
11/11/88	1459.2 '
12/28/88	1467.40'
03/08/89	1464.55'
06/20/89	1466.25'

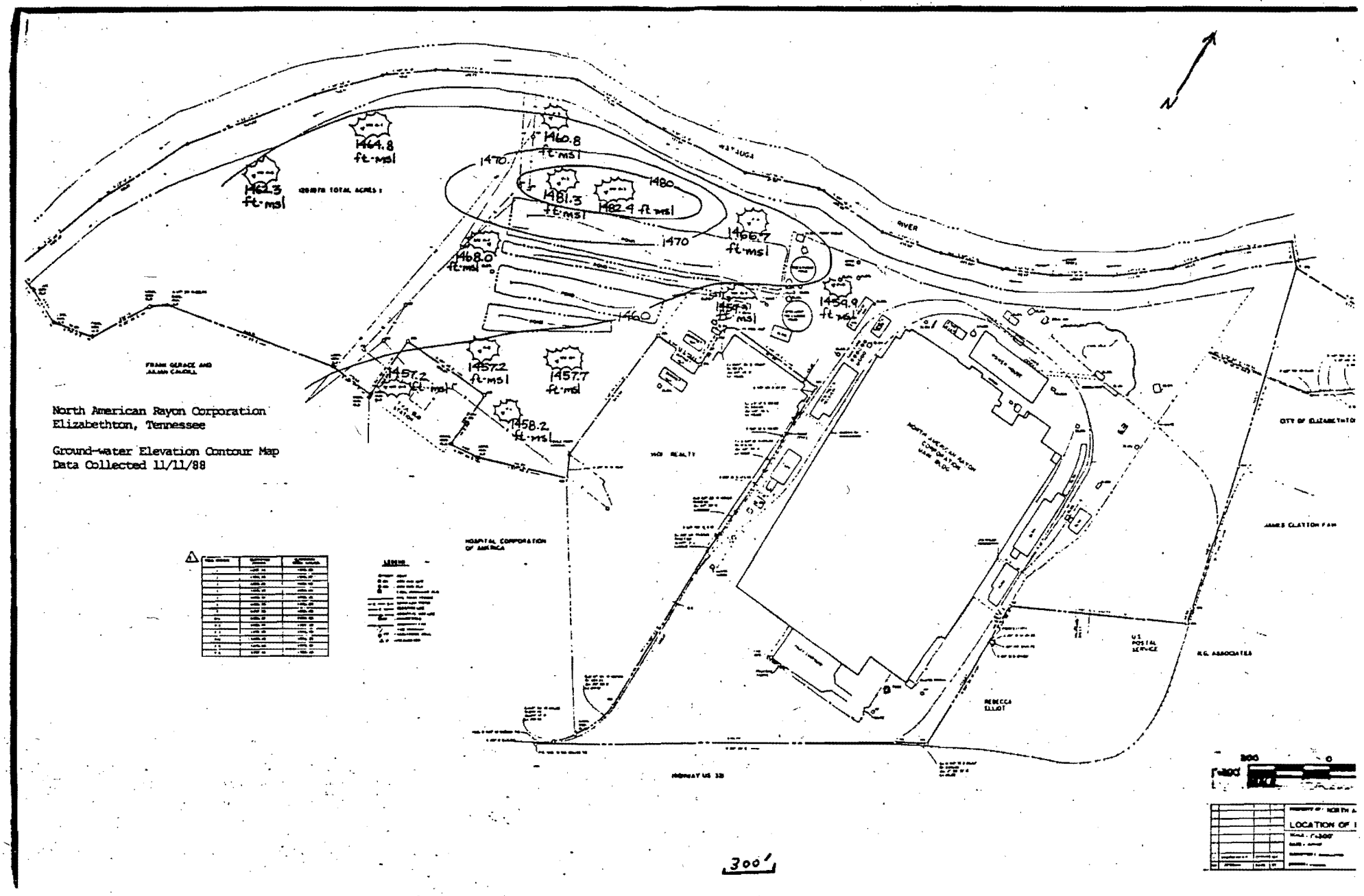
	GROUND	ELEVATION METAL CASING
1	1487.18	1490.20
2	1498.42	1500.97
3	1500.68	1503.65
4	1498.12	1500.65
5	1490.84	1493.24
6	1493.33	1496.83
7	1497.58	1500.83
P-1	1496.27	1493.58
P-2	1490.97	1494.20
P-3	1499.09	1501.98
P-4	1499.12	1502.24
P-5	1476.60	1479.27
P-6	1497.41	1500.48

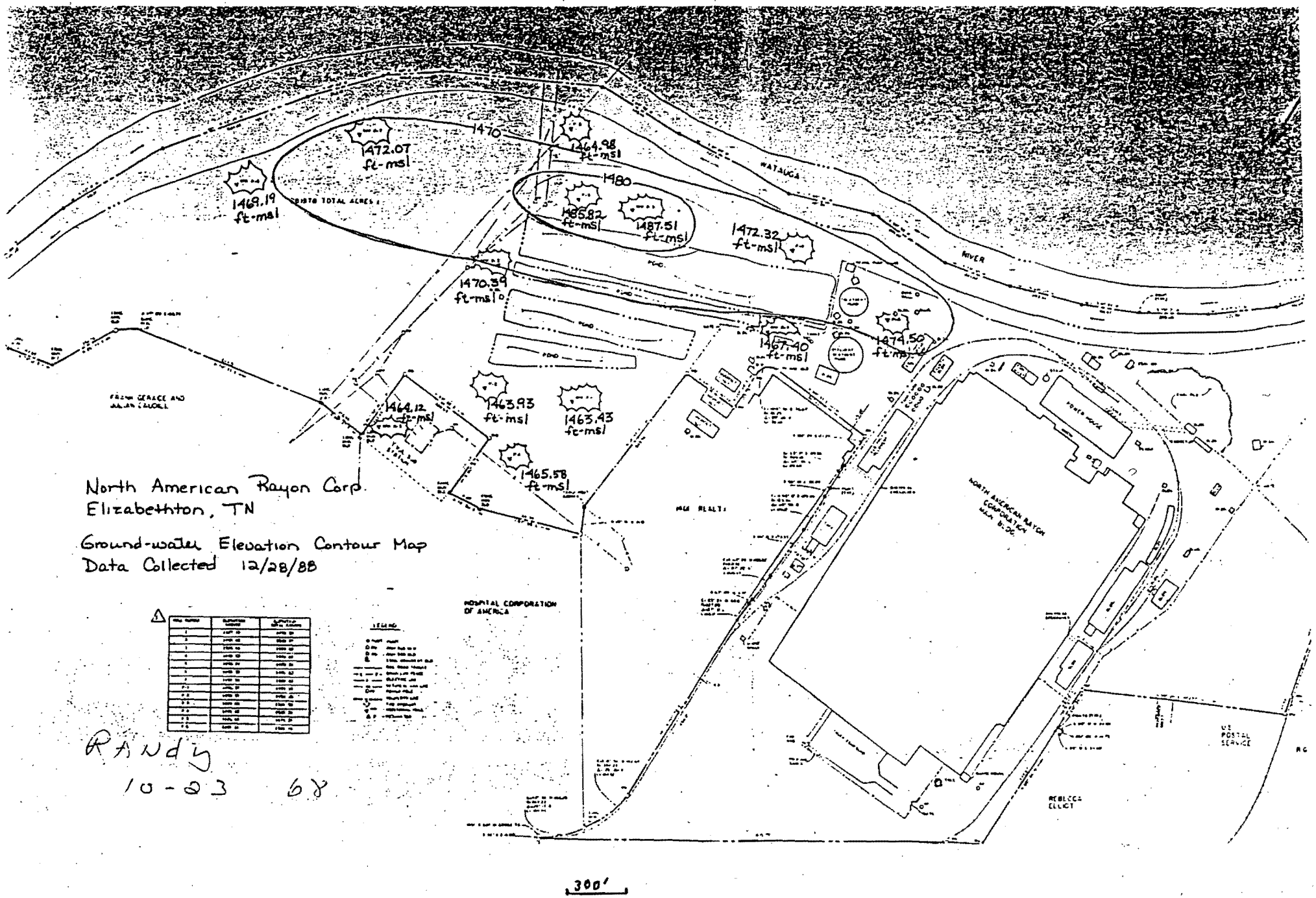
Enlargement of Survey Data Table,

North American Rayon Corporation

Ground-Water Monitoring System


North American Rayon Corp.
Elizabethton, TN
Ground-water Elevation Contour Map
September 1988
WATAUGA
RIVER
H_2O 1465.08 ft-msl
MW7
H_2O 1458.49 ft-msl
MW6
H_2O 1482.85 ft-msl
MW5
H_2O 1438.67 ft-msl
H_2O 1457.80 ft-msl
MW9
H_2O 1457.44 ft-msl
MW8
H_2O 1426.80 ft-msl
MW1
1470
1460
1450
1440
1430
POND
POWER HOUSE
NORTH AMERICAN RAYON CORPORATION MAIN BLDG.
FRANK GERACE AND
REBECCA ELLIOT
300'

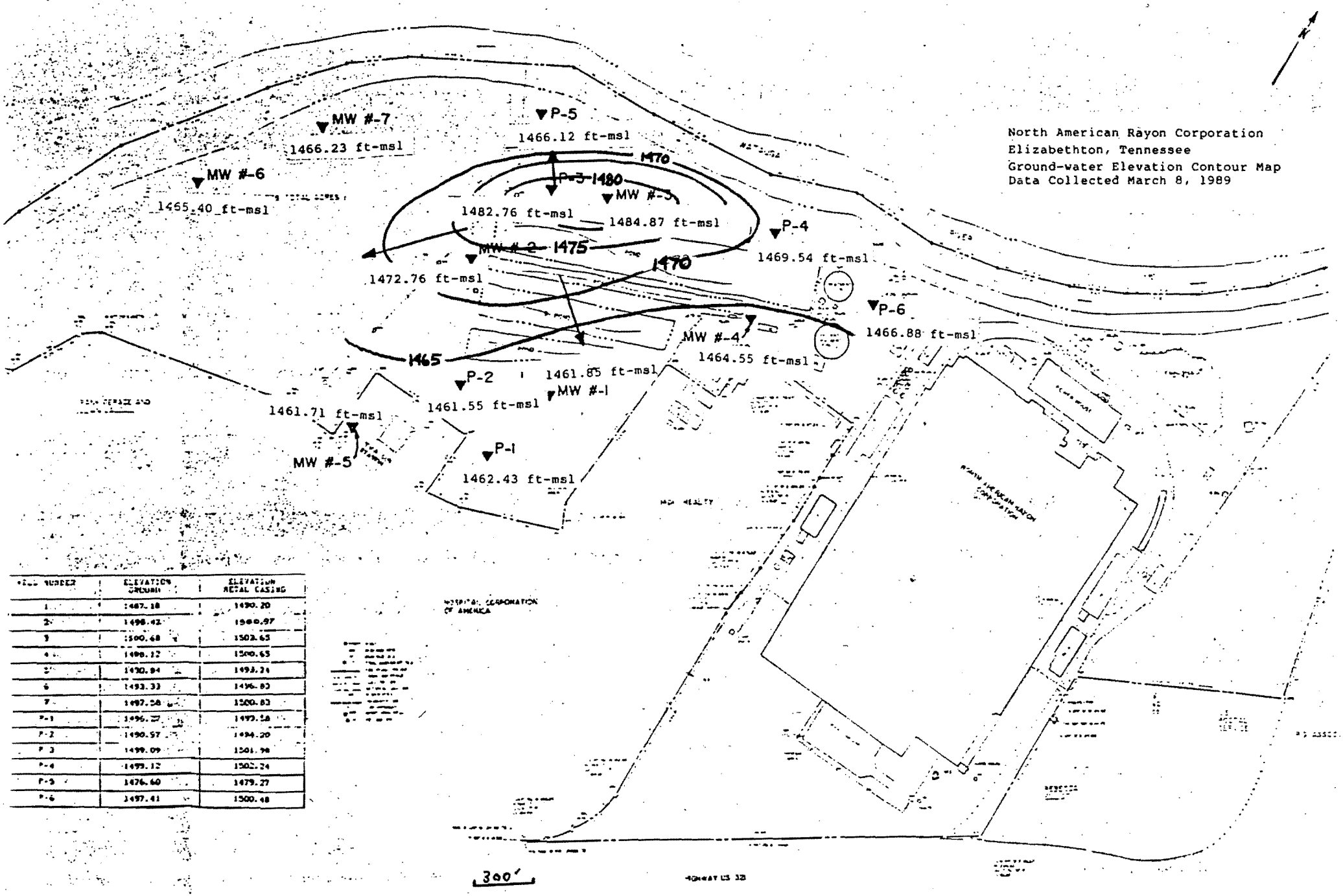

North American Rayon Corporation
Elizabethton, Tennessee
Ground-water Elevation Contour Map
Data Collected 11/11/88
1464.8 ft-msl
1462.3 ft-msl
1460.8 ft-msl
1470
1481.3 ft-msl
1482.4 ft-msl
1480
1466.7 ft-msl
1470
1468.0 ft-msl
1460
1459.9 ft-msl
1457.2 ft-msl
1457.7 ft-msl
1458.2 ft-msl
WATAUGA
RIVER
FRANK GERACE AND JULIAN CAUDILL
HOSPITAL CORPORATION OF AMERICA
NORTH AMERICAN RAYON CORPORATION MAIN BLDG
CITY OF ELIZABETHTON
JAMES CLAYTON FAW
U.S. POSTAL SERVICE
R.G. ASSOCIATES
REBECCA ELLIOT
HIGHWAY US 321
LEGEND
300'



North American Rayon Corp.
Elizabethton, TN

Ground-water Elevation Contour Map
Data Collected 12/28/88

Randy
10-23 68



WELL NUMBER	ELEVATION GROUND	ELEVATION METAL CASING
1	1487.18	1490.20
2	1498.42	1500.97
3	1500.68	1503.65
4	1498.12	1500.65
5	1490.84	1493.24
6	1493.33	1496.83
7	1497.58	1500.83
P-1	1496.27	1499.58
P-2	1490.57	1494.20
P-3	1499.09	1501.98
P-4	1499.12	1502.24
P-5	1476.60	1479.27
P-6	1497.41	1500.48

03486000 WATAUGA RIVER AT ELIZABETHTON, TN

LOCATION.--Lat 36°21'21", long 82°12'26", Carter County, Hydrologic Unit 06010103, on left bank 25 ft (8 m) upstream from bridge on U. S. Highway 19E at Elizabethton, 0.6 mi (1.0 km) downstream from Doe River, and at mile 25.9 (41.7 km).

DRAINAGE AREA.--692 mi² (1,792 km²).

PERIOD OF RECORD.--October 1925 to July 1949, July 1953 to current year. Monthly discharge only prior to February 1926, published in WSP 1306. Gage-height records collected in this vicinity December 1909 to July 1949 are contained in reports of U. S. Weather Bureau.

REVISED RECORDS.--WSP 758: 1932(M). WSP 823: Drainage area. WSP 1336: 1927-28(M), 1930, 1931-32(M).

GAGE.--Water-stage recorder. Datum of gage is 1,486.23 ft (453.003 m) National Geodetic Vertical Datum of 1929. Feb. 21 to Oct. 4, 1926, nonrecording gage on former Southern Railway bridge 10 ft (3 m) upstream at same datum.

REMARKS.--Records good. Flow partly regulated by Watauga Lake 10.8 mi (17.4 km) upstream since Dec. 1, 1948 (station 03483500). Low-flow regulated by Wilbur Lake 8.1 mi (13.0 km) upstream during period of record. Periodic observations of water temperature and specific conductance are published in this report as miscellaneous water quality data.

AVERAGE DISCHARGE.--51 years (water years 1926-48, 1954-81), 1,095 ft³/s (31.01 m³/s), 21.49 in/yr (546 mm/yr), unadjusted.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 75,100 ft³/s (2,130 m³/s) Aug. 14, 1940, gage height, 20.87 ft (6.361 m), from rating curve extended above 29,000 ft³/s (821 m³/s) on basis of contracted-opening measurement of peak flow; minimum, 42 ft³/s (1.19 m³/s) Sept 20, 1932; minimum daily, 85 ft³/s (2.41 m³/s) Dec. 3, 1953; minimum gage height, 1.54 ft (0.469 m) Sept. 20, 1932. Maximum discharge since closure of Watauga Dam on Dec. 1, 1948, 14,500 ft³/s (411 m³/s) Mar. 12, 1963; gage height, 10.70 ft (3.261 m).

EXTREMES OUTSIDE PERIOD OF RECORD.--Flood of May 21, 1901, reached a stage of about 21 ft (6.4 m), discharge, 76,000 ft³/s (2,150 m³/s), from reports of Tennessee Valley Authority.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 4,960 ft³/s (140 m³/s) May 29, gage height, 7.16 ft (2.182 m); minimum, 104 ft³/s (2.95 m³/s) Oct. 13, minimum gage height, 1.93 ft (0.588 m); minimum daily, 133 ft³/s (3.77 m³/s) Nov. 15.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1980 TO SEPTEMBER 1981
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	360	454	169	289	280	348	388	351	1790	1930	416	226
2	1030	206	319	170	1750	516	345	325	2520	1370	373	171
3	160	735	744	293	2070	553	305	296	2610	989	804	141
4	315	553	603	162	1420	316	284	278	2640	1170	696	621
5	263	1170	150	874	1990	758	433	270	1860	353	1370	996
6	788	1080	225	695	1980	1090	425	320	949	1770	993	238
7	823	730	140	857	1190	731	372	334	2010	2320	520	217
8	465	383	148	861	231	524	338	296	2090	2160	411	176
9	977	336	147	673	882	430	341	297	2190	1710	313	448
10	785	486	614	351	910	375	365	290	2130	1980	701	854
11	219	470	439	155	2250	336	370	895	1720	1390	841	752
12	156	311	318	668	2750	304	297	837	1750	1220	1430	221
13	778	304	179	988	3330	284	388	1040	1530	1890	1530	253
14	860	432	172	652	3320	275	450	1380	839	1940	2140	582
15	1330	133	323	619	1480	251	493	1220	1890	2040	1170	1530
16	615	305	164	902	565	368	345	402	2030	2050	309	1450
17	753	1270	479	585	611	411	428	416	1850	2060	200	921
18	392	1340	233	1210	428	439	622	1600	1410	1980	450	798
19	282	1640	223	1350	466	584	509	1540	297	1340	161	252
20	596	1870	766	1810	659	531	2540	2670	267	1630	148	221
21	656	775	603	1840	671	251	1730	2710	343	1700	144	634
22	782	321	1160	1920	525	250	954	1230	1700	1730	138	1020
23	790	150	410	1900	796	405	761	743	1960	794	137	830
24	969	399	171	973	1040	366	1220	469	1710	771	646	708
25	594	474	416	204	864	244	906	942	1890	451	504	742
26	237	813	269	1200	677	238	673	345	1900	392	717	360
27	898	412	208	813	357	236	1200	1370	1420	1630	379	146
28	685	666	192	781	326	230	568	2580	681	1820	612	1150
29	1360	550	303	552	---	225	425	3610	1820	1640	206	729
30	1070	202	345	776	---	417	400	1990	1660	410	292	756
31	844	---	423	525	---	431	---	1050	---	783	656	---
TOTAL	20832	18970	11055	25648	33818	12717	18875	32096	49456	45413	19407	18143
MEAN	672	632	357	827	1208	410	629	1035	1649	1465	626	605
MAX	1360	1870	1160	1920	3330	1090	2540	3610	2640	2320	2140	1530
MIN	156	133	140	155	231	225	284	270	267	353	137	141
(†)	-10100	-7700	+1400	-16000	+13500	+19700	+28400	+23600	-10500	-28200	-10100	-7900
MEAN‡	346	376	402	311	1690	1046	1576	1797	1299	555	300	341
CFSM‡	.50	.54	.58	.45	2.44	1.51	2.28	2.60	1.88	.80	.43	.49
IN.‡	.58	.61	.67	.52	2.54	1.74	2.54	2.99	2.09	.92	.50	.55

CAL YR 1980 TOTAL 414535 MEAN 1133 MAX 4240 MIN 133 MEAN‡ 991 CFSM‡ 1.43 IN‡ 19.47
WTR YR 1981 TOTAL 306430 MEAN 840 MAX 3610 MIN 133 MEAN‡ 829 CFSM‡ 1.20 IN‡ 16.25

† Change in contents, in cfs-days, in Watauga Lake, furnished by Tennessee Valley Authority.
‡ Adjusted for change in contents in lakes or reservoirs listed above.

NARC Detection Program
Work Sheet

Prepared By:
Approved By:

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
	MW#1 1st qtr Sept 13 1988	MW#1 2nd qtr ~~March~~ Dec 28 1988	MW#1 3rd qtr March 3 1989	MW#1 4th qtr	MW#2 1st qtr Sept 13 1988	MW#2 2nd qtr. Dec 28 1988	MW#2 3rd qtr. March 3 1989	MW#2 4th qtr	MW#3 1st qtr Sept 13 1988	MW#3 2nd qtr Dec 28 1988	MW#3 3rd qtr March 3 1989	MW#3 4th qtr	MW#4 1st qtr Sept 13 1988	MW#4 2qtr Dec 28 1988	MW#4 3rd qtr March 3 1989	MW#4 4th qtr
Ph	7.10	7.8	7.505		6.57	6.8	6.52		7.98	7.6	7.273		7.35	9.4	9.74	
BOD (5-day)																
M.B.A.S.																
Nitrate	6.1	1.50	1.1		<0.10	0.08	0.1		<0.10	<0.05	<0.1		0.4	1.11	0.46	
Chloride	95	69.7	62.2		14	13.7	17.5		16	18.6	22.7		7.5	76.1	9.4	
Fluoride	0.37	0.15	0.17		<0.10	0.15	0.18		<0.10	0.34	0.45		0.4	3.50	2.5	
Total Organic Carbon	10.97	0.66	0.536		5.66	7.54	1.78		V 5.5391 <0.10	8.18	5.2625		7.34 16.748	7.70	1.545	
Chemical O_2 demand																
Cadmium	<0.01	<0.01	<0.0004		<0.01	<0.01	<0.0004		<0.01	<0.01	<0.0004		<0.01	<0.01	<0.004	
Nickel																
Copper																
Chromium	0.01	0.07	0.009		<0.01	0.04	0.009		<0.01	0.07	<0.005		0.03	0.01	<0.005	
Total Sodium	5130	6145	5887		4.71	466.7	470.09		678	618.29	486.97		2.44	7.49	19.477	
Lead	<0.07	0.07	<0.075		<0.07	0.07	0.007		<0.07	0.04	0.07		<0.03	<0.03	<0.075	
Manganese	0.95	0.003	0.26		.95	7.025	6.81		2.7	0.210	1.79		1.9	0.006	0.44	
Silver	<0.1	0.04	<0.007		<0.1	0.03	<0.007		<0.1	0.07	<0.007		<0.1	0.02	0.0083	
Barium	0.10	0.14	0.08		0.01	0.02	0.07		0.12	<0.05	0.05		0.07	<0.01	0.01	
Mercury	<0.0008	<0.0001	<0.00008		<0.008	<0.001	<0.00008		<0.008	<0.001	<0.00008		<0.008	<0.001	<0.0008	
Arsenic	0.18	0.20	<0.00002		<0.05	0.24	<0.00002		0.69	0.27	0.0039		0.73	0.07	0.0003	
Selenium	0.25	0.12	<0.0008		<0.07	0.19 ~~0.24~~	<0.0008		0.22	0.13 ~~0.27~~	<0.0008		0.15	0.01 ~~0.07~~	<0.0008	
Iron	0.67	0.07	0.51		0.70	0.07	0.27		7.66	0.07	1.95		5.71	0.01	0.05	
Conductivity	553	670	637.5		257.25	290.0	208.75		287.75	295.0	225.6		125.75	95.0	93.75	
Sulfate	158	270	233.45		78.7	192.5	120.37		77.8	78.4	95.24		29.7	38.4	49.35	
Color																
Endrin ppb	<0.007	<0.07	<0.07		<0.07	<0.07	<0.07		<0.07	<0.07	<0.07		<0.07	<0.07	<0.07	
Lindane ppb	<0.008	<0.008	<0.008		<0.008	<0.008	<0.008		<0.008	<0.008	<0.008		<0.008	<0.005	<0.008	
Methoxychlor ppb	<0.20	<0.20	<0.20		<0.20	<0.20	<0.30		<0.20	<0.20	<0.30		<0.30	<0.20	<0.30	
Toxaphene ppb	<1.2	<1.2	<1.12		<1.2	<1.2	<1.12		<1.2	<1.2	<1.12		<1.2	<1.2	<1.12	
2,4-D ppb	<5.2	<5.2	<5.2		<5.2	<5.2	<5.2		<5.2	<5.2	<5.2		<5.2	<5.2	<5.2	
2,4,5-TP Silex ppb	<0.1	<0.1	0.95		<0.1	<0.1	<0.1		<0.1	<0.1	<0.1		<0.1	<0.1	<0.1	
TOX ug/L	1.77	10.1	<50		1.25	1.66	17.25		2.77	4.48	34.25		8.2	21.8	11.35	
TEMP °C	20		13.2		2.3	9.275 28.03	1.73 15.50		11.23	22 ~~13.81~~	14.4 15.81		22		14	
WATER Elev. MSL	1926.80	1963.93	1961.95		1938.67	1948.37	1972.76		1982.85	1987.51 13.1	1989.87		1957.60	1967.40	1964.55	
Coliform	<1	<1	<1		<1	<1	<1		<1	<1	<1		<1	<1	<1	
Gross B pCi/L	~~6 ±2~~ ~~20 ±7~~	67	6		9 ±2	18	8		16 ±3	10	14		79 ±3 ~~97~~	5	47	
Gross α pCi/L	<3	5	4		<3	4	1938.12 7		3 ±3	~~4~~	<5		7±2	4	7	

4916 BUFF · 4914 GREEN · 4216 WHITE

RECEIVED
Division of Solid Waste Management
Date 5/10/89 File No.
Received by

Westinghouse
Environmental Services

Westinghouse HAZTECH, Inc.

5280 Panola Industrial Boulevard
Decatur, Georgia 30035
(404) 981-9332
(404) 981-9339 (24 Hr.)
FAX (404) 981-1786

May 5, 1989

Mr. Randy Curtis
Geologist
Tennessee Department of
Health and Environment
1733 Sunset Drive
Johnson City, Tennessee 37601

Subject: North American Rayon Corporation
Transmittal of Ground-water Analytical Data
For March 1989 Sampling

Dear Mr. Curtis:

Westinghouse HAZTECH is pleased to provide you the above-referenced analytical data. The data are presented in the attached tables. A ground-water elevation contour map is also attached.

The EPA drinking water standard for fluoride was exceeded in samples collected from MW4. With this exception, all wells demonstrated compliance with EPA drinking water standards.

Please contact me at (404) 981-9332 if you require additional information.

Sincerely,

Westinghouse HAZTECH, Inc.

Laura Harris

Laura Harris
Project Manager

ENC

cc: Lou Raasch
Melissa McGuire

NORTH AMERICAN RAYON CORPORATION

ANALYTICAL DATA FOR GROUND-WATER SAMPLES
COLLECTED MARCH 8 AND 9, 1989

Parameters characterizing suitability of ground-water as a drinking water supply:

	Units	MW1	MW2	MW3	MW4	EPA Standard
Arsenic	ppm	<0.0002	<0.0002	0.0034	0.0003	0.05
Mercury	ppm	<0.0008	<0.0008	<0.0008	<0.0008	0.002
Selenium	ppm	<0.0008	<0.0008	<0.0008	<0.0008	0.01
Barium	ppm	0.08	0.02	0.05	0.01	1
Cadmium	ppm	<0.004	<0.004	<0.004	<0.004	0.01
Chromium	ppm	0.009	0.009	<0.005	<0.005	0.05
Lead	ppm	<0.025	0.007	0.03	<0.025	0.05
Silver	ppm	<0.007	<0.007	<0.007	0.0003	0.05
Nitrate	ppm	1.1	<0.1	<0.1	0.46	10
Fluoride	ppm	0.12	0.18	0.45	2.5	1.4-2.4
Coliform	col/100 ml	<1	<1	<1	<1	1
Endrin	ppb	<0.03	<0.03	<0.03	<0.03	0.2
Lindane	ppb	<0.008	<0.008	<0.008	<0.008	4
Methoxychlor	ppb	<0.30	<0.30	<0.30	<0.30	100
Toxaphene	ppb	<1.12	<1.12	<1.12	<1.12	5
2,4-D	ppb	<5.2	<5.2	<5.2	<5.2	100
2,4,5-TP	ppb	0.95	<0.1	<0.1	<0.1	10
Radium	pCi/l	<0.1	0.2	<0.1	<0.1	5
Gross Alpha	pCi/l	4	7	<5	7	15
Gross Beta	pCi/l	6	8	14	47	4 millirem/yr

Parameters establishing ground-water quality:

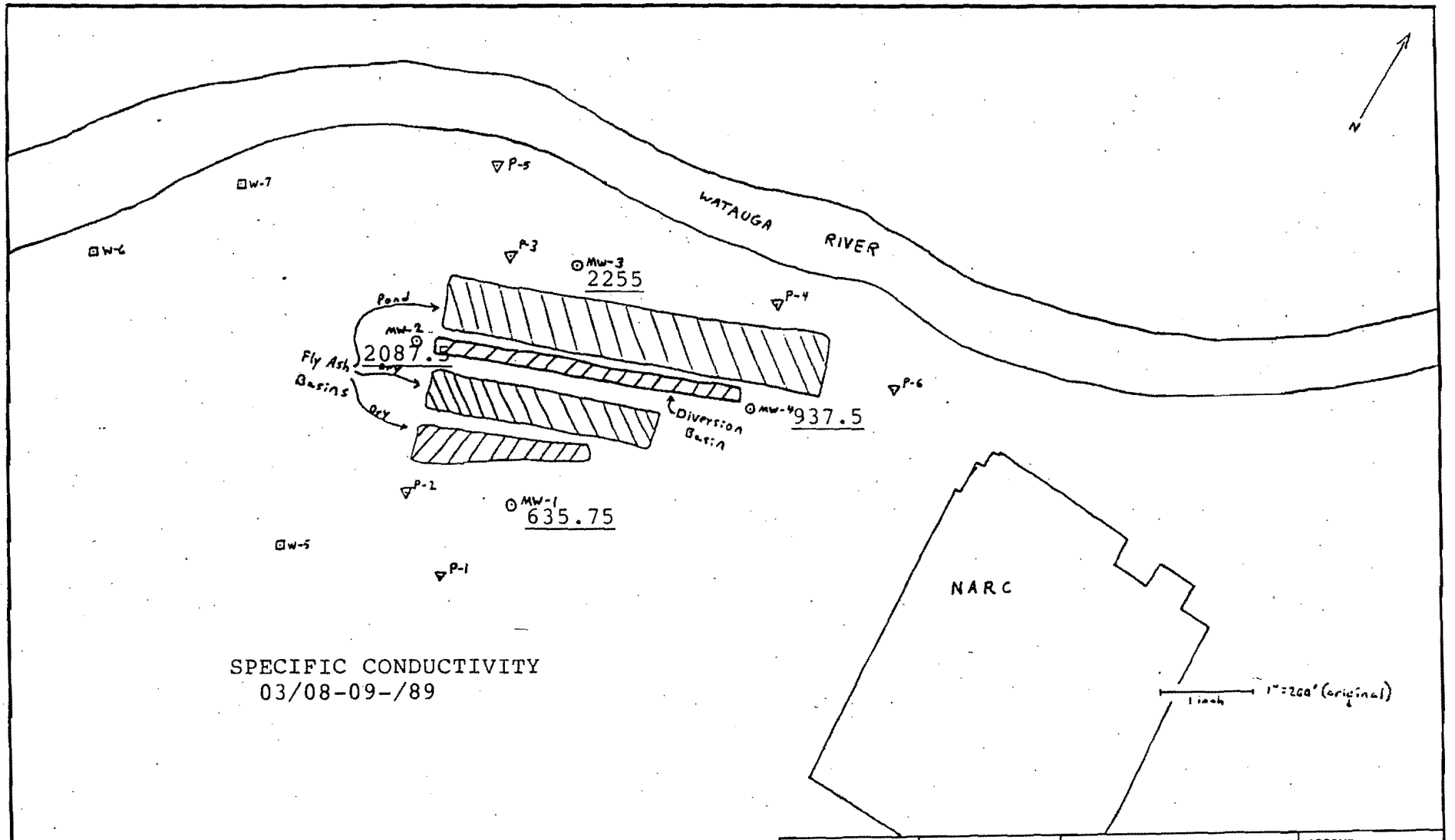
	Units	MW1	MW2	MW3	MW4
Iron	ppm	0.51	0.22	0.95	0.05
Manganese	ppm	0.26	6.81	1.77	0.44
Sodium	ppm	58.83	407.04	486.97	194.77
Phenols	ppm	<0.010	<0.010	<0.010	<0.010
Chloride	ppm	6.22	17.1	22.7	9.4
Sulfate	ppm	233.45	1200.39	952.24	493.35

Parameters used as indicators of ground-water contamination:

	Units		MW1	MW2	MW3	MW4
pH	s.u.		7.48	6.67	7.25	9.68
			7.49	6.48	7.3	9.7
			7.51	6.47	7.33	9.75
			7.54	6.46	--	9.83
		mean	7.505	6.52	7.293333	9.74
Conductivity	umhos/cm		640	2100	2250	920
			638	2050	2260	950
			630	2100	--	930
			635	2100	--	950
		mean	635.75	2087.5	2255	937.5
TOC	ppm		0.49	1.75	5.14	1.64
			0.55	1.79	5.18	1.54
			0.58	1.83	5.43	1.49
			0.52	1.75	5.3	1.51
		mean	0.535	1.78	5.2625	1.545
TOX	ug/l		<5.0	16	29	15
			<5.0	18	29	7.5
			<5.0	21	35	15
			<5.0	14	44	7.9
		mean	<5.0	17.25	34.25	11.35
Temperature	degrees C		13.2	17.3	14.4	14
Water Elev.	ft-msl		1461.85	1472.76	1484.87	1464.55

Quality Control/Quality Assurance Data:

	Units	MW1 Dup	Blank
Arsenic	ppm	<0.0002	<0.0002
Mercury	ppm	<0.0008	<0.0008
Selenium	ppm	<0.0008	<0.0008
Barium	ppm	0.09	<0.001
Cadmium	ppm	<0.004	<0.004
Chromium	ppm	0.009	0.007
Lead	ppm	<0.025	<0.025
Silver	ppm	0.01	<0.007
Iron	ppm	1.05	<0.005
Manganese	ppm	0.38	0.002
Sodium	ppm	59.09	0.15
Fluoride	ppm	--	<0.1
Chloride	ppm	--	0.77
Nitrate	ppm	--	<0.1
Sulfate	ppm	--	<2
TOC	ppm	--	0.31
Coliform	col/100 ml	--	<1



SPECIFIC CONDUCTIVITY
03/08-09-/89

ACCURACY:	SCALE: 1"=200'	DRAWN BY: RMC, copied from Haztech Document	APPRVD:
LINES:	DATE: 02/27/89		SHEET NO:
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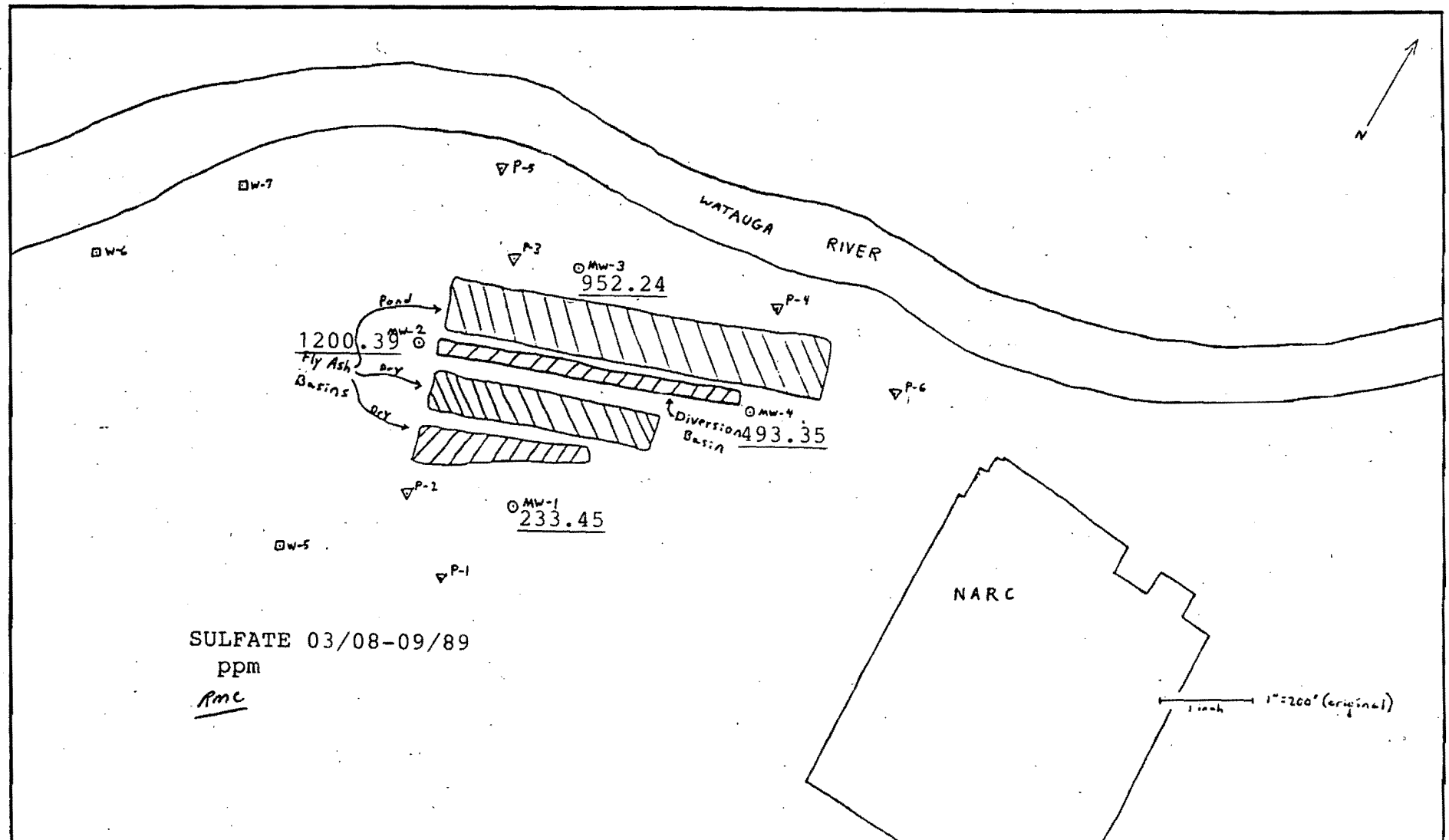
LETTERING:			
ARROWS:			DRAWING NO.
OTHER:			



SULFATE 03/08-09/89
ppm
Rmc

ACCURACY:	SCALE: 1"=200'	DRAWN BY: Rmc, copied from Hartech Document	APPRVD:
LINES:	DATE: 02/27/89		SHEET NO:
DIMENS.ETC:	TITLE NARCO monitoring system (Reduced 65%)		
LETTERING:			
ARROWS:			DRAWING NO.
OTHER:			

BAKER, WORTHINGTON, CROSSLEY, STANSBERRY & WOOLF

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TELECOPIER 615 726-0464

HENDERSONVILLE, TENNESSEE 37075
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TELECOPIER 615 824-4684

of Solid Waste Mg.
2/28/89 File No.
by

February 27, 1989

Mr. Randy Curtis
Tennessee Department of
Health and Environment
1733 Sunset Drive
Johnson City, Tennessee 37601

RE: North American Rayon Corporation Groundwater Analytical Data - December 28, 1988 Sampling

Dear Mr. Curtis:

Enclosed please find a copy of a letter that I received on this date from Laura Harris of Westinghouse Haztech concerning the groundwater analytical data for North American Rayon Corporation. As you will note, the data for selenium and arsenic is suspect due to the method of analysis and the fact that the groundwater is high in calcium.

If you have any questions regarding the enclosed material, please feel free to call me.

Sincerely yours,

Melissa McGuire

Melissa M. McGuire

ssr
Enclosure

Westinghouse
Environmental Services

Westinghouse HAZTECH, Inc.

5280 Panola Industrial Boulevard
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FAX (404) 981-1786

February 22, 1989

Ms. Melissa McGuire
Baker, Worthington, Crossley,
Stransberry, and Woolf
Attorneys-at-Law
Hamilton Bank Building
207 Mockingbird Lane
Johnson City, TN 37601

Project No. 2322-88-1107

SUBJECT: North American Rayon Corp.
Groundwater Analytical Data
Sample Event - December 28, 1988

Dear Ms. McGuire:

Enclosed are the above-referenced data for ground water samples collected at the North American Rayon Corporation in Elizabethton, Tennessee on December 28, 1988. The following drinking water parameters were found to exceed the EPA standard:

- Arsenic - MW-1, MW-2, MW-3, MW-4
- Selenium - MW-1, MW-2, MW-3
- Fluoride - MW-4
- Nitrate - MW1, MW4

Laboratory analyses were performed by RCRA Analytical Services, Inc. of Athens, Georgia. Metals have been analyzed by Inductively Coupled Plasma Spectroscopy (ICP) except for mercury which is analyzed by Atomic Absorption (AA). RCRA has confirmed that water samples having high calcium, aluminum, and iron contents cause interference in measuring arsenic and selenium on the ICP apparatus. This interference does not occur when these elements are analyzed by AA. ICP and AA analysis of ground-water samples from another site situated in limestone terrain indicated that error in measurements of arsenic and selenium by ICP increases as

calcium concentration increases. ICP analysis of a sample indicated 2 ppm arsenic whereas the same sample was non-detectable when analyzed by AA. The arsenic and selenium data transmitted herein are based on analysis by ICP and are suspected of being inaccurate. Sample volumes were inadequate for re-analysis by AA. From now on arsenic and selenium, as well as mercury, will be analyzed by AA.

A ground water elevation countour map is enclosed. Please call if you have any questions.

Sincerely,

Laura

Laura B. Harris
Project Manager

LBH/jlv
Enclosure

cc: Lou Raasch

GROUND-WATER ANALYTICAL DATA
FOR MONITOR WELLS 1-4

Sample Events 12-28-88

Parameters characterizing the suitability of ground water as a drinking water supply:

	MW-1	MW-2	MW-3	MW-4	EPA Drinking Water Standard
Metals (ppm)					
Arsenic	0.20	0.24	0.27	0.07	0.05
Barium	0.14	0.02	<0.05	<0.01	1.0
Cadmium	<0.01	<0.01	<0.01	<0.01	0.01
Chromium	0.03	0.04	0.03	0.01	0.05
Lead	0.02	0.03	0.04	<0.03	0.05
Mercury	<0.001	<0.001	<0.001	<0.001	0.0002
Selenium	0.12	0.19	0.13	0.01	0.01
Silver	0.04	0.03	0.02	0.02	0.05
Inorganics (ppm)					
Fluoride	0.15	0.15	0.34	2.50	1.4-2.4
Nitrate (N)	1.50	0.08	<0.05	1.11	1.00
Pesticides (ppb)					
Endrin	<0.03	<0.03	<0.03	<0.03	0.20
Lindane	<0.008	<0.008	<0.008	<0.008	4.0
Methoxychlor	<0.30	<0.30	<0.30	<0.30	100
Toxaphene	<1.20	<1.20	<1.20	<1.20	5.0
Phenoxy Herbicides, ppb					
2,4-D	<5.2	<5.2	<5.2	<5.2	100
2,4,5-TP	<0.1	<0.1	<0.1	<0.1	10
Fecal Coliform, per 100 ml	<1	<1	<1	<1	1
Radium, pCi/l	<0.1	0.1	<0.1	0.1	5
Gross Alpha, pCi/l	5	4	4	4	15
Gross Beta, pCi/l	67	18	10	5	4 mrem/yr

Parameters Establishing Ground Water Quality (ppm):

	MW-1	MW-2	MW-3	MW-4
Iron	0.03	0.03	0.02	0.01
Manganese	0.003	7.025	0.210	0.006
Sodium	61.45	466.9	618.29	214.4
Chloride	6.49	13.9	18.6	7.61
Sulfate	230	1425	984	384
Phenols	<10	<10	<10	<10

Parameters Used as Indicators of Ground Water Contamination:

TOC (ppm)	0.66	2.54	8.18	2.70
TOX (ppb)	10.1	16.6	44.8	21.8
pH* (s.u.)	7.8	6.8	7.6	9.4
Specific Conductance* (umhos/cm)	520	2400	2450	950
Water Level (ft-msl)	1463.43	1470.39	1487.51	1467.40

*Data Collected Week of 2/13/89

10-43

61

RECEIVED
Division of Solid Waste Management
Date 11/16/88 File No.
Received By 90

Westinghouse
Environmental Services

Westinghouse HAZTECH, Inc.

Technical
5280 Panola Industrial Boulevard
Decatur, Georgia 30035
(404) 981-9332
(404) 981-9339 (24 Hr.)
FAX (404) 593-3959

November 11, 1988

Mr. Randy Curtis, Geologist
Tennessee Department of
Health & Environment
1733 Sunset Drive
Johnson City, TN 37601

Project No. 2322-88-1107

Subject: North American Rayon Corp.
Groundwater Analytical Data
Sample Event - September 12, 1988

Dear Randy:

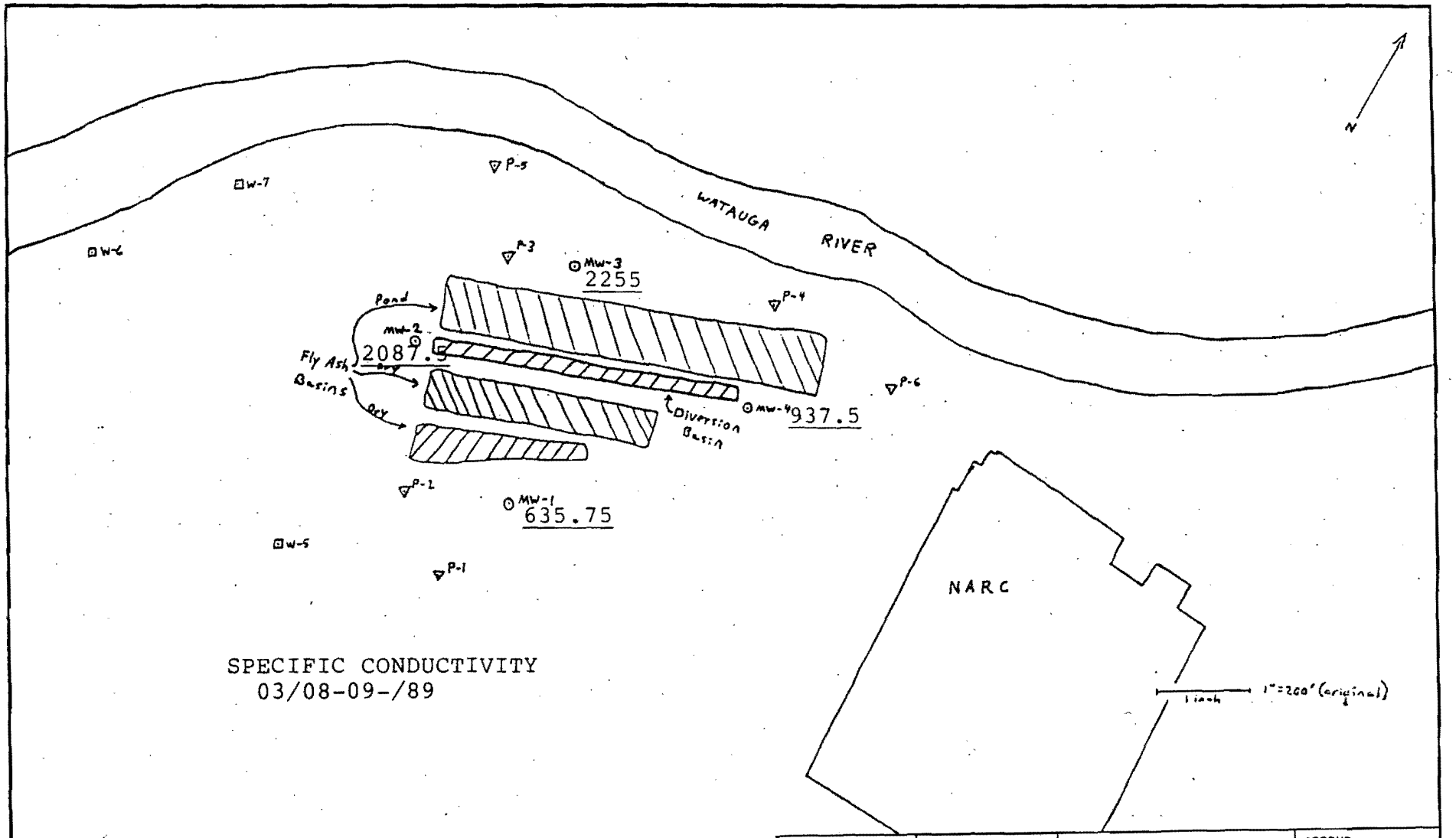
Enclosed are the above-referenced data for ground-water samples collected at the North American Rayon Corporation on September 12, 1988. The following paramters characterizing the suitability of ground-water as a drinking-water supply have been found to exceed EPA standards:

- Arsenic - MW1, MW3, MW4, MW5, MW6
- Camium - MW3
- Fluoride - MW4
- Selenium - MW1, MW3, MW4, MW5, MW6

Please note that wells MW5, MW6, and MW7 were sampled within two days of completion, and within one day of air-jetting. Wells MW1, MW2, MW3 and MW4 were sampled within two weeks of construction, and within five days of air-jetting.

Quality Control/Quality Assurance Data:

	Units	MW1 Dup	Blank
Arsenic	ppm	<0.0002	<0.0002
Mercury	ppm	<0.0008	<0.0008
Selenium	ppm	<0.0008	<0.0008
Barium	ppm	0.09	<0.001
Cadmium	ppm	<0.004	<0.004
Chromium	ppm	0.009	0.007
Lead	ppm	<0.025	<0.025
Silver	ppm	0.01	<0.007
Iron	ppm	1.05	<0.005
Manganese	ppm	0.38	0.002
Sodium	ppm	59.09	0.15
Fluoride	ppm	--	<0.1
Chloride	ppm	--	0.77
Nitrate	ppm	--	<0.1
Sulfate	ppm	--	<2
TOC	ppm	--	0.31
Coliform	col/100 ml	--	<1



SPECIFIC CONDUCTIVITY
03/08-09-/89

ACCURACY:	SCALE: 1"=200'	DRAWN BY: RMC, copied from Hazteach Document	APPRVD:
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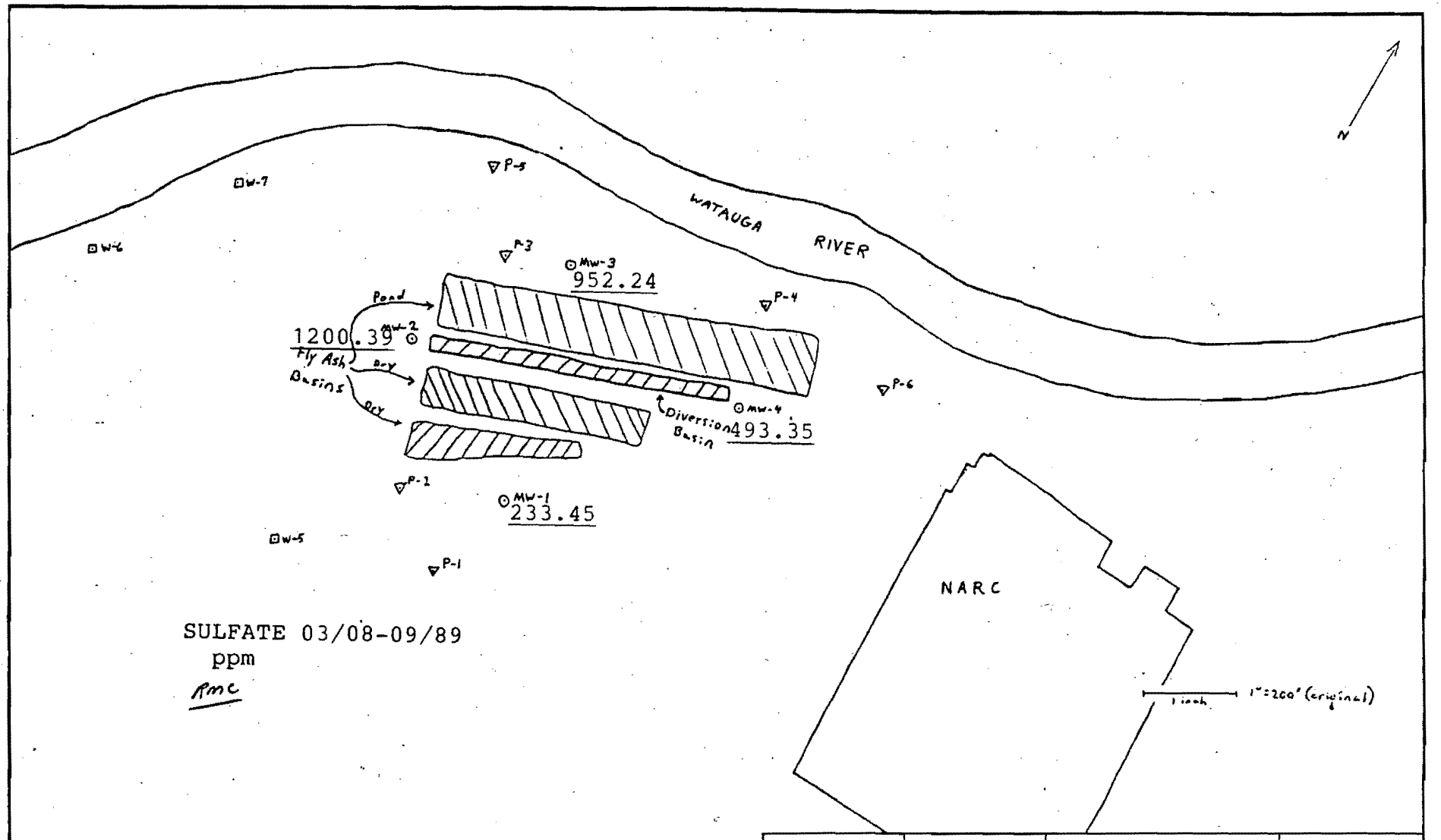
DIMENS.ETC:	TITLE NARCO monitoring system (Reduced 65%)		
LETTERING:			
ARROWS:			DRAWING NO.
OTHER:			



SULFATE 03/08-09/89
ppm
Rmc

ACCURACY:	SCALE: 1"=200'	DRAWN BY: Rmc, copied from Hazteck Document	APPRVD:
LINES:	DATE: 02/27/89		SHEET NO:
DIMENS.ETC:	TITLE		
LETTERING:	NARCO monitoring system (Reduced 65%)		
ARROWS:			DRAWING NO.
OTHER:			

BAKER, WORTHINGTON, CROSSLEY, STANSBERRY & WOOLF

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DURWARD S. JONES
WILLIAM E. ANDERSEN
OF COUNSEL

of Solid Waste Mg.
2/28/89 File No.
by JJ

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February 27, 1989

Mr. Randy Curtis
Tennessee Department of
Health and Environment
1733 Sunset Drive
Johnson City, Tennessee 37601

RE: North American Rayon Corporation Groundwater Analytical Data - December 28, 1988 Sampling

Dear Mr. Curtis:

Enclosed please find a copy of a letter that I received on this date from Laura Harris of Westinghouse Haztech concerning the groundwater analytical data for North American Rayon Corporation. As you will note, the data for selenium and arsenic is suspect due to the method of analysis and the fact that the groundwater is high in calcium.

If you have any questions regarding the enclosed material, please feel free to call me.

Sincerely yours,

Melissa McGuire

Melissa M. McGuire

ssr
Enclosure

Westinghouse
Environmental Services

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February 22, 1989

Ms. Melissa McGuire
Baker, Worthington, Crossley,
Stransberry, and Woolf
Attorneys-at-Law
Hamilton Bank Building
207 Mockingbird Lane
Johnson City, TN 37601

Project No. 2322-88-1107

SUBJECT: North American Rayon Corp.
Groundwater Analytical Data
Sample Event - December 28, 1988

Dear Ms. McGuire:

Enclosed are the above-referenced data for ground water samples collected at the North American Rayon Corporation in Elizabethton, Tennessee on December 28, 1988. The following drinking water parameters were found to exceed the EPA standard:

- Arsenic - MW-1, MW-2, MW-3, MW-4
- Selenium - MW-1, MW-2, MW-3
- Fluoride - MW-4
- Nitrate - MW1, MW4

Laboratory analyses were performed by RCRA Analytical Services, Inc. of Athens, Georgia. Metals have been analyzed by Inductively Coupled Plasma Spectroscopy (ICP) except for mercury which is analyzed by Atomic Absorption (AA). RCRA has confirmed that water samples having high calcium, aluminum, and iron contents cause interference in measuring arsenic and selenium on the ICP apparatus. This interference does not occur when these elements are analyzed by AA. ICP and AA analysis of ground-water samples from another site situated in limestone terrain indicated that error in measurements of arsenic and selenium by ICP increases as

calcium concentration increases. ICP analysis of a sample indicated 2 ppm arsenic whereas the same sample was non-detectable when analyzed by AA. The arsenic and selenium data transmitted herein are based on analysis by ICP and are suspected of being inaccurate. Sample volumes were inadequate for re-analysis by AA. From now on arsenic and selenium, as well as mercury, will be analyzed by AA.

A ground water elevation countour map is enclosed. Please call if you have any questions.

Sincerely,

Laura

Laura B. Harris
Project Manager

LBH/jlv
Enclosure

cc: Lou Raasch

GROUND-WATER ANALYTICAL DATA
FOR MONITOR WELLS 1-4

Sample Events 12-28-88

Parameters characterizing the suitability of ground water as a drinking water supply:

	MW-1	MW-2	MW-3	MW-4	EPA Drinking Water Standard
Metals (ppm)					
Arsenic	0.20	0.24	0.27	0.07	0.05
Barium	0.14	0.02	<0.05	<0.01	1.0
Cadmium	<0.01	<0.01	<0.01	<0.01	0.01
Chromium	0.03	0.04	0.03	0.01	0.05
Lead	0.02	0.03	0.04	<0.03	0.05
Mercury	<0.001	<0.001	<0.001	<0.001	0.0002
Selenium	0.12	0.19	0.13	0.01	0.01
Silver	0.04	0.03	0.02	0.02	0.05
Inorganics (ppm)					
Fluoride	0.15	0.15	0.34	2.50	1.4-2.4
Nitrate (N)	1.50	0.08	<0.05	1.11	1.00
Pesticides (ppb)					
Endrin	<0.03	<0.03	<0.03	<0.03	0.20
Lindane	<0.008	<0.008	<0.008	<0.008	4.0
Methoxychlor	<0.30	<0.30	<0.30	<0.30	100
Toxaphene	<1.20	<1.20	<1.20	<1.20	5.0
Phenoxy Herbicides, ppb					
2,4-D	<5.2	<5.2	<5.2	<5.2	100
2,4,5-TP	<0.1	<0.1	<0.1	<0.1	10
Fecal Coliform, per 100 ml	<1	<1	<1	<1	1
Radium, pCi/l	<0.1	0.1	<0.1	0.1	5
Gross Alpha, pCi/l	5	4	4	4	15
Gross Beta, pCi/l	67	18	10	5	4 mrem/yr

Parameters Establishing Ground Water Quality (ppm):

	MW-1	MW-2	MW-3	MW-4
Iron	0.03	0.03	0.02	0.01
Manganese	0.003	7.025	0.210	0.006
Sodium	61.45	466.9	618.29	214.4
Chloride	6.49	13.9	18.6	7.61
Sulfate	230	1425	984	384
Phenols	<10	<10	<10	<10

Parameters Used as Indicators of Ground Water Contamination:

TOC (ppm)	0.66	2.54	8.18	2.70
TOX (ppb)	10.1	16.6	44.8	21.8
pH* (s.u.)	7.8	6.8	7.6	9.4
Specific Conductance* (umhos/cm)	520	2400	2450	950
Water Level (ft-msl)	1463.43	1470.39	1487.51	1467.40

*Data Collected Week of 2/13/89

10-92

61

RECEIVED
Division of Solid Waste Management
Date 11/16/88 File No.
Received By 90

Westinghouse
Environmental Services

Westinghouse HAZTECH, Inc.

Technical
5280 Panola Industrial Boulevard
Decatur, Georgia 30035
(404) 981-9332
(404) 981-9339 (24 Hr.)
FAX (404) 593-3959

November 11, 1988

Mr. Randy Curtis, Geologist
Tennessee Department of
Health & Environment
1733 Sunset Drive
Johnson City, TN 37601

Project No. 2322-88-1107

Subject: North American Rayon Corp.
Groundwater Analytical Data
Sample Event - September 12, 1988

Dear Randy:

Enclosed are the above-referenced data for ground-water samples collected at the North American Rayon Corporation on September 12, 1988. The following paramters characterizing the suitability of ground-water as a drinking-water supply have been found to exceed EPA standards:

- Arsenic - MW1, MW3, MW4, MW5, MW6
- Camium - MW3
- Fluoride - MW4
- Selenium - MW1, MW3, MW4, MW5, MW6

Please note that wells MW5, MW6, and MW7 were sampled within two days of completion, and within one day of air-jetting. Wells MW1, MW2, MW3 and MW4 were sampled within two weeks of construction, and within five days of air-jetting.

A ground-water elevation contour map is enclosed. A revised contour map including piezometer measurements will be submitted to your office as soon as available.

Please contact my office if you would like to discuss these data.

Sincerely,

Laura B. Harris

Laura B. Harris
Project Manager

LBH:jlc
Enclosure

cc: Melissa McGuire
Lou Raasch

TABLE 1

GROUND-WATER ANALYTICAL DATA
FOR MONITOR WELLS 1-4

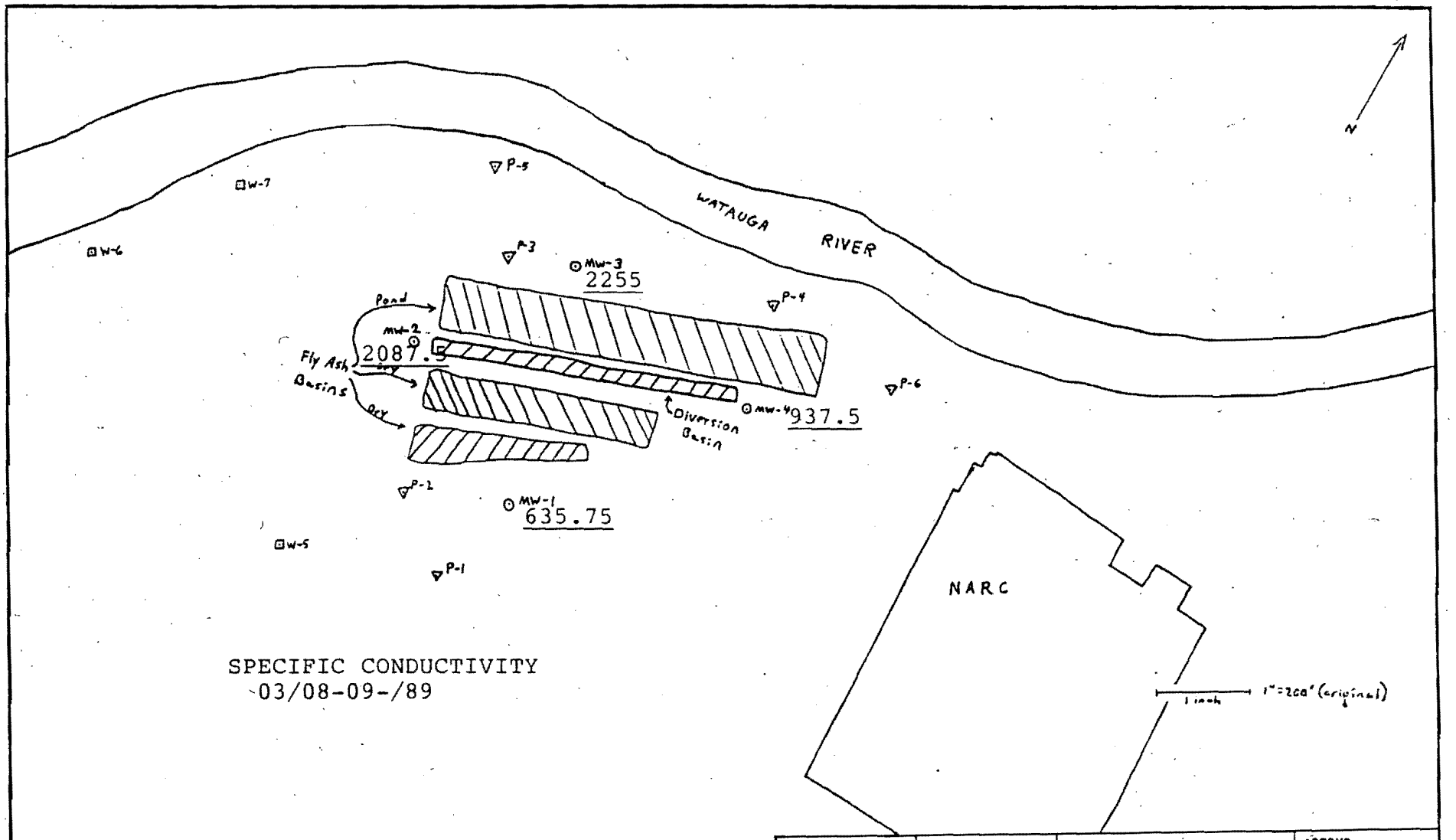
Sample Event: Sept. 12, 1988

Parameters characterizing the suitability of ground-water as a drinking-water supply:

	MW1	MW2	MW3	MW4	EPA Drinking Water Standard
Arsenic (ppm)	0.18	<0.05	0.69	0.33	0.05
Barium (ppm)	0.10	0.01	0.12	0.03	1.0
Cadmium (ppm)	<0.01	<0.01	<0.01	<0.01	<0.01
Chromium (ppm)	0.01	<0.01	<0.01	0.03	0.05
Flouride (ppm)	0.37	<0.10	<0.10	3.4	1.4-2.4
Lead (ppm)	<0.03	<0.03	<0.03	<0.03	0.05
Mercury (ppm)	<0.0008	<0.0008	<0.0008	<0.0008	0.0002
Nitrate (N) (ppm)	6.6	<0.10	<0.10	6.4	10.0
Selenium (ppm)	0.25	<0.03	0.22	0.15	0.01
Silver (ppm)	<0.10	<0.10	<0.10	<0.10	0.05
Endrin (ppb)	<0.03	<0.03	<0.03	<0.03	0.20
Lindene (ppb)	<0.0008	<0.0008	<0.0008	<0.0008	4.0
Methoxychler (ppb)	<0.30	<0.30	<0.30	<0.30	100
Toxaphene (ppb)	<1.20	<1.20	<1.20	<1.20	5.0
2,4-D (ppb)	<5.2	<5.2	<5.2	<5.2	100
2,4,5-TP Silvex (ppb)	<0.10	<0.10	<0.10	<0.10	10
Radium (pCi/l)	1.8 ± 0.2	<0.1	0.2	0.3 ± 0.1	5
Gross Alpha (pCi/l)	<3	<3	3 ± 3	7 ± 2	15
Gross Beta (pCi/l)	6 ± 2	9 ± 2	15 ± 3	79 ± 3	4 millirem/yr
Coliform Bacteria (col/100me)	<1	<1	<1	<1	1

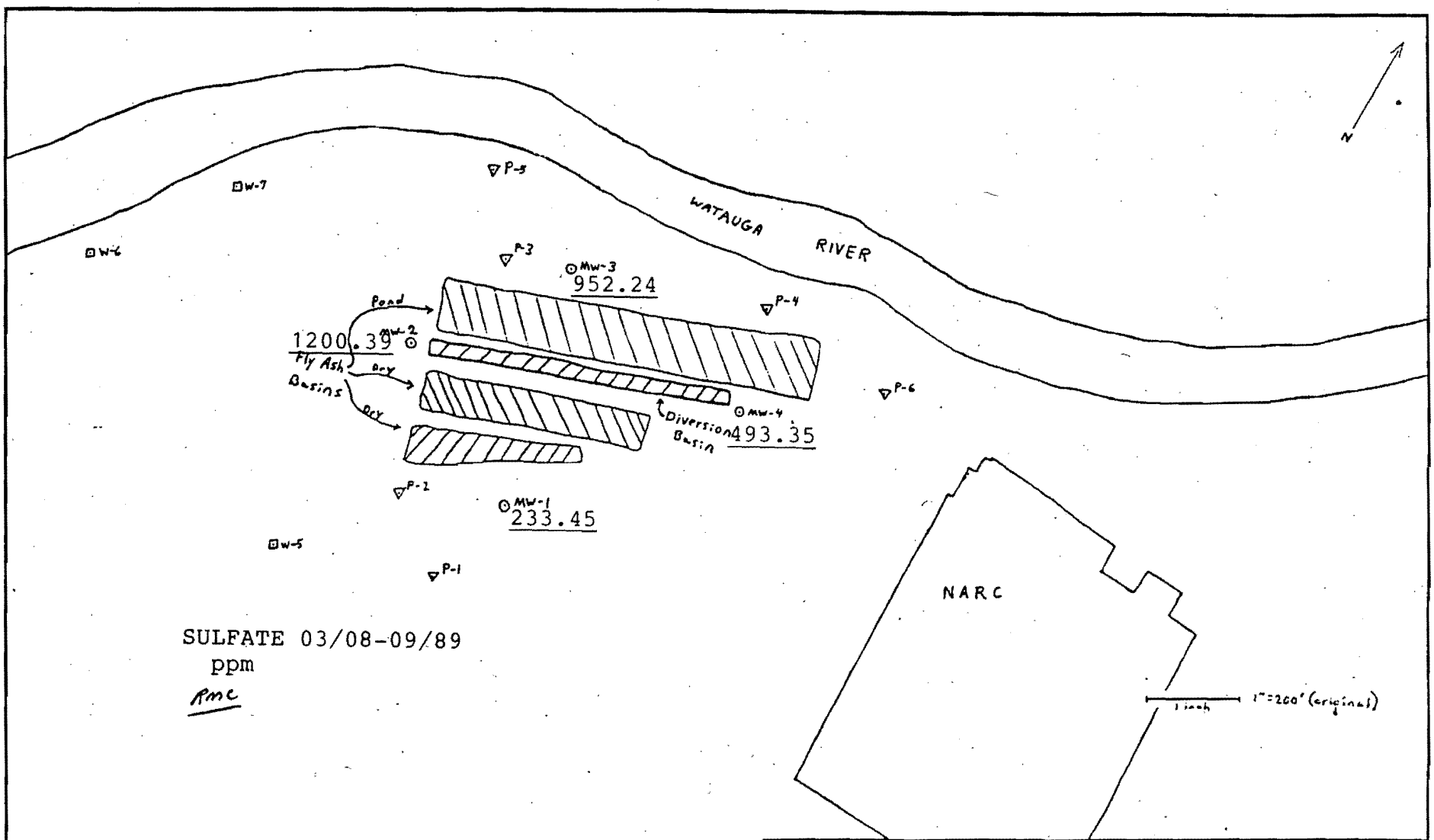
Quality Control/Quality Assurance Data:

	Units	MW1 Dup	Blank
Arsenic	ppm	<0.0002	<0.0002
Mercury	ppm	<0.0008	<0.0008
Selenium	ppm	<0.0008	<0.0008
Barium	ppm	0.09	<0.001
Cadmium	ppm	<0.004	<0.004
Chromium	ppm	0.009	0.007
Lead	ppm	<0.025	<0.025
Silver	ppm	0.01	<0.007
Iron	ppm	1.05	<0.005
Manganese	ppm	0.38	0.002
Sodium	ppm	59.09	0.15
Fluoride	ppm	--	<0.1
Chloride	ppm	--	0.77
Nitrate	ppm	--	<0.1
Sulfate	ppm	--	<2
TOC	ppm	--	0.31
Coliform	col/100 ml	--	<1



SPECIFIC CONDUCTIVITY
03/08-09-/89

ACCURACY:	SCALE: 1"=200'	DRAWN BY: RMC, copied from HazTech Document	APPRVD:
LINES:	DATE: 02/27/89		SHEET NO:
DIMENS.ETC:	TITLE NARCO monitoring system (Reduced 65%)		
LETTERING:			
ARROWS:			DRAWING NO.
OTHER:			



SULFATE 03/08-09/89
ppm
Rmc

ACCURACY:	SCALE: 1"=200'	DRAWN BY: Rmc, copied from Hazteck Document	APPRVD:
LINES:	DATE: 03/27/89		SHEET NO:
DIMENS.ETC:	TITLE NARCO monitoring system (Reduced 65%)		
LETTERING:			
ARROWS:			DRAWING NO.
OTHER:			

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HOWARD H. BAKER (1902-1964)
HOWARD H. BAKER, JR.
ROBERT F. WORTHINGTON, JR.
ROBERT L. CROSSLEY
DON C. STANSBERRY, JR.
LOUIS C. WOOLF
ROBERT G. McCULLOUGH
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ERNEST A. PETROFF
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JAMES A. McINTOSH
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CYNTHIA K. MANCEBO
JULIAN M. OLEJNICZAK
JOHN B. WHITESELL
DURWARD S. JONES
WILLIAM E. ANDERSEN
OF COUNSEL

of Solid Waste Mgt.
2/28/89 File No.
by JJ

KNOXVILLE, TENNESSEE 37902
BANK OF EAST TENNESSEE BUILDING
TELEPHONE 615 549-7000
TELECOPIER 615 525-8569

HUNTSVILLE, TENNESSEE 37756
COURTHOUSE SQUARE
TELEPHONE 615 663-2321
TELECOPIER 615 663-2111

WASHINGTON, D.C. 20004
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TELEPHONE 202 347-4360
TELECOPIER 202 347-4540

NASHVILLE, TENNESSEE 37219
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TELEPHONE 615 726-5600
TELECOPIER 615 726-0464

HENDERSONVILLE, TENNESSEE 37075
MAPLE GLEN OFFICE BUILDING
TELEPHONE 615 822-8822
TELECOPIER 615 824-4684

February 27, 1989

Mr. Randy Curtis
Tennessee Department of
Health and Environment
1733 Sunset Drive
Johnson City, Tennessee 37601

RE: North American Rayon Corporation Groundwater Analytical Data - December 28, 1988 Sampling

Dear Mr. Curtis:

Enclosed please find a copy of a letter that I received on this date from Laura Harris of Westinghouse Haztech concerning the groundwater analytical data for North American Rayon Corporation. As you will note, the data for selenium and arsenic is suspect due to the method of analysis and the fact that the groundwater is high in calcium.

If you have any questions regarding the enclosed material, please feel free to call me.

Sincerely yours,

Melissa McGuire

Melissa M. McGuire

ssr
Enclosure

Westinghouse
Environmental Services

Westinghouse HAZTECH, Inc.

5280 Panola Industrial Boulevard
Decatur, Georgia 30035
(404) 981-9332
(404) 981-9339 (24 Hr.)
FAX (404) 981-1786

February 22, 1989

Ms. Melissa McGuire
Baker, Worthington, Crossley,
Stransberry, and Woolf
Attorneys-at-Law
Hamilton Bank Building
207 Mockingbird Lane
Johnson City, TN 37601

Project No. 2322-88-1107

SUBJECT: North American Rayon Corp.
Groundwater Analytical Data
Sample Event - December 28, 1988

Dear Ms. McGuire:

Enclosed are the above-referenced data for ground water samples collected at the North American Rayon Corporation in Elizabethton, Tennessee on December 28, 1988. The following drinking water parameters were found to exceed the EPA standard:

- Arsenic - MW-1, MW-2, MW-3, MW-4
- Selenium - MW-1, MW-2, MW-3
- Fluoride - MW-4
- Nitrate - MW1, MW4

Laboratory analyses were performed by RCRA Analytical Services, Inc. of Athens, Georgia. Metals have been analyzed by Inductively Coupled Plasma Spectroscopy (ICP) except for mercury which is analyzed by Atomic Absorption (AA). RCRA has confirmed that water samples having high calcium, aluminum, and iron contents cause interference in measuring arsenic and selenium on the ICP apparatus. This interference does not occur when these elements are analyzed by AA. ICP and AA analysis of ground-water samples from another site situated in limestone terrain indicated that error in measurements of arsenic and selenium by ICP increases as

calcium concentration increases. ICP analysis of a sample indicated 2 ppm arsenic whereas the same sample was non-detectable when analyzed by AA. The arsenic and selenium data transmitted herein are based on analysis by ICP and are suspected of being inaccurate. Sample volumes were inadequate for re-analysis by AA. From now on arsenic and selenium, as well as mercury, will be analyzed by AA.

A ground water elevation countour map is enclosed. Please call if you have any questions.

Sincerely,

Laura

Laura B. Harris
Project Manager

LBH/jlv
Enclosure

cc: Lou Raasch

GROUND-WATER ANALYTICAL DATA
FOR MONITOR WELLS 1-4

Sample Events 12-28-88

Parameters characterizing the suitability of ground water as a drinking water supply:

	MW-1	MW-2	MW-3	MW-4	EPA Drinking Water Standard
Metals (ppm)					
Arsenic	0.20	0.24	0.27	0.07	0.05
Barium	0.14	0.02	<0.05	<0.01	1.0
Cadmium	<0.01	<0.01	<0.01	<0.01	0.01
Chromium	0.03	0.04	0.03	0.01	0.05
Lead	0.02	0.03	0.04	<0.03	0.05
Mercury	<0.001	<0.001	<0.001	<0.001	0.0002
Selenium	0.12	0.19	0.13	0.01	0.01
Silver	0.04	0.03	0.02	0.02	0.05
Inorganics (ppm)					
Fluoride	0.15	0.15	0.34	2.50	1.4-2.4
Nitrate (N)	1.50	0.08	<0.05	1.11	1.00
Pesticides (ppb)					
Endrin	<0.03	<0.03	<0.03	<0.03	0.20
Lindane	<0.008	<0.008	<0.008	<0.008	4.0
Methoxychlor	<0.30	<0.30	<0.30	<0.30	100
Toxaphene	<1.20	<1.20	<1.20	<1.20	5.0
Phenoxy Herbicides, ppb					
2,4-D	<5.2	<5.2	<5.2	<5.2	100
2,4,5-TP	<0.1	<0.1	<0.1	<0.1	10
Fecal Coliform, per 100 ml	<1	<1	<1	<1	1
Radium, pCi/l	<0.1	0.1	<0.1	0.1	5
Gross Alpha, pCi/l	5	4	4	4	15
Gross Beta, pCi/l	67	18	10	5	4 mrem/yr

Parameters Establishing Ground Water Quality (ppm):

	MW-1	MW-2	MW-3	MW-4
Iron	0.03	0.03	0.02	0.01
Manganese	0.003	7.025	0.210	0.006
Sodium	61.45	466.9	618.29	214.4
Chloride	6.49	13.9	18.6	7.61
Sulfate	230	1425	984	384
Phenols	<10	<10	<10	<10

Parameters Used as Indicators of Ground Water Contamination:

TOC (ppm)	0.66	2.54	8.18	2.70
TOX (ppb)	10.1	16.6	44.8	21.8
pH* (s.u.)	7.8	6.8	7.6	9.4
Specific Conductance* (umhos/cm)	520	2400	2450	950
Water Level (ft-msl)	1463.43	1470.39	1487.51	1467.40

*Data Collected Week of 2/13/89

10-93

61

RECEIVED
Division of Solid Waste Management
Date 11/16/88 File No.
Received by 90

Westinghouse
Environmental Services

Westinghouse HAZTECH, Inc.

Technical
5280 Panola Industrial Boulevard
Decatur, Georgia 30035
(404) 981-9332
(404) 981-9339 (24 Hr.)
FAX (404) 593-3959

November 11, 1988

Mr. Randy Curtis, Geologist
Tennessee Department of
Health & Environment
1733 Sunset Drive
Johnson City, TN 37601

Project No. 2322-88-1107

Subject: North American Rayon Corp.
Groundwater Analytical Data
Sample Event - September 12, 1988

Dear Randy:

Enclosed are the above-referenced data for ground-water samples collected at the North American Rayon Corporation on September 12, 1988. The following paramters characterizing the suitability of ground-water as a drinking-water supply have been found to exceed EPA standards:

- Arsenic - MW1, MW3, MW4, MW5, MW6
- Camium - MW3
- Fluoride - MW4
- Selenium - MW1, MW3, MW4, MW5, MW6

Please note that wells MW5, MW6, and MW7 were sampled within two days of completion, and within one day of air-jetting. Wells MW1, MW2, MW3 and MW4 were sampled within two weeks of construction, and within five days of air-jetting.

A ground-water elevation contour map is enclosed. A revised contour map including piezometer measurements will be submitted to your office as soon as available.

Please contact my office if you would like to discuss these data.

Sincerely,

Laura B. Harris

Laura B. Harris
Project Manager

LBH:jlc
Enclosure

cc: Melissa McGuire
Lou Raasch

TABLE 1

GROUND-WATER ANALYTICAL DATA
FOR MONITOR WELLS 1-4

Sample Event: Sept. 12, 1988

Parameters characterizing the suitability of ground-water as a drinking-water supply:

	MW1	MW2	MW3	MW4	EPA Drinking Water Standard
Arsenic (ppm)	0.18	<0.05	0.69	0.33	0.05
Barium (ppm)	0.10	0.01	0.12	0.03	1.0
Cadmium (ppm)	<0.01	<0.01	<0.01	<0.01	<0.01
Chromium (ppm)	0.01	<0.01	<0.01	0.03	0.05
Flouride (ppm)	0.37	<0.10	<0.10	3.4	1.4-2.4
Lead (ppm)	<0.03	<0.03	<0.03	<0.03	0.05
Mercury (ppm)	<0.0008	<0.0008	<0.0008	<0.0008	0.0002
Nitrate (N) (ppm)	6.6	<0.10	<0.10	6.4	10.0
Selenium (ppm)	0.25	<0.03	0.22	0.15	0.01
Silver (ppm)	<0.10	<0.10	<0.10	<0.10	0.05
Endrin (ppb)	<0.03	<0.03	<0.03	<0.03	0.20
Lindene (ppb)	<0.0008	<0.0008	<0.0008	<0.0008	4.0
Methoxychler (ppb)	<0.30	<0.30	<0.30	<0.30	100
Toxaphene (ppb)	<1.20	<1.20	<1.20	<1.20	5.0
2,4-D (ppb)	<5.2	<5.2	<5.2	<5.2	100
2,4,5-TP Silvex (ppb)	<0.10	<0.10	<0.10	<0.10	10
Radium (pCi/l)	1.8 ± 0.2	<0.1	0.2	0.3 ± 0.1	5
Gross Alpha (pCi/l)	<3	<3	3 ± 3	7 ± 2	15
Gross Beta (pCi/l)	6 ± 2	9 ± 2	15 ± 3	79 ± 3	4 millirem/yr
Coliform Bacteria (col/100me)	<1	<1	<1	<1	1

TABLE 1 (continued)

Parameters establishing ground-water quality:

	MW1	MW2	MW3	MW4
Chloride (ppm)	4.5	14	16	7.5
Iron (ppm)	0.69	0.30	3.66	5.91
Manganese(ppm)	0.45	4.5	2.7	1.9
Phenols (ppm)	<0.01	<0.01	<0.01	<0.01
Sodium (ppm)	51.30	471	678	244
Sulfate (ppm)	154	387	338	242

Parameters used as indicators of ground-water contamination:

		MW1	MW2	MW3	MW4
pH (s.u.)		7.80	6.60	7.54	7.50
		7.65	6.58	7.50	7.35
		7.90	6.55	7.45	7.28
		7.85	6.56	7.43	7.28
	Mean	7.80	6.57	7.48	7.35
Specific Conductance		550	2570	2850	1250
		555	2600	2890	1280
		560	2600	2820	1300
		NA*	2600	2770	1200
	Mean	553.3	2592.5	2832.5	1257.5

		MW1	MW2	MW3	MW4
TOC (ppm)		11.08	52.69	141.93	75.16
		10.18	54.80	174.91	66.71
		10.35	58.55	151.70	63.10
		10.35	56.61	144.69	64.97
	Mean	10.49	55.66	153.31	67.48

TABLE 1 (continued)

		MW1	MW2	MW3	MW4
TOX (ppb)		<5.0	16	36	8.8
		8.8	24	37	<5.0
		34	<5.0	38	9.8
		<5.0	<5.0	38	9.3
	Mean	13.2	12.5	37.2	8.2
Temperature (°C)		20	23	22	22
Water Level	(ft msl)	1426.80	1438.67	1482.85	1457.80

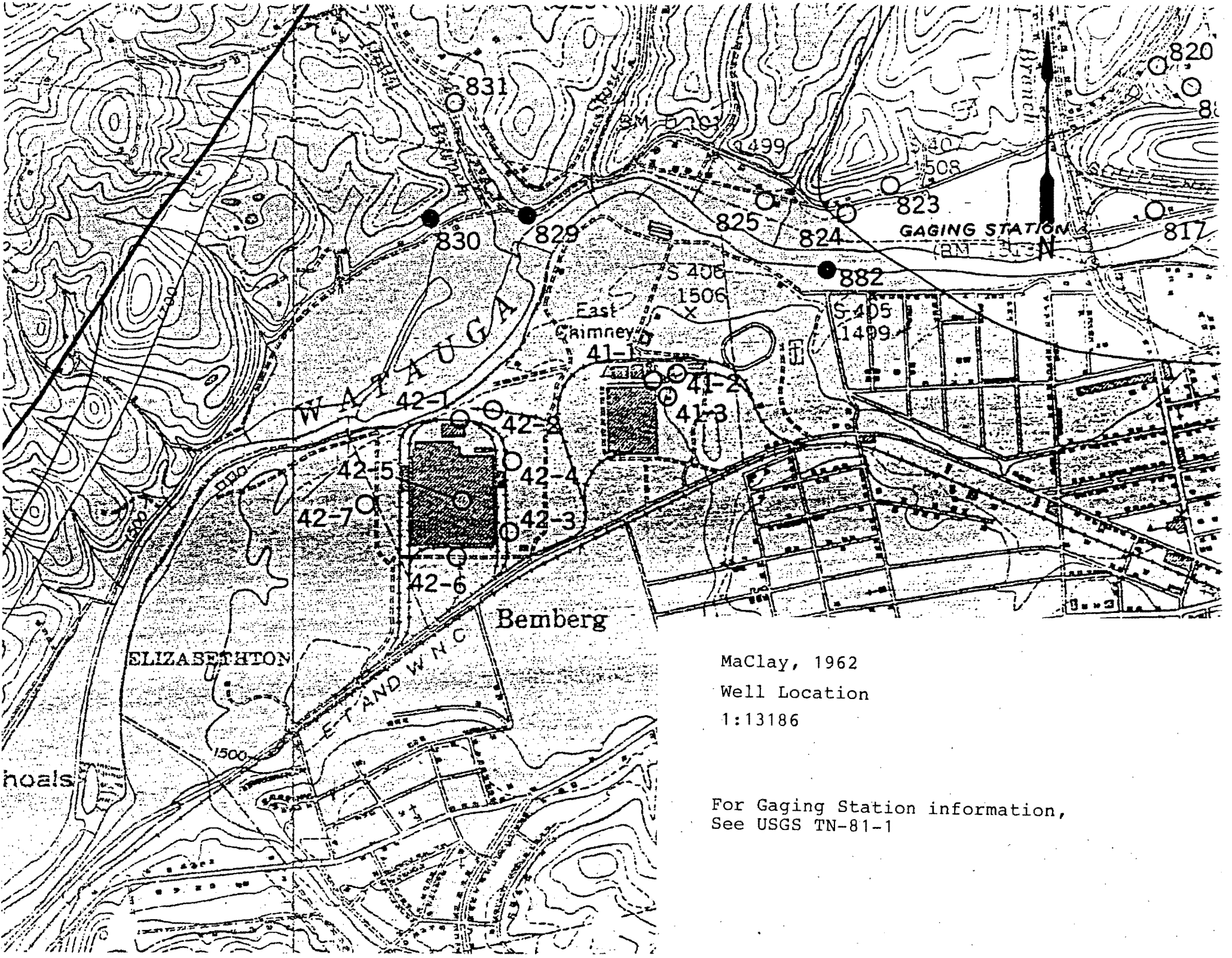
*NA data not obtained

Geology and Ground-water Resources of the Elizabethton-Johnson City Area Tennessee

GEOLOGICAL SURVEY WATER-SUPPLY PAPER 1460-J

Prepared in cooperation with the Tennessee Division of Geology

Mackay—GEOLOGY AND GROUND-WATER RESOURCES, ELIZABETHTON-JOHNSON CITY AREA, TENNESSEE—Geological Survey Water-Supply Paper 1460-J



MaClay, 1962

Well Location

1:13186

For Gaging Station information,
See USGS TN-81-1

abandoned; D, domestic; Ind, industrial; P, public supply; S, stock.]

No. on plate	Location (Tennessee rectangular coordinates)	Owner or name	Topographic situation	Altitude (feet)	Type of well	Depth (feet)	Diameter (inches)	Stratigraphic unit	Depth to water (feet)	Date of measurement	Method of lift	Use of water	Remarks
S	710,300 N 3,127,100 E	Hampton Spring	Valley	1,780				Rome formation				P	Spring used by Elizabethton for municipal supply. See fig. 4.
S	721,700 N 3,106,900 E	Big Spring	do	1,700				Knox dolomite				D, S	
8-S	713,800 N 3,090,500 E	Milligan College Spring.	do	1,520				do				P	Estimated yield 50 gpm 8/30/55.
34-S	698,600 N 3,097,500 E	C. W. Tucker	do	1,860				Shady dolomite				D	Estimated yield 5 gpm 9/20/49.
35-S	707,200 N 3,087,700 E	Anderson Spring	Slope	1,600				Knox dolomite				D, S	Estimated yield 25 gpm 9/20/55.
36	724,700 N 3,090,900 E	— — Bowers	do	1,620	Dr	302	6	do			J	D	
37	725,300 N 3,091,700 E	Mrs. Hite	do	1,620	Dr	284	6	do			J	D	
38	740,300 N 3,100,200 E	Range School	do	1,720	Dr	180	6	do			Cy	P	
39	715,100 N 3,102,150 E	Oak Grove School	do	1,700	Dr	96	6	do			Cy	P	
40	704,100 N 3,097,150 E	Green Pine School	Valley	1,900	Dr	75	6	do			Cy	P	
41-1	735,500 N 3,107,200 E	American Bemberg Div., Beaunit Mills, Inc.	do	1,520	Dr	600	18	Honaker dolomite.	34		T	Ind	Water sample analyzed.
41-2	735,400 N 3,107,300 E	do	do	1,525	Dr	305	18	do	38		T	Ind	Well No. 1 and No. 2 are pumped simultaneously.
41-3	735,500 N 3,107,400 E	do	do	1,528	Dr	700	18	do	41		T	Ind	
42-1	734,700 N 3,105,700 E	North American Rayon Corp.	do	1,500	Dr	180	30	do	42		T	Ind	
42-2	734,680 N 3,105,750 E	do	do	1,501	Dr	305	18	do				Ab	Well abandoned because polluted by water from the river.
42-3	733,650 N 3,106,200 E	do	do	1,512	Dr	700	20	do	54		T	Ind	Water sample analyzed.
42-4	734,300 N 3,106,200 E	do	do	1,517	Dr	483	20	do	52			Ab	Well abandoned because polluted by water from the river.
42-5	734,900 N 3,105,750 E	do	do	1,509	Dr	305	20	do	51		T	Ind	
42-6	733,300 N 3,105,800 E	do	do	1,509	Dr	304	20	do	52		T	Ind	

MacLay, 1962

42-7	733,700 N 3,104,800 E	do	do	1,500	Dr	311	20	do	46		T	Ind	
500-S	698,600 N 3,106,500 E	N. Lyons	Slope	2,210				Rome formation.				D, S	Estimated yield half a gpm 10/10/51.
501	697,800 N 3,106,200 E	S. Lyons	Valley	2,320	Du	36.5	18	do	18.22	10/ 9/51	B	D	Observation well.
503-S	701,900 N 3,111,150 E	William Wright	Slope	2,060				do				D	Estimated yield half a gpm 10/10/51.
504-S	702,250 N 3,114,650 E	Tennessee Forest Service.	do	2,360				do				D	Do.
505	706,800 N 3,110,800 E	R. Smith	Valley	1,910	Du	34.2	18	Shady dolomite.	33.31	10/10/51	J	D, S	
506	707,000 N 3,108,100 E	Earl Taylor	Slope	2,000	B	185	18	do	15.55	10/10/51	Cy	D, S	
507	711,800 N 3,106,000 E	J. B. Fair	Valley	1,790	Du		30	Knox dolomite	10.45	10/10/51		D	Observation well.
508	708,900 N 3,111,900 E	B. G. Pate	Slope	1,990	Du			Rome formation.	10		Cy	D, S	
509	701,300 N 3,122,300 E	Clyde Clark	Valley	1,875	Du	15.4	30	Shady dolomite.	10.94	10/11/51	B	D, S	
510	702,400 N 3,122,800 E	J. W. Street	do	1,870	B	108	12	do	45		J	D	
511	702,500 N 3,118,050 E	G. Stanley	Slope	2,100	Dr	203	8	Rome formation.			J	D, S	
512	702,500 N 3,125,000 E	Helon Norris	Valley	2,070	Du	32.7		do	10.79	10/11/51	B	D	
513	707,400 N 3,125,000 E	Charles Nave	do	1,840	Du	45.1	24	do	39.60	10/11/51	B	D	
514	712,300 N 3,134,650 E	T. H. Saults	Slope	1,920	Dr	185	8	Shady dolomite.	27		J	D	
515	714,700 N 3,136,850 E	— — Johnson	do	2,000	Du	31.8	36	do	14.62	10/13/51	B	D	
516	716,100 N 3,138,150 E	B. H. Peters	Valley	2,030	Du	19.0	30	Rome formation.	7.59	10/13/51	P	D	
517	718,900 N 3,139,000 E	J. M. Hinkle	Slope	2,070	Dr	180	6	do	120			Ab	
518-S	718,200 N 3,139,000 E		do	2,010				do					Estimated yield 3 gpm 10/13/51.
519-S	717,500 N 3,121,850 E	McEtheren Spring	Valley	1,690				Shady dolomite.					Estimated yield 20 gpm 10/14/51.
520	716,000 N 3,120,900 E	R. R. Jenkins	Slope	1,660	Dr	43	6	do	20		Cy	D, S	
521-S	716,350 N 3,120,750 E		Valley	1,645				do				D	Estimated yield 4 gpm 10/14/51.
522-S	716,700 N 3,118,900 E	M. C. Ward	do	1,780				Rome formation.				D	Do.
523	711,400 N 2,113,350 E	— — McKinney	do	1,910	Du	13.6	30	do	10.28	10/14/51	P	D	
524-S	711,100 N 3,113,850 E		do	1,950				do					Estimated yield 3 gpm 10/14/51.
525	713,600 N 3,112,400 E	— — Greenville	do	1,820	Du	31.0	24	Honaker dolomite.	17.86	10/14/51		Ab	Recording gage on well.

MaClay, 1962 USGS WSP-1460-J

RECEIVED
Division of Solid Waste Management
Date 2/15/85 File No.
Received by

Drilling and Well Installation Data
Carter County-Elizabethton
Regional Landfill
Bemberg Site
Elizabethton, Tennessee
S&ME Job No. 092-84-195-A/092-85-003-A

Bemberg Site Information--relevant to points 1 & 4 of conclusions and recommendations section of NARC CEI/CME Report.

RMC

SOIL & MATERIAL ENGINEERS INC. ENGINEERING-TESTING-INSPECTION

Box 1118, Tri-Cities Airport Station, Blountville, TN 37617, Phone (615) 323-2101

March 13, 1985

Mr. Ed Ossi
First Tennessee Regional
Public Health Office
1233 S.W. Avenue Extension
Johnson City, Tennessee 37601

Attention: Mr. Ed Ossi

Subject: Drilling and Well Installation Data
Carter County-Elizabethton Regional Landfill
Bemberg Site
Elizabethton, Tennessee
S&ME Job No. 092-84-195-A/092-85-003-A

Dear Ed:

Soil and Material Engineers, Inc. and its subcontractor have completed the work you outlined at the subject sites.

Joe Samples Drilling performed the rotary drilling to be used as monitoring wells, Tri-State Analytical Laboratory performed well development and Soil and Material Engineers, Inc. performed auger probes at Carter County and well installation and grouting at both sites.

Appendix I contains Carter County Boring Logs, well design and well development information.

Appendix II contains Bemberg Boring Logs, well design and well development.

If you have any questions regarding this report, please contact us at your convenience.

Very truly yours,

SOIL & MATERIAL ENGINEERS, INC.

C. T. Oakes
Drilling Department Manager

cc: Bob Denney Lisa Hughy
Lynn Patrillo

Appendix II

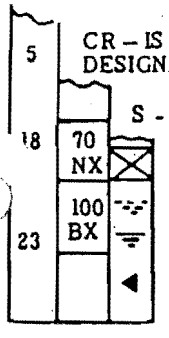
Bemberg Drilling and Well Installation

TEST BORING RECORD

ELEV.	DEPTH	DESCRIPTION	DEPTH	N	CR / RQD	S	REMARKS
	0.0						
	1.0	TOPSOIL					Rotary drill with 6.5" rock bit.
		Tan to brown silty CLAY					
	6.0	Red silty CLAY					
	17.0	Red silty CLAY (moist)					
	22.0	Red silty CLAY with large to medium size boulders					6" casing set through boulder zone 22'-67'

N – IS PENETRATION IN BLOWS PER FOOT (ASTM D-1586)

CR – IS % CORE RECOVERY, NX OR BX DESIGNATES BIT SIZE (ASTM D 2113)



SYMBOLS DESCRIBED BELOW:

UNDISTURBED SAMPLE, (ASTM D-1587)

WATER TABLE, TIME OF BORING
WATER TABLE, 24 HOUR READING
LOSS OF DRILLING FLUID

BORING NUMBER: Bemberg Well

DATE DRILLED: 11/26/84

JOB NUMBER: 092-85-003-A

SOIL & MATERIAL ENGINEERS INC.
ENGINEERING·TESTING·INSPECTION·DRILLING

FORM NO. 103

TEST BORING RECORD

ELEV.	DEPTH		DESCRIPTION	DEPTH	N	CR / RQD	S	REMARKS
	41.5		Red silty CLAY with large to medium size boulders					All classifications are driller's description
	67.0		Gray LIMESTONE with weathering seams					Casing could not be pulled after set through boulder zone.

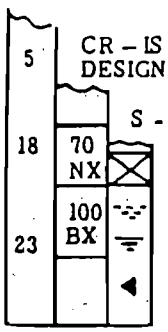
N – IS PENETRATION IN BLOWS PER FOOT (ASTM D-1586)

CR – IS % CORE RECOVERY, NX OR BX DESIGNATES BIT SIZE (ASTM D 2113)

S - SYMBOLS DESCRIBED BELOW:

UNDISTURBED SAMPLE, (ASTM D-1587)

WATER TABLE, TIME OF BORING
WATER TABLE, 24 HOUR READING
LOSS OF DRILLING FLUID



FORM NO. 103

BORING NUMBER: Bemberg Well

DATE DRILLED: 11/26/84

JOB NUMBER: 092-85-003-A

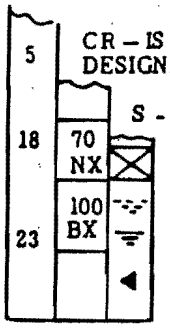
SOIL & MATERIAL ENGINEERS INC.
ENGINEERING·TESTING·INSPECTION·DRILLING

TEST BORING RECORD

ELEV.	DEPTH	DESCRIPTION	DEPTH	N	CR / RQD	S	REMARKS
	83.0	Gray LIMESTONE with weathering seam					
	93.0	Gary LIMESTONE					
	105.0	Boring Terminated at 105.0'					

N – IS PENETRATION IN BLOWS PER FOOT (ASTM D-1586)

CR – IS % CORE RECOVERY, NX OR BX DESIGNATES BIT SIZE (ASTM D 2113)



SYMBOLS DESCRIBED BELOW:

UNDISTURBED SAMPLE, (ASTM D-1587)

WATER TABLE, TIME OF BORING
WATER TABLE, 24 HOUR READING
LOSS OF DRILLING FLUID

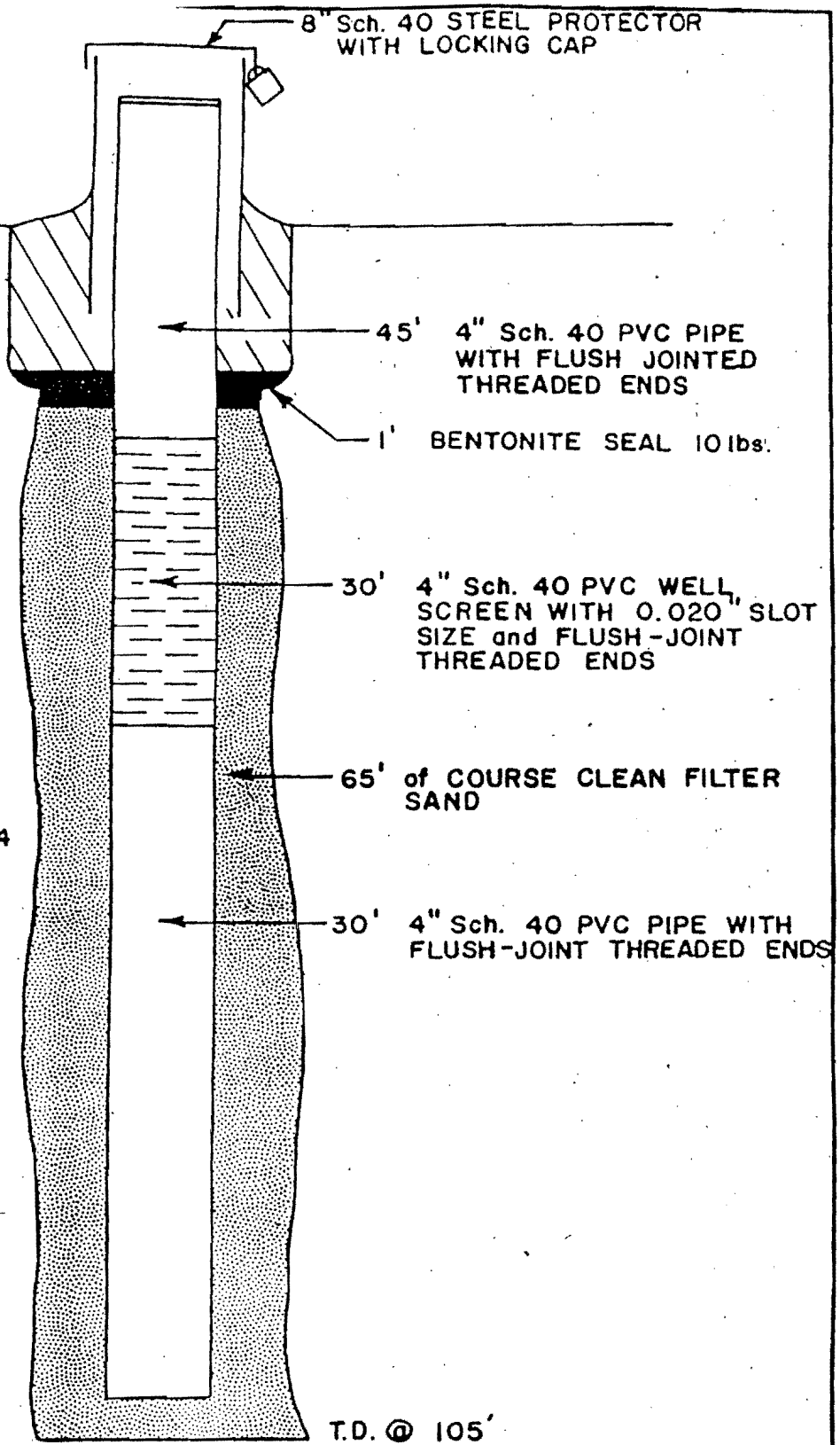
FORM NO. 103

BORING NUMBER: Bemberg Well

DATE DRILLED: 11/26/84

JOB NUMBER: 092-85-003-A

SOIL & MATERIAL ENGINEERS INC.
ENGINEERING-TESTING-INSPECTION-DRILLING



WATER TABLE
2-18-85 at 48'
2-21-85 at 34'

WELL DEVELOPMENT 2-21-84
PUMPED 11 MINUTES
PUMPED 66 Gals. of WATER

WELL DRAWN DOWN 26'
WATER TABLE AFTER PUMPING 60'

SOIL & MATERIAL ENGINEERS, INC. TRI-CITIES BRANCH, BLOUNTVILLE, TN		BEMBERG MONITORING WELL 3	
PROJECT NO. -85-003-A	DRAWING NUMBER	APPROVED BY CTD	DATE: 3-6-85
		DRAWN BY / SCALE NTS	REVISED

Tri-State Analytical Laboratory

P O. BOX 1186
949 E. SULLIVAN ST.
KINGSPORT, TENNESSEE 37662
(615) 245-7961

7-1-85

June 28, 1985

Mr. Lynn E. Patillo
Director of Public Works
City of Elizabethton
P.O. Box 189
Elizabethton, TN, 37643

ANALYSIS REPORT

Sample Date: 6-12-85
Sample I.D.: Bemburg Well #1

pH	6.8	
Ammonia as N	7.6	mg/l
Nitrate	44.0	mg/l
Sulfate	475.4	mg/l
Cadmium	0.053	mg/l
Nickel	0.028	mg/l
Copper	0.053	mg/l
Zinc	0.055	mg/l
Lead	less than 0.05	mg/l

Kendred A Young
KENDRED A. YOUNG

Tri-State Analytical Laboratory

P O. BOX 1186
949 E. SULLIVAN ST.
KINGSPORT, TENNESSEE 37662
(615) 245-7961

7-1-85

June 28, 1985

Mr. Lynn E. Patillo
Director of Public Works
City of Elizabethton
P.O. Box 189
Elizabethton, TN, 37643

ANALYSIS REPORT

Sample Date: 6-12-85
Sample I.D.: Bemburg Well #2

pH	7.1
Ammonia as N	69.5 mg/l
Nitrate	45.8 mg/l
Sulfate	770.5 mg/l
Cadmium	0.025 mg/l
Nickel	0.051 mg/l
Copper	0.17 mg/l
Zinc	0.144 mg/l
Lead	0.09 mg/l

Kendred A Young
KENDRED A. YOUNG

Tri-State Analytical Laboratory

P O. BOX 1186
949 E. SULLIVAN ST.
KINGSPORT, TENNESSEE 37662
(615) 245-7961

June 28, 1985

7-1-85

Mr. Lynn E. Patillo
Director of Public Works
City of Elizabethton
P.O. Box 189
Elizabethton, TN, 37643

ANALYSIS REPORT

Sample Date: 6-12-85
Sample I.D.: Bemburg Well #3

pH	8.0
Ammonia as N	less than 0.10 mg/l
Nitrate	1.50 mg/l
Sulfate	60.5 mg/l
Cadmium	0.033 mg/l
Nickel	0.028 mg/l
Copper	0.15 mg/l
Zinc	0.097 mg/l
Lead	less than 0.05 mg/l

Kendred A Young

KENDRED A. YOUNG

APPENDIX C

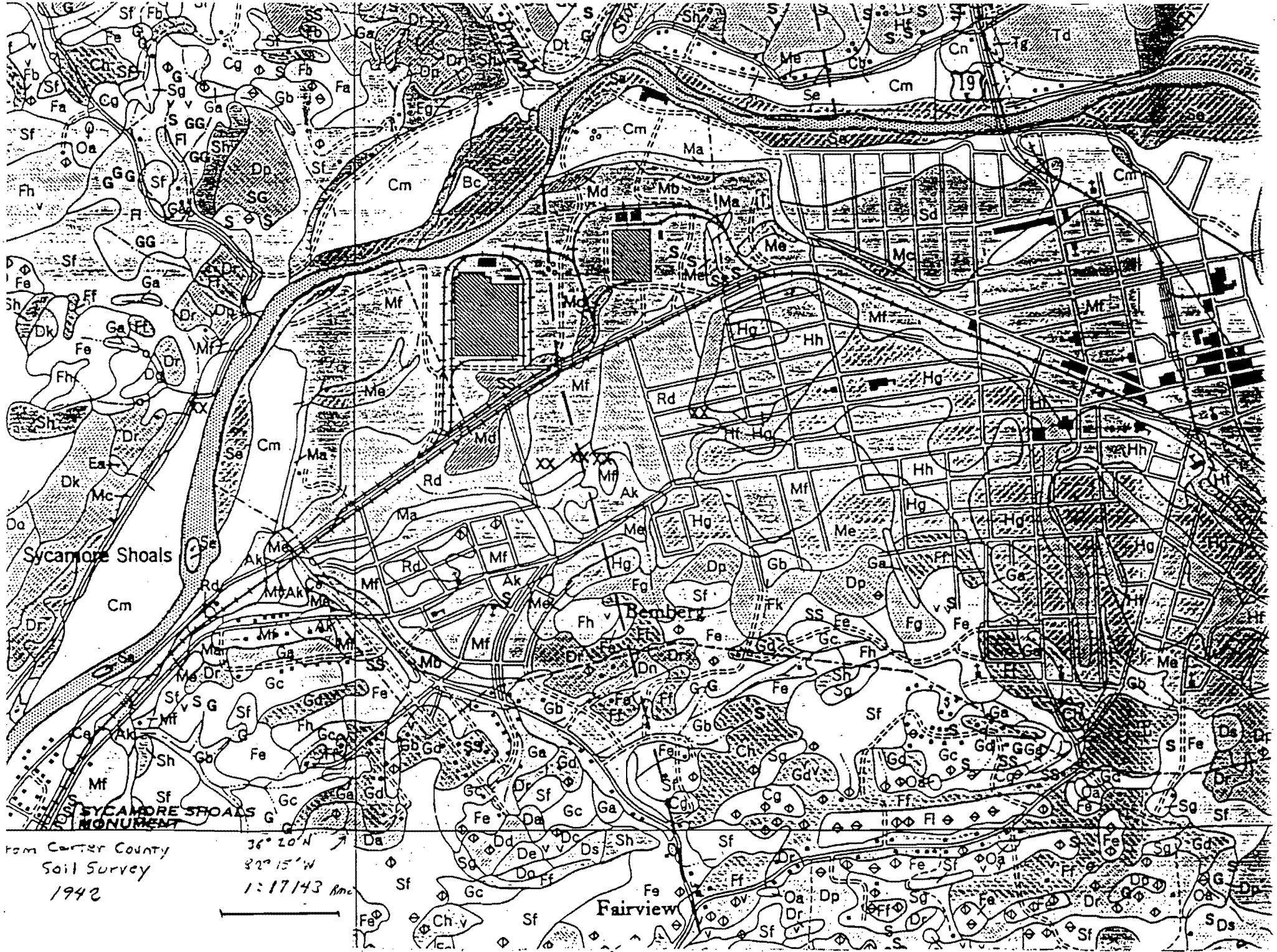
Soils Information

SOIL SURVEY

Carter County Tennessee

Series 1942, No. 4 Issued November, 1953

UNITED STATES DEPARTMENT OF AGRICULTURE
Soil Conservation Service
In cooperation with the
TENNESSEE AGRICULTURAL EXPERIMENT STATION
and the
TENNESSEE VALLEY AUTHORITY



from Carter County
Soil Survey
1942

Masada silt loam, undulating phase (MF).—Most of the high stream terraces occupied by this soil are 30 to 100 feet above the present flood plain. The parent material from which this phase is formed has washed chiefly from uplands underlain by granite and gneiss but in most places includes some material from sandstone, quartzite, shale, and slate. The soil has 1- to 7-percent slopes. Surface runoff is slow to moderate, and internal drainage is moderate. Areas are principally in the Hiwassee-Masada-Altavista soil association, in close association with Hiawassee, Altavista, Roanoke, State, Congaree, Fullerton, Dunmore, and other Masada soils.

Profile description:

0 to 10 inches, grayish-brown mellow friable silt loam.

10 to 34 inches, yellowish-brown (reddish in places) friable sandy clay loam or silty clay loam with a moderately well developed medium blocky structure.

34 inches +, brownish-yellow or yellow moderately friable sandy clay loam or sandy clay faintly splotched with gray below about 40 inches; limestone or calcareous shale at depths of 6 to 20 feet in most places.

The soil is medium to strongly acid and apparently contains a moderate quantity of organic matter and plant nutrients. A few gravelstones and quartzite cobblestones are on the surface and throughout the soil in many places. The soil is permeable to air, roots, and water. Water-holding capacity is relatively high. Although a considerable part of it has been eroded away in places, the original surface soil still constitutes much of the plow layer in most areas.

Use and management.—About 200 acres of Masada silt loam, undulating phase, practically all of which has been cleared and cultivated, is within the city limits of Elizabethton and is consequently removed from agricultural use. Of the rest, about 5 percent is idle and 20 percent is in corn, 15 percent in small grain, 30 percent in hay, 20 percent in pasture, and 10 percent in other crops. A wide variety of crops are grown. Some farmers use a 3- or 4-year rotation of corn, small grain, and hay. Tobacco and truck crops are moderately heavily fertilized with a complete fertilizer. Corn and small grains may receive light applications of a low-analysis fertilizer, but many fields are not fertilized. Acre yields under prevailing management are 40 bushels of corn, 19 bushels of wheat, 1,400 pounds of tobacco, and 1.4 tons of red clover hay.

This soil is well suited to crops and pasture. It is moderately productive under present management but responds to better management practices. The supply of lime, phosphate, and nitrogen is deficient for high yields of most crops. Potash is apparently adequate for most crops, and the need for it depends largely on the crop and the past cropping system. Lime and phosphate are essential in most places for the successful growth of alfalfa or red clover. The soil is only slightly susceptible to erosion; special practices for water control should not be necessary, although it is advisable to practice contour tillage if at all feasible.

Masada silt loam, eroded rolling phase (ME).—This well-drained soil of the old stream terraces has developed from old alluvium that washed principally from Ashe, Porters, and associated soils of the uplands. The chief characteristics differentiating this soil from the undulating phase are greater erosion and steeper slope (7 to 15 percent). About one-half to two-thirds of the original surface soil has been lost as a result of erosion; consequently, the present surface layer is slightly heavier, but not so much so that workability is significantly affected. The subsoil is exposed in some severely eroded spots.

This soil is largely confined to the Hiwassee-Masada-Altavista soil association. It is closely associated with Hiwassee, Altavista, Roanoke, State, Congaree, and other Masada soils.

Use and management.—All of this eroded rolling phase has been cleared and used for crops and pasture. About 20 percent is used for corn, 15 percent for small grain, 30 percent for hay, 20 percent for pasture, and 5 percent for other crops. The rest of the land is idle. In general, crops are not systematically rotated. A few farmers, however, follow a 4-year rotation of corn, small grain, hay, and pasture. Tobacco and truck crops are heavily fertilized, but other crops are not consistently fertilized. Under common management practices, corn produces 35 bushels an acre; wheat, 14 bushels; and red clover hay, 1.2 tons.

This soil is well suited to most of the common field crops and pasture plants of the county, but is less desirable for crops than the undulating phase. Use and management requirements are somewhat similar to those for the undulating phase; but this soil is lower in organic matter and plant nutrients, because they have been removed by cropping and erosion. Water-holding capacity is also slightly lower, and susceptibility to erosion is greater. If crop yields are to be maintained at levels comparable to those of the undulating phase, a longer rotation, including more legumes and grasses, and possibly somewhat heavier applications of lime and phosphate will be required. Surface runoff is more rapid, and erosion control is more difficult. Contour tillage should be practiced. Terraces may be desirable on some slopes, especially if row crops are grown frequently.

Masada gravelly silt loam, eroded hilly phase (MA).—The alluvium from which this well-drained soil has formed has washed chiefly from Ashe, Porters, and associated soils of the mountains. The soil differs from the eroded rolling phase chiefly in having stronger slopes (15 to 30 percent). It is also somewhat more variable in stoniness, depth of alluvial deposit, and in distinctness and thickness of the soil layers. Most areas are on old high stream terraces, associated with Hiwassee, Altavista, State, Congaree, Teas, Fullerton, Dunmore, and other Masada soils.

The surface soil, a grayish-brown to yellowish-brown friable gravelly silt loam, is 4 to 8 inches thick. In a few places, however, all this layer is missing. The subsoil is yellowish-brown friable gravelly silty clay loam to sandy clay loam.

Use and management.—Practically all of Masada gravelly silt loam, eroded hilly phase, has been cleared and cultivated. Most of it is moderately eroded, a small part is severely eroded, and about 5 percent has a forest cover and is uneroded. A major part is in hay crops and pasture, some is in crops, and a considerable part is idle or is reverting to forest. Crop and pasture yields are low.

This soil is poorly suited to intertilled crops and on most farms is probably best used for semipermanent hay crops or pasture. Pasture gives low yields if amendments are not applied. Good pasture can be established and maintained by applying adequate quantities of lime and phosphate and by controlling grazing. Strong slopes and stoniness not only interfere with tillage of crops but also with clipping of pasture. Weeds are therefore difficult to control on permanent pasture. Farmers consider the growing of corn or other clean-cultivated crops every 7 to 10 years a good practice.

Roanoke silt loam (Rd).—Areas of this soil occur on nearly level to slightly depressional parts of the low stream terraces. Drainage, both internal and external, is slow to very slow. The soil has formed from old alluvium washed largely from uplands that are underlain by granite but includes a small admixture of a wide variety of materials in most places. The soil is closely associated with Masada and Altavista soils and differs from them chiefly in being more poorly drained.

Profile description:

0 to 8 inches, light-gray friable silt loam with a weak medium crumb structure.

8 to 16 inches, moderately plastic silty clay to silty clay loam mottled with gray and yellow and having a moderately well developed medium blocky structure.

16 inches +, compact clay highly mottled with gray, yellow, rust, brown, and black; the terrace deposit is 5 or more feet thick.

Organic-matter content is apparently low, reaction is medium to strongly acid throughout, and content of most plant nutrients is low. The soil waterlogged for extended periods, preventing normal air circulation and root penetration. It is very slowly permeable to water and full of stones and gravel.

As mapped, small areas of soils are included that vary greatly in color (gray to yellow) and drainage (poor to imperfect). Some poorly drained areas differ in not having the typical slowly permeable compact clay subsoil; their poor drainage is due largely to seepage.

Use and management.—Most of Roanoke silt loam is cleared and used for corn, hay, and pasture. Some of the cleared land is idle. Crop yields are very low, and complete failures are common. Owing chiefly to poor drainage, this soil is not considered suited to crops. The supply of lime and of most major plant nutrients is deficient, and very poor quality pasture is produced. Response to good management is neither very great nor lasting. Artificial drainage is difficult and of doubtful practicability.

Congaree fine sandy loam (Cm).—This soil of the first bottoms consists of general alluvium washed from uplands underlain by granite, and, in places, slight admixtures of materials washed from uplands underlain by quartzite and shale. It lies in narrow, elongated areas along streams in the Ashe-Tusquitee-Perkinsville and Porters-Tusquitee-Balfour soil associations or along streams flowing from those areas. Surface runoff is slow to moderate, and internal drainage is moderate to rapid.

Profile description:

0 to 12 inches, grayish-brown to brown loose fine sandy loam.
12 to 24 inches, brownish-yellow friable heavy fine sandy loam.
24 inches +, brownish-yellow loose loamy fine sand.

Much mica occurs throughout the soil. Only a few areas have a small quantity of gravel and small cobblestones scattered over the surface and through the profile, and then the number is not sufficient to interfere with tillage. In places the lower layers may contain considerable gravel or cobblestones. Rainfall is readily absorbed but is not retained so well as in Congaree loam. The soil is medium to strongly acid, contains a moderate quantity of organic matter and plant nutrients, and is easily permeated by plant roots and air. It is subject to overflow during periods of high water.

Included are small areas of Congaree loam, Buncombe loamy fine sand, and State loam.

Use and management.—All of Congaree fine sandy loam has been cleared and cultivated. Approximately 25 percent of it is in corn, 5 percent in oats, 10 percent in wheat, 5 percent in barley, 25 percent in hay, 15 percent in pasture, and 5 percent in tobacco, vegetables, and various other crops. About 10 percent of the land is idle. In general, crops are not systematically rotated, but a few farmers use a 3-year rotation of corn, small grain, and hay. The use of commercial fertilizer is limited, but when used, corn and small grains receive light applications. Under common management practices, corn yields 40 bushels an acre; wheat, 14 bushels; tobacco, 1,400 pounds; and red clover, 1.4 tons of hay.

The soil is well suited to intensive crop use. Susceptibility to overflow somewhat limits use suitability, but overflows bring material that serves to replenish the supply of organic matter and plant nutrients. This soil is less fertile and lower in water-holding capacity than Congaree loam; consequently, crop yields are less. Applications of lime and phosphate and use of a short rotation that includes a legume crop are necessary if yields are to be increased or maintained.

Stony colluvium (Tusquitee and Jefferson soil materials) (Se).—Small alluvial or colluvial fans and sloping areas at the base of steep mountain slopes are occupied by this soil. Slopes range from 2 to 30 percent. The small areas are widely distributed in the mountainous section. The soil material has washed from the associated Ashe, Porters, or Ramsey soils of the mountain uplands and is similar to that from which the Tusquitee and Jefferson soils are formed. Rocks and cobblestones on the surface and throughout the soil make tillage impractical (pl. 7, *A*). The rocks are of various sizes and may range up to several feet across. Some are somewhat rounded; others are angular.

Use and management.—This stony soil is unsuited to crops and poor for pasture. Fair pasture can be obtained, but weeds are hard to control. If enough lime and phosphate is applied, much better pasture is obtained.

APPENDIX D

Relevant Correspondence, etc.

Tennessee Department of Health and Environment
Bureau of Environment
1733 Sunset Drive
Johnson City, Tennessee 37601-3621

June 15, 1989

Dr. Lou Raasch, Environmental Services Manager
North American Rayon Corporation
West Elk Avenue
Elizabethton, Tennessee 37643

RE: Extension of Compliance Date for March 19, 1989 NOV
TND 09 505 1207

Dear Dr. Raasch:

Your request for an extension of the compliance date for sampling of the groundwater monitoring system from June 15, 1989 until June 30, 1989 is approved.

It is my understanding that NARC hopes to utilize the upgradient well from the adjacent Bemberg site in lieu of attempting to locate an upgradient background well on NARC property. The Division has received a revised Ground Water Sampling and Analysis Plan and is in the process of reviewing this document. I am enclosing a memo from Division Geologist, Randy Curtis, outlining our position on data generated thus far by your detection monitoring system.

If there are any questions or comments, please do not hesitate to contact Randy Curtis or myself at 928-6487.

Sincerely,

D. Larry Gilliam
Regional Director
Division of Solid Waste Management

DLG/RC/14199166

Enclosure

cc: Ms. Laura Harris, Haztech
Ms. Melissa McGuire, Baker Worthington
Mr. James Scarbrough, EPA, Region IV
DSWM, Nashville 10-23 98
Mr. Randy Curtis, DSWM, Johnson City
Mr. Bill Krispin, DSWM, Nashville
Carter County Health Department

TENNESSEE DEPARTMENT OF HEALTH AND ENVIRONMENT

OFFICE CORRESPONDENCE

FROM	TO	DATE
RMC	File	06/14/89

DATE: June 14, 1989

TO: File

FROM: Randy M. Curtis

SUBJECT: NARC (TND 09-505-1207) Ground Water Sampling and Analysis

During a CME inspection conducted March 8, 1989 at North American Rayon Company, I noted certain deviations from the facility's Sampling and Analysis Plan. A NOV was issued for not having an upgradient background well and for not following certain requirements of the approved plan. The facility was informed that the Division might have to regard the data generated from this event as flawed.

Subsequent to the issuance of the NOV, Westinghouse Haztech, Inc., the consultants for the facility, responded with an explanatory letter addressing my specific concerns and indicating that a revised Sampling and Analysis Plan would be submitted. Haztech requested that the data be considered valid or adequate for retention.

My primary concerns were for TOC, TOX, coliform bacteria, and nitrate. Haztech's arguments, coupled with my own research and conversations with State and EPA lab personnel, led to the conclusion that the TOC data is viable for consideration for the purposes required by the Hazardous Waste Regulations. Similarly, the coliform bacteria numbers may be used with a fair degree of confidence.

FROM	DATE
RMC	6/16

TO

TDH	
WEK	

The numbers on TOX and nitrate are of more concern because of possible problems due to sampling or preservation. I told Ms. Laura Harris of Haztech, in a telephone conversation on June 2, 1989, that the Division would defer a final decision on TOX and nitrate until a subsequent event has yielded samples of unquestioned veracity, for comparison. I told her during the same conversation that TOC and coliform bacteria data would be accepted.

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interference from calcium or aluminum which affected the inductively coupled plasma spectroscopy, but not the Atomic Absorption Method, which was adopted after the 2nd event.

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R. M. C.
06/14/89

RMC/14139166 10-23 97

10-23

92

RECEIVED

Division of Solid Waste Management

Date 6/12/89 File No.

Received by

Westinghouse
Environmental Services

Westinghouse HAZTECH, Inc.

5280 Panola Industrial Boulevard
Decatur, Georgia 30035
(404) 981-9332
(404) 981-9339 (24 Hr.)
FAX (404) 981-1786

June 7, 1989

Mr. Lynn Patillo
City of Elizabethton
P.O. Box 6040
Elizabethton, Tennessee 37644

Subject: Bemberg Superfund Site Upgradient Well
North American Rayon Corporation (NARC)
Project No. 2322-88-1107

Dear Mr. Patillo:

Last Friday I spoke with Randy Curtis and Mike Moody, both with the Tennessee Department of Health and Environment, Johnson City office, regarding the possibility of using the Bemberg upgradient well as part of a ground-water monitoring system for North American Rayon. Both Mr. Moody and Mr. Curtis approved of this practice. Mr. Moody indicated that I should pursue this matter with you.

Westinghouse HAZTECH, Inc. installed 7 wells and 6 piezometers at the NARC plant. To be in compliance with state and federal regulations, NARC's ground-water monitoring system must have at least one upgradient well capable of yielding ground-water samples unaffected by the facility. However, due to a mound in the water table created by recharge from 4 surface impoundments located in the study area, all locations away from the impoundments are hydraulically downgradient of the study area. There is no location for an upgradient well unaffected by the facility on NARC property.

On behalf of NARC, I am writing this letter to request that NARC be given access to the Bemberg upgradient well for use as part of their ground-water monitoring system. NARC will be performing a sample event this month, and wishes to include the upgradient Bemberg well in this sampling. NARC will need to perform 4 sample events from June to December. After December, NARC will require access to the well biannually. Occasionally, they may need additional access to verify data which indicates their facility may be impacting ground-water quality beneath their facility.

Mr. Patillo, please feel free to contact Mr. Moody or Mr. Curtis in the Johnson City field office to discuss this matter. I would appreciate any effort on your behalf to expedite this matter. Please contact me at (404)981-9332 so we can discuss this further.

Sincerely,

Westinghouse HAZTECH, Inc.

Laura Harris

Laura Harris
Project Manager

cc: Lou Raasch
Melissa McGuire
Randy Curtis

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Date 5/10/89 File No.
Received by JJ

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Environmental Services

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Decatur, Georgia 30035
(404) 981-9332
(404) 981-9339 (24 Hr.)
FAX (404) 981-1786

May 5, 1989

Mr. Randy Curtis
Geologist
Tennessee Department of
Health and Environment
1733 Sunset Drive
Johnson City, Tennessee 37601

Subject: North American Rayon Corporation (NARC)
March 18, 1989 Notice of Violation

Dear Mr. Curtis:

This letter is written in reponse to the above-referenced Notice of Violation regarding ground-water sampling at the NARC site in March of this year.

The following discussions are based on information obtained from the references listed below:

- o Standard Methods for the Examination of Water and Wastewater. Sixteenth edition.
- o Methods for the Chemical Analysis of Water and Wastes. EPA, 1983.
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- o Handbook for Sampling and Sample Preservation of Water and Wastewater. EPA, 1982.
- o RCRA Ground-water Monitoring Technical Enforcement Guidance Document (TEGD). EPA, 1986.

After reviewing the various analytical methods it is apparent that revisions to the NARC ground-water sampling and analysis plan are required. A revised plan will be submitted to your office when available.

TOC

TOC bottles provided by the lab were not as requested. Attached is a copy of correspondence to RCRA Analytical requesting certain sample containers and analyses for this monitoring event. Pleas note that amber glass bottles with teflon lids were requested.

Most of the above references recommend glass containers, and that the sample be protected from sunlight. Standard Methods and SW 846 do not indicate that sample containers should have no headspace. The containers provided by RCRA for TOC samples are designed such that it is impossible to close the container without trapping air bubbles. Efforts were made to reduce the amount of air trapped in the sample containers as much as possible. Also, the method descriptions do not indicate that sample volume effects quality of analytical data.

Based on the above information, Westinghouse HAZTECH request that the TOC data associated with this sample event be considered viable. Further, the surface impoundment of concern has been sampled and has not demonstrated the presence of volatile organic compounds which would contribute to the volatile fraction of TOC.

Nitrate

Westinghouse HAZTECH also requested a certain container(s) for samples for nitrate analysis. The laboratory erred in combining nitrate with fluoride, sulfate, and chloride, which do not require chemical preservatives. The manuals referenced above indicate that unpreserved nitrate samples must be analyzed within 48 hours. The samples for nitrate analysis were not analyzed within this time frame. While the nitrate results may be suspect due to this, it is felt that the data should be kept on record, as opposed to not having the data on record at all.

Coliform Bacteria

The sample containers used for coliform analyses were correct for the concentrations of coliform colonies previously detected at the site. Standard Methods indicates that 50 - 100 ml of sample be filtered when well and spring water is being analyzed. SW 846 recommends that a sample container of 120 ml or more be used, and that 2.5 cm of headspace be left in the container after filling. Westinghouse HAZTECH feels that there is no basis to suspect coliform data associated with this sample event as being invalid.

TOX

Following review of the various analytical methods for TOX determination, it is apparent that TOX sample containers should have been completely filled. However, the NARC sampling and analysis plan does not specify that headspace be avoided in TOX sample containers. Therefore, there was no deviation from the plan in this respect. The plan will be ammended to indicate that headspace be avoided for TOX sample containers.

Whether or not the volume of the sample container affects the quality of data for TOX analysis is inconclusive based on review of the various analytical method descriptions. The sample container used was an amber glass bottle with a teflon-lined lid, as prescribed by the NARC plan as well as in other references.

References indicate that sodium sulfite preservative is to be added in the field if the analysis is to be performed immediately. The sodium sulfite serves to reduce residual chlorine, which may cause mechanical interference in measuring true TOX values. The addition of sodium sulfite does not serve to preserve the integrity of the sample. Preservation by adjusting the pH to less than 2 with nitric acid is essential, and was performed on the March 1989 samples from NARC. The samples were acidified on-site prior to packaging for shipment.

Tetrachloroethylene and Trichloroethylene

The table referenced in the notice of violation was modified from the TEGD and is basically a boilerplate table. The parameters associated with NARC's ground-water monitoring program are dictated by an approved ground-water monitoring plan and not by the sampling and analysis plan. Tetrachloroethylene and trichloroethylene are not parameters associated with the surface impoundment monitoring program.

Sequence of Sample Withdrawal

While the sample withdrawal sequence presented in the sampling and analysis plan was not strictly adhered to, it is over ambitious to disregard the validity of analytical data on this basis. The sequence presented in the sampling and analysis plan is based on "a preferred order of collection" presented in the TEGD. No highly volatile parameters are analyzed in NARC wells 1, 2, 3, and 4, which were sampled in March of this year. Deviation from a preferred order in this instance should not cause analyses to be suspect.

Further, the sample enters the sample pump at a point within the water column in the well that may be as much as 20 feet below the water table surface. The sample is not exposed to atmospheric conditions as would be a sample collected by bailing, where the sample point is near the water table surface in close proximity to atmospheric conditions.

Westinghouse HAZTECH will revise the current sampling and analysis plan and submit to your office as soon as it is available. Please contact me at (404) 981-9332 if you would like to discuss this further.

Sincerely,

Westinghouse HAZTECH, Inc.

Laura Harris

Laura Harris
Project Manager

ENC

cc: Lou Raasch
Melissa McGuire

Westinghouse
Environmental Services

Westinghouse HAZTECH, Inc.

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Decatur, Georgia 30035
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FAX (404) 981-1786

February 16, 1989

Parshall Bush
RCRA Analytical Services, Inc.
183 Paradise Blvd.
Suite 108
Athens, Georgia 30607

Subject: PChem, Thomas Industries, NARC
Ground-water Sampling - March 1988

Dear Parshall:

As you can see everybody is due for ground-water sampling in March. Attached please find an analysis request sheet for NARC with the requested analyses highlighted. The following analyses are requested for PChem and Thomas.

PChem	Thomas
TOC*	TOC*
TOX*	tetrachloroethylene*
iron	trichloroethylene*
manganese	acetone
sodium	1,2-dichloroethylene
phenols	chloroform
sulfate	1,1,1-trichloroethane
chloride	vinyl chloride
	1,1-dichloroethylene
	arsenic
	chromium
	lead
	selenium

* run analyses in quadruplicate

Provide PChem with sufficient containers to sample 6 wells. Please provide Thomas sufficient containers to sample 10 wells. NARC requires sufficient containers to sample 5 wells. Additionally, all three facilities need two extra polyethylene containers for field analyses and field blanks.

Sample containers should be as follows for the indicated analyses:

TOC and TOX: amber glass with teflon lined lid

Metals: polyethylene

VOA: VOA vile

Phenols: glass

Chloride and Sulfate: polyethylene

Additional container specifications pretaining to NARC analyses are included on the attached sheets. I will let you be the judge of volumes required for each site/analysis. If multiple containers are required please make this evident.

I would also like to request that arsenic and selenium be run by Atomic Absorption rather than ICP.

If you have any coolers from previous shipments to your lab, please use them to send containers to our clients. You may ship them as soon as you are prepared. NARC and Thomas are scheduled for sampling March 1, 1989. PChem has not been scheduled yet. Ship Thomas' containers to me at the letterhead address. Addresses for PChem and NARC follow:

PChem	North American Rayon
100 Latexo Rd.	West Elk Ave.
Latexo, TX 75849	Elizabethton, TN 37643
ATTN: Lois Waits	ATTN: Lou Raasch

Parshall, please contact me if you have any concerns or questions regarding this request(s).

Sincerely,

Westinghouse HAZTECH, Inc.

Laura

Laura Harris
Project Scientist

enclosures

NORTH AMERICAN RAYON COMPANY
Elizabethton, TN

Parameters	Method	Preservative	Holding Time	Container/Amount
GROUP A Parameters Characterizing Suitability of Groundwater as a Drinking Water Supply, MW 1,2,3,4.				
Metals:				
Arsenic	EPA 206.3	HNO_3	6 mos.	P,G/500 ml
Mercury	EPA 245.1			
Selenium	EPA 270.3			
Barium, Cadmium, Chromium, Lead, Silver	EPA 200.7			
Nitrate	EPA 300.1	H_2SO_4	48 hrs.	P,G/200 ml
Fluoride	EPA 300.1	Cool, 4°C	28 days	P/500 ml
Coliform Bacteria	SM 909C	Cool, 4°C	6 hrs.	Sterile P,G/ 200 ml
Pesticides:				
Endrin, Lindane, Methoxychlor, Toxaphene	EPA 8080	Cool, 4°C	7 days	G/1L Teflon cap
Phenoxy Herbicides				
2,4-D, 2,4,5-TP, Silvex	EPA 8150	Cool, 4°C	7 days	G/1L Teflon cap
Radium, Gross Alpha, Gross Beta	SM 703	HNO_3	6 mos.	P/1 gal

NORTH AMERICAN RAYON COMPANY
Elizabethton, TN

Parameters	Method	Preservative	Holding Time	Container/Amount
GROUP B Parameters Establishing Groundwater Quality, MW 1,2,3,4				
Metals:				
Iron, Manganese, Sodium	EPA 200.7	HNO_3	6 mos.	P/500 ml
Phenols	EPA 420.3	H_2SO_4 Cool, 4°C	28 days	G/500 ml
Chloride, Sulfate	EPA 300.1	Cool, 4°C	28 days	P,G/1L
GROUP C Parameters Used as Indicators of Groundwater Contamination, MW 1,2,3,4				
pH	EPA 150.1	Analyze immediately in field		
Conductivity	EPA 120.1	Analyze immediately in field		
TOC	EPA 415.2	H_2SO^4 or HCl Cool, 4°C	28 days	G,P/200 ml 4 replicates
TOX	SM506	HNO_3 Cool, 4°C	—	Amber Glass Teflon lid/1L 4 replicates

P=polyethylene, G=glass containers
Polyethylene containers are preferred over glass when both are useable.
Do not duplicate containers when Groups A & B are both requested (i.e. metals, inorganics).

Methods: EPA prefix designates methods from SW846 "Methods for Chemical Analysis of Water and Wastes", or any related updates.
SM prefix designates methods from "Standard Methods for the Examination of Water and Wastewater, 16th Edition".

Congaree fine sandy loam (Cm).—This soil of the first bottoms consists of general alluvium washed from uplands underlain by granite, and, in places, slight admixtures of materials washed from uplands underlain by quartzite and shale. It lies in narrow, elongated areas along streams in the Ashe-Tusquitee-Perkinsville and Porters-Tusquitee-Balfour soil associations or along streams flowing from those areas. Surface runoff is slow to moderate, and internal drainage is moderate to rapid.

Profile description:

0 to 12 inches, grayish-brown to brown loose fine sandy loam.
12 to 24 inches, brownish-yellow friable heavy fine sandy loam.
24 inches +, brownish-yellow loose loamy fine sand.

Much mica occurs throughout the soil. Only a few areas have a small quantity of gravel and small cobblestones scattered over the surface and through the profile, and then the number is not sufficient to interfere with tillage. In places the lower layers may contain considerable gravel or cobblestones. Rainfall is readily absorbed but is not retained so well as in Congaree loam. The soil is medium to strongly acid, contains a moderate quantity of organic matter and plant nutrients, and is easily permeated by plant roots and air. It is subject to overflow during periods of high water.

Included are small areas of Congaree loam, Buncombe loamy fine sand, and State loam.

Use and management.—All of Congaree fine sandy loam has been cleared and cultivated. Approximately 25 percent of it is in corn, 5 percent in oats, 10 percent in wheat, 5 percent in barley, 25 percent in hay, 15 percent in pasture, and 5 percent in tobacco, vegetables, and various other crops. About 10 percent of the land is idle. In general, crops are not systematically rotated, but a few farmers use a 3-year rotation of corn, small grain, and hay. The use of commercial fertilizer is limited, but when used, corn and small grains receive light applications. Under common management practices, corn yields 40 bushels an acre; wheat, 14 bushels; tobacco, 1,400 pounds; and red clover, 1.4 tons of hay.

The soil is well suited to intensive crop use. Susceptibility to overflow somewhat limits use suitability, but overflows bring material that serves to replenish the supply of organic matter and plant nutrients. This soil is less fertile and lower in water-holding capacity than Congaree loam; consequently, crop yields are less. Applications of lime and phosphate and use of a short rotation that includes a legume crop are necessary if yields are to be increased or maintained.

Stony colluvium (Tusquitee and Jefferson soil materials) (Se).—Small alluvial or colluvial fans and sloping areas at the base of steep mountain slopes are occupied by this soil. Slopes range from 2 to 30 percent. The small areas are widely distributed in the mountainous section. The soil material has washed from the associated Ashe, Porters, or Ramsey soils of the mountain uplands and is similar to that from which the Tusquitee and Jefferson soils are formed. Rocks and cobblestones on the surface and throughout the soil make tillage impractical (pl. 7, *A*). The rocks are of various sizes and may range up to several feet across. Some are somewhat rounded; others are angular.

Use and management.—This stony soil is unsuited to crops and poor for pasture. Fair pasture can be obtained, but weeds are hard to control. If enough lime and phosphate is applied, much better pasture is obtained.

APPENDIX D

Relevant Correspondence, etc.

Tennessee Department of Health and Environment
Bureau of Environment
1733 Sunset Drive
Johnson City, Tennessee 37601-3621

June 15, 1989

Dr. Lou Raasch, Environmental Services Manager
North American Rayon Corporation
West Elk Avenue
Elizabethton, Tennessee 37643

RE: Extension of Compliance Date for March 19, 1989 NOV
TND 09 505 1207

Dear Dr. Raasch:

Your request for an extension of the compliance date for sampling of the groundwater monitoring system from June 15, 1989 until June 30, 1989 is approved.

It is my understanding that NARC hopes to utilize the upgradient well from the adjacent Bemberg site in lieu of attempting to locate an upgradient background well on NARC property. The Division has received a revised Ground Water Sampling and Analysis Plan and is in the process of reviewing this document. I am enclosing a memo from Division Geologist, Randy Curtis, outlining our position on data generated thus far by your detection monitoring system.

If there are any questions or comments, please do not hesitate to contact Randy Curtis or myself at 928-6487.

Sincerely,

D. Larry Gilliam
Regional Director
Division of Solid Waste Management

DLG/RC/14199166

Enclosure

cc: Ms. Laura Harris, Haztech
Ms. Melissa McGuire, Baker Worthington
Mr. James Scarbrough, EPA, Region IV
DSWM, Nashville 10-23 98
Mr. Randy Curtis, DSWM, Johnson City
Mr. Bill Krispin, DSWM, Nashville
Carter County Health Department

TENNESSEE DEPARTMENT OF HEALTH AND ENVIRONMENT

OFFICE CORRESPONDENCE

FROM	TO	DATE
RMC	File	06/14/89

DATE: June 14, 1989

TO: File

FROM: Randy M. Curtis

SUBJECT: NARC (TND 09-505-1207) Ground Water Sampling and Analysis

During a CME inspection conducted March 8, 1989 at North American Rayon Company, I noted certain deviations from the facility's Sampling and Analysis Plan. A NOV was issued for not having an upgradient background well and for not following certain requirements of the approved plan. The facility was informed that the Division might have to regard the data generated from this event as flawed.

Subsequent to the issuance of the NOV, Westinghouse Haztech, Inc., the consultants for the facility, responded with an explanatory letter addressing my specific concerns and indicating that a revised Sampling and Analysis Plan would be submitted. Haztech requested that the data be considered valid or adequate for retention.

My primary concerns were for TOC, TOX, coliform bacteria, and nitrate. Haztech's arguments, coupled with my own research and conversations with State and EPA lab personnel, led to the conclusion that the TOC data is viable for consideration for the purposes required by the Hazardous Waste Regulations. Similarly, the coliform bacteria numbers may be used with a fair degree of confidence.

FROM	DATE
RMC	6/16

TO

TDH
WER

The numbers on TOX and nitrate are of more concern because of possible problems due to sampling or preservation. I told Ms. Laura Harris of Haztech, in a telephone conversation on June 2, 1989, that the Division would defer a final decision on TOX and nitrate until a subsequent event has yielded samples of unquestioned veracity, for comparison. I told her during the same conversation that TOC and coliform bacteria data would be accepted.

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06/14/89

RMC/14139166 10-23 97

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June 7, 1989

Mr. Lynn Patillo
City of Elizabethton
P.O. Box 6040
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Project No. 2322-88-1107

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Laura Harris

Laura Harris
Project Manager

cc: Lou Raasch
Melissa McGuire
Randy Curtis

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Geologist
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Westinghouse HAZTECH, Inc.

Laura Harris

Laura Harris
Project Manager

ENC

cc: Lou Raasch
Melissa McGuire

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Environmental Services

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February 16, 1989

Parshall Bush
RCRA Analytical Services, Inc.
183 Paradise Blvd.
Suite 108
Athens, Georgia 30607

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	chromium
	lead
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* run analyses in quadruplicate

Provide PChem with sufficient containers to sample 6 wells. Please provide Thomas sufficient containers to sample 10 wells. NARC requires sufficient containers to sample 5 wells. Additionally, all three facilities need two extra polyethylene containers for field analyses and field blanks.

Sample containers should be as follows for the indicated analyses:

TOC and TOX: amber glass with teflon lined lid

Metals: polyethylene

VOA: VOA vile

Phenols: glass

Chloride and Sulfate: polyethylene

Additional container specifications pretaining to NARC analyses are included on the attached sheets. I will let you be the judge of volumes required for each site/analysis. If multiple containers are required please make this evident.

I would also like to request that arsenic and selenium be run by Atomic Absorption rather than ICP.

If you have any coolers from previous shipments to your lab, please use them to send containers to our clients. You may ship them as soon as you are prepared. NARC and Thomas are scheduled for sampling March 1, 1989. PChem has not been scheduled yet. Ship Thomas' containers to me at the letterhead address. Addresses for PChem and NARC follow:

PChem	North American Rayon
100 Latexo Rd.	West Elk Ave.
Latexo, TX 75849	Elizabethton, TN 37643
ATTN: Lois Waits	ATTN: Lou Raasch

Parshall, please contact me if you have any concerns or questions regarding this request(s).

Sincerely,

Westinghouse HAZTECH, Inc.

Laura

Laura Harris
Project Scientist

enclosures

NORTH AMERICAN RAYON COMPANY
Elizabethton, TN

Parameters	Method	Preservative	Holding Time	Container/Amount
GROUP A Parameters Characterizing Suitability of Groundwater as a Drinking Water Supply, MW 1,2,3,4.				
Metals:				
Arsenic	EPA 206.3	HNO_3	6 mos.	P,G/500 ml
Mercury	EPA 245.1			
Selenium	EPA 270.3			
Barium, Cadmium, Chromium, Lead, Silver	EPA 200.7			
Nitrate	EPA 300.1	H_2SO_4	48 hrs.	P,G/200 ml
Fluoride	EPA 300.1	Cool, 4°C	28 days	P/500 ml
Coliform Bacteria	SM 909C	Cool, 4°C	6 hrs.	Sterile P,G/ 200 ml
Pesticides:				
Endrin, Lindane, Methoxychlor, Toxaphene	EPA 8080	Cool, 4°C	7 days	G/1L Teflon cap
Phenoxy Herbicides				
2,4-D, 2,4,5-TP, Silvex	EPA 8150	Cool, 4°C	7 days	G/1L Teflon cap
Radium, Gross Alpha, Gross Beta	SM 703	HNO_3	6 mos.	P/1 gal

NORTH AMERICAN RAYON COMPANY
Elizabethton, TN

Parameters	Method	Preservative	Holding Time	Container/Amount
GROUP B Parameters Establishing Groundwater Quality, MW 1,2,3,4				
Metals:				
Iron, Manganese, Sodium	EPA 200.7	HNO_3	6 mos.	P/500 ml
Phenols	EPA 420.3	H_2SO_4 Cool, 4°C	28 days	G/500 ml
Chloride, Sulfate	EPA 300.1	Cool, 4°C	28 days	P,G/1L
GROUP C Parameters Used as Indicators of Groundwater Contamination, MW 1,2,3,4				
pH	EPA 150.1	Analyze immediately in field		
Conductivity	EPA 120.1	Analyze immediately in field		
TOC	EPA 415.2	H_2SO^4 or HCl Cool, 4°C	28 days	G,P/200 ml 4 replicates
TOX	SM506	HNO_3 Cool, 4°C	—	Amber Glass Teflon lid/1L 4 replicates

P=polyethylene, G=glass containers
Polyethylene containers are preferred over glass when both are useable.
Do not duplicate containers when Groups A & B are both requested (i.e. metals, inorganics).
Methods: EPA prefix designates methods from SW846 "Methods for Chemical Analysis of Water and Wastes", or any related updates.
SM prefix designates methods from "Standard Methods for the Examination of Water and Wastewater, 16th Edition".

10-25 83

3/22/89

Westinghouse
Environmental Services

Westinghouse HAZTECH, Inc.

5280 Panola Industrial Boulevard
Decatur, Georgia 30035
(404) 981-9332
(404) 981-9339 (24 Hr.)
FAX (404) 981-1786

MARCH 20, 1989

Melissa McGuire
Attorney at Law
Baker, Worthington, Crossley,
Stansberry & Woolf
Hamilton Bank Building
207 Mockingbird Lane
Johnson City, Tennessee 37601

SUBJECT: North American Rayon Corp (Narc)
Additional Ground-Water Analytical Data
Sample Event- December 28, 1988

Dear Melissa:

This letter is written in follow-up to my correspondence to you, dated February 22, 1989, regarding analytical data associated with NARC's ground-water samples collected in December 1988. Please recall that reported arsenic and selenium values were measured by Inductively Coupled Plasma Spectroscopy (ICP) and are suspected to be inaccurate. The chemist at the laboratory was able to re-evaluate arsenic and selenium by atomic absorption (AA). The ground-water samples collected in December for metals analysis were used for both measurements (AA and ICP).

Data associated with each analytical method are presented below:

Well	Arsenic (PPM) ICP	Arsenic (PPM) AA	Selenium(PPM) ICP	Selenium(PPM) AA
MW1	0.20	<0.001	0.12	<0.001
MW2	0.24	<0.001	0.19	<0.001
MW3	0.27	0.001	0.13	<0.001
MW4	0.07	0.001	0.01	<0.001

All four wells are well below the EPA Drinking Water Standards for arsenic (0.005 ppm) and selenium (0.001 ppm).

Congaree fine sandy loam (Cm).—This soil of the first bottoms consists of general alluvium washed from uplands underlain by granite, and, in places, slight admixtures of materials washed from uplands underlain by quartzite and shale. It lies in narrow, elongated areas along streams in the Ashe-Tusquitee-Perkinsville and Porters-Tusquitee-Balfour soil associations or along streams flowing from those areas. Surface runoff is slow to moderate, and internal drainage is moderate to rapid.

Profile description:

0 to 12 inches, grayish-brown to brown loose fine sandy loam.
12 to 24 inches, brownish-yellow friable heavy fine sandy loam.
24 inches +, brownish-yellow loose loamy fine sand.

Much mica occurs throughout the soil. Only a few areas have a small quantity of gravel and small cobblestones scattered over the surface and through the profile, and then the number is not sufficient to interfere with tillage. In places the lower layers may contain considerable gravel or cobblestones. Rainfall is readily absorbed but is not retained so well as in Congaree loam. The soil is medium to strongly acid, contains a moderate quantity of organic matter and plant nutrients, and is easily permeated by plant roots and air. It is subject to overflow during periods of high water.

Included are small areas of Congaree loam, Buncombe loamy fine sand, and State loam.

Use and management.—All of Congaree fine sandy loam has been cleared and cultivated. Approximately 25 percent of it is in corn, 5 percent in oats, 10 percent in wheat, 5 percent in barley, 25 percent in hay, 15 percent in pasture, and 5 percent in tobacco, vegetables, and various other crops. About 10 percent of the land is idle. In general, crops are not systematically rotated, but a few farmers use a 3-year rotation of corn, small grain, and hay. The use of commercial fertilizer is limited, but when used, corn and small grains receive light applications. Under common management practices, corn yields 40 bushels an acre; wheat, 14 bushels; tobacco, 1,400 pounds; and red clover, 1.4 tons of hay.

The soil is well suited to intensive crop use. Susceptibility to overflow somewhat limits use suitability, but overflows bring material that serves to replenish the supply of organic matter and plant nutrients. This soil is less fertile and lower in water-holding capacity than Congaree loam; consequently, crop yields are less. Applications of lime and phosphate and use of a short rotation that includes a legume crop are necessary if yields are to be increased or maintained.

Stony colluvium (Tusquitee and Jefferson soil materials) (Se).—Small alluvial or colluvial fans and sloping areas at the base of steep mountain slopes are occupied by this soil. Slopes range from 2 to 30 percent. The small areas are widely distributed in the mountainous section. The soil material has washed from the associated Ashe, Porters, or Ramsey soils of the mountain uplands and is similar to that from which the Tusquitee and Jefferson soils are formed. Rocks and cobblestones on the surface and throughout the soil make tillage impractical (pl. 7, *A*). The rocks are of various sizes and may range up to several feet across. Some are somewhat rounded; others are angular.

Use and management.—This stony soil is unsuited to crops and poor for pasture. Fair pasture can be obtained, but weeds are hard to control. If enough lime and phosphate is applied, much better pasture is obtained.

APPENDIX D

Relevant Correspondence, etc.

Tennessee Department of Health and Environment
Bureau of Environment
1733 Sunset Drive
Johnson City, Tennessee 37601-3621

June 15, 1989

Dr. Lou Raasch, Environmental Services Manager
North American Rayon Corporation
West Elk Avenue
Elizabethton, Tennessee 37643

RE: Extension of Compliance Date for March 19, 1989 NOV
TND 09 505 1207

Dear Dr. Raasch:

Your request for an extension of the compliance date for sampling of the groundwater monitoring system from June 15, 1989 until June 30, 1989 is approved.

It is my understanding that NARC hopes to utilize the upgradient well from the adjacent Bemberg site in lieu of attempting to locate an upgradient background well on NARC property. The Division has received a revised Ground Water Sampling and Analysis Plan and is in the process of reviewing this document. I am enclosing a memo from Division Geologist, Randy Curtis, outlining our position on data generated thus far by your detection monitoring system.

If there are any questions or comments, please do not hesitate to contact Randy Curtis or myself at 928-6487.

Sincerely,

D. Larry Gilliam
Regional Director
Division of Solid Waste Management

DLG/RC/14199166

Enclosure

cc: Ms. Laura Harris, Haztech
Ms. Melissa McGuire, Baker Worthington
Mr. James Scarbrough, EPA, Region IV
DSWM, Nashville 10-23 98
Mr. Randy Curtis, DSWM, Johnson City
Mr. Bill Krispin, DSWM, Nashville
Carter County Health Department

TENNESSEE DEPARTMENT OF HEALTH AND ENVIRONMENT

OFFICE CORRESPONDENCE

FROM	TO	DATE
RMC	File	06/14/89

DATE: June 14, 1989

TO: File

FROM: Randy M. Curtis

SUBJECT: NARC (TND 09-505-1207) Ground Water Sampling and Analysis

During a CME inspection conducted March 8, 1989 at North American Rayon Company, I noted certain deviations from the facility's Sampling and Analysis Plan. A NOV was issued for not having an upgradient background well and for not following certain requirements of the approved plan. The facility was informed that the Division might have to regard the data generated from this event as flawed.

Subsequent to the issuance of the NOV, Westinghouse Haztech, Inc., the consultants for the facility, responded with an explanatory letter addressing my specific concerns and indicating that a revised Sampling and Analysis Plan would be submitted. Haztech requested that the data be considered valid or adequate for retention.

My primary concerns were for TOC, TOX, coliform bacteria, and nitrate. Haztech's arguments, coupled with my own research and conversations with State and EPA lab personnel, led to the conclusion that the TOC data is viable for consideration for the purposes required by the Hazardous Waste Regulations. Similarly, the coliform bacteria numbers may be used with a fair degree of confidence.

FROM	DATE
RMC	6/16

TO

TDH	
WER	

The numbers on TOX and nitrate are of more concern because of possible problems due to sampling or preservation. I told Ms. Laura Harris of Haztech, in a telephone conversation on June 2, 1989, that the Division would defer a final decision on TOX and nitrate until a subsequent event has yielded samples of unquestioned veracity, for comparison. I told her during the same conversation that TOC and coliform bacteria data would be accepted.

There is also a separate question of an analytical nature involving the data generated by the detection monitoring program at NARC. This involves the initial detection of arsenic and selenium at levels above the maximum contaminant levels listed in Appendix .05/B. After two (2) sampling events the analytical method for these constituents was changed and the levels detected dropped dramatically to a point well below the mcl. This was attributed to

interference from calcium or aluminum which affected the inductively coupled plasma spectroscopy, but not the Atomic Absorption Method, which was adopted after the 2nd event.

To be sure that the AA method numbers are an accurate reflection of the situation at NARC;, I intend to split samples with the facility for As, Se,and Ca on the 4th quarter event. I have discussed the situation with Mr. Edward McCrary of the Knoxville Lab and Mr. Craig Edwards of the Nashville Lab. The Knoxville Lab has an ICPS unit if I feel the need to use it as a verification tool.

R. M. C.
06/14/89

RMC/14139166 10-23 97

10-23

92

RECEIVED

Division of Solid Waste Management

Date 6/12/89 File No.

Received by

Westinghouse
Environmental Services

Westinghouse HAZTECH, Inc.

5280 Panola Industrial Boulevard
Decatur, Georgia 30035
(404) 981-9332
(404) 981-9339 (24 Hr.)
FAX (404) 981-1786

June 7, 1989

Mr. Lynn Patillo
City of Elizabethton
P.O. Box 6040
Elizabethton, Tennessee 37644

Subject: Bemberg Superfund Site Upgradient Well
North American Rayon Corporation (NARC)
Project No. 2322-88-1107

Dear Mr. Patillo:

Last Friday I spoke with Randy Curtis and Mike Moody, both with the Tennessee Department of Health and Environment, Johnson City office, regarding the possibility of using the Bemberg upgradient well as part of a ground-water monitoring system for North American Rayon. Both Mr. Moody and Mr. Curtis approved of this practice. Mr. Moody indicated that I should pursue this matter with you.

Westinghouse HAZTECH, Inc. installed 7 wells and 6 piezometers at the NARC plant. To be in compliance with state and federal regulations, NARC's ground-water monitoring system must have at least one upgradient well capable of yielding ground-water samples unaffected by the facility. However, due to a mound in the water table created by recharge from 4 surface impoundments located in the study area, all locations away from the impoundments are hydraulically downgradient of the study area. There is no location for an upgradient well unaffected by the facility on NARC property.

On behalf of NARC, I am writing this letter to request that NARC be given access to the Bemberg upgradient well for use as part of their ground-water monitoring system. NARC will be performing a sample event this month, and wishes to include the upgradient Bemberg well in this sampling. NARC will need to perform 4 sample events from June to December. After December, NARC will require access to the well biannually. Occasionally, they may need additional access to verify data which indicates their facility may be impacting ground-water quality beneath their facility.

Mr. Patillo, please feel free to contact Mr. Moody or Mr. Curtis in the Johnson City field office to discuss this matter. I would appreciate any effort on your behalf to expedite this matter. Please contact me at (404)981-9332 so we can discuss this further.

Sincerely,

Westinghouse HAZTECH, Inc.

Laura Harris

Laura Harris
Project Manager

cc: Lou Raasch
Melissa McGuire
Randy Curtis

RECEIVED
Division of Solid Waste Management
Date 5/10/89 File No.
Received by JJ

Westinghouse
Environmental Services

Westinghouse HAZTECH, Inc.

5280 Panola Industrial Boulevard
Decatur, Georgia 30035
(404) 981-9332
(404) 981-9339 (24 Hr.)
FAX (404) 981-1786

May 5, 1989

Mr. Randy Curtis
Geologist
Tennessee Department of
Health and Environment
1733 Sunset Drive
Johnson City, Tennessee 37601

Subject: North American Rayon Corporation (NARC)
March 18, 1989 Notice of Violation

Dear Mr. Curtis:

This letter is written in reponse to the above-referenced Notice of Violation regarding ground-water sampling at the NARC site in March of this year.

The following discussions are based on information obtained from the references listed below:

- o Standard Methods for the Examination of Water and Wastewater. Sixteenth edition.
- o Methods for the Chemical Analysis of Water and Wastes. EPA, 1983.
- o Test Methods for Evaluating Solid Wastes: Physical/Chemical Methods (SW 846). Third edition.
- o Handbook for Sampling and Sample Preservation of Water and Wastewater. EPA, 1982.
- o RCRA Ground-water Monitoring Technical Enforcement Guidance Document (TEGD). EPA, 1986.

After reviewing the various analytical methods it is apparent that revisions to the NARC ground-water sampling and analysis plan are required. A revised plan will be submitted to your office when available.

TOC

TOC bottles provided by the lab were not as requested. Attached is a copy of correspondence to RCRA Analytical requesting certain sample containers and analyses for this monitoring event. Pleas note that amber glass bottles with teflon lids were requested.

Most of the above references recommend glass containers, and that the sample be protected from sunlight. Standard Methods and SW 846 do not indicate that sample containers should have no headspace. The containers provided by RCRA for TOC samples are designed such that it is impossible to close the container without trapping air bubbles. Efforts were made to reduce the amount of air trapped in the sample containers as much as possible. Also, the method descriptions do not indicate that sample volume effects quality of analytical data.

Based on the above information, Westinghouse HAZTECH request that the TOC data associated with this sample event be considered viable. Further, the surface impoundment of concern has been sampled and has not demonstrated the presence of volatile organic compounds which would contribute to the volatile fraction of TOC.

Nitrate

Westinghouse HAZTECH also requested a certain container(s) for samples for nitrate analysis. The laboratory erred in combining nitrate with fluoride, sulfate, and chloride, which do not require chemical preservatives. The manuals referenced above indicate that unpreserved nitrate samples must be analyzed within 48 hours. The samples for nitrate analysis were not analyzed within this time frame. While the nitrate results may be suspect due to this, it is felt that the data should be kept on record, as opposed to not having the data on record at all.

Coliform Bacteria

The sample containers used for coliform analyses were correct for the concentrations of coliform colonies previously detected at the site. Standard Methods indicates that 50 - 100 ml of sample be filtered when well and spring water is being analyzed. SW 846 recommends that a sample container of 120 ml or more be used, and that 2.5 cm of headspace be left in the container after filling. Westinghouse HAZTECH feels that there is no basis to suspect coliform data associated with this sample event as being invalid.

TOX

Following review of the various analytical methods for TOX determination, it is apparent that TOX sample containers should have been completely filled. However, the NARC sampling and analysis plan does not specify that headspace be avoided in TOX sample containers. Therefore, there was no deviation from the plan in this respect. The plan will be ammended to indicate that headspace be avoided for TOX sample containers.

Whether or not the volume of the sample container affects the quality of data for TOX analysis is inconclusive based on review of the various analytical method descriptions. The sample container used was an amber glass bottle with a teflon-lined lid, as prescribed by the NARC plan as well as in other references.

References indicate that sodium sulfite preservative is to be added in the field if the analysis is to be performed immediately. The sodium sulfite serves to reduce residual chlorine, which may cause mechanical interference in measuring true TOX values. The addition of sodium sulfite does not serve to preserve the integrity of the sample. Preservation by adjusting the pH to less than 2 with nitric acid is essential, and was performed on the March 1989 samples from NARC. The samples were acidified on-site prior to packaging for shipment.

Tetrachloroethylene and Trichloroethylene

The table referenced in the notice of violation was modified from the TEGD and is basically a boilerplate table. The parameters associated with NARC's ground-water monitoring program are dictated by an approved ground-water monitoring plan and not by the sampling and analysis plan. Tetrachloroethylene and trichloroethylene are not parameters associated with the surface impoundment monitoring program.

Sequence of Sample Withdrawal

While the sample withdrawal sequence presented in the sampling and analysis plan was not strictly adhered to, it is over ambitious to disregard the validity of analytical data on this basis. The sequence presented in the sampling and analysis plan is based on "a preferred order of collection" presented in the TEGD. No highly volatile parameters are analyzed in NARC wells 1, 2, 3, and 4, which were sampled in March of this year. Deviation from a preferred order in this instance should not cause analyses to be suspect.

Further, the sample enters the sample pump at a point within the water column in the well that may be as much as 20 feet below the water table surface. The sample is not exposed to atmospheric conditions as would be a sample collected by bailing, where the sample point is near the water table surface in close proximity to atmospheric conditions.

Westinghouse HAZTECH will revise the current sampling and analysis plan and submit to your office as soon as it is available. Please contact me at (404) 981-9332 if you would like to discuss this further.

Sincerely,

Westinghouse HAZTECH, Inc.

Laura Harris

Laura Harris
Project Manager

ENC

cc: Lou Raasch
Melissa McGuire

Westinghouse
Environmental Services

Westinghouse HAZTECH, Inc.

5280 Panola Industrial Boulevard
Decatur, Georgia 30035
(404) 981-9332
(404) 981-9339 (24 Hr.)
FAX (404) 981-1786

February 16, 1989

Parshall Bush
RCRA Analytical Services, Inc.
183 Paradise Blvd.
Suite 108
Athens, Georgia 30607

Subject: PChem, Thomas Industries, NARC
Ground-water Sampling - March 1988

Dear Parshall:

As you can see everybody is due for ground-water sampling in March. Attached please find an analysis request sheet for NARC with the requested analyses highlighted. The following analyses are requested for PChem and Thomas.

PChem	Thomas
TOC*	TOC*
TOX*	tetrachloroethylene*
iron	trichloroethylene*
manganese	acetone
sodium	1,2-dichloroethylene
phenols	chloroform
sulfate	1,1,1-trichloroethane
chloride	vinyl chloride
	1,1-dichloroethylene
	arsenic
	chromium
	lead
	selenium

* run analyses in quadruplicate

Provide PChem with sufficient containers to sample 6 wells. Please provide Thomas sufficient containers to sample 10 wells. NARC requires sufficient containers to sample 5 wells. Additionally, all three facilities need two extra polyethylene containers for field analyses and field blanks.

Sample containers should be as follows for the indicated analyses:

TOC and TOX: amber glass with teflon lined lid

Metals: polyethylene

VOA: VOA vile

Phenols: glass

Chloride and Sulfate: polyethylene

Additional container specifications pretaining to NARC analyses are included on the attached sheets. I will let you be the judge of volumes required for each site/analysis. If multiple containers are required please make this evident.

I would also like to request that arsenic and selenium be run by Atomic Absorption rather than ICP.

If you have any coolers from previous shipments to your lab, please use them to send containers to our clients. You may ship them as soon as you are prepared. NARC and Thomas are scheduled for sampling March 1, 1989. PChem has not been scheduled yet. Ship Thomas' containers to me at the letterhead address. Addresses for PChem and NARC follow:

PChem	North American Rayon
100 Latexo Rd.	West Elk Ave.
Latexo, TX 75849	Elizabethton, TN 37643
ATTN: Lois Waits	ATTN: Lou Raasch

Parshall, please contact me if you have any concerns or questions regarding this request(s).

Sincerely,

Westinghouse HAZTECH, Inc.

Laura

Laura Harris
Project Scientist

enclosures

NORTH AMERICAN RAYON COMPANY
Elizabethton, TN

Parameters	Method	Preservative	Holding Time	Container/Amount
GROUP A Parameters Characterizing Suitability of Groundwater as a Drinking Water Supply, MW 1,2,3,4.				
Metals:				
Arsenic	EPA 206.3	HNO_3	6 mos.	P,G/500 ml
Mercury	EPA 245.1			
Selenium	EPA 270.3			
Barium, Cadmium, Chromium, Lead, Silver	EPA 200.7			
Nitrate	EPA 300.1	H_2SO_4	48 hrs.	P,G/200 ml
Fluoride	EPA 300.1	Cool, 4°C	28 days	P/500 ml
Coliform Bacteria	SM 909C	Cool, 4°C	6 hrs.	Sterile P,G/ 200 ml
Pesticides:				
Endrin, Lindane, Methoxychlor, Toxaphene	EPA 8080	Cool, 4°C	7 days	G/1L Teflon cap
Phenoxy Herbicides				
2,4-D, 2,4,5-TP, Silvex	EPA 8150	Cool, 4°C	7 days	G/1L Teflon cap
Radium, Gross Alpha, Gross Beta	SM 703	HNO_3	6 mos.	P/1 gal

NORTH AMERICAN RAYON COMPANY
Elizabethton, TN

Parameters	Method	Preservative	Holding Time	Container/Amount
GROUP B Parameters Establishing Groundwater Quality, MW 1,2,3,4				
Metals:				
Iron, Manganese, Sodium	EPA 200.7	HNO_3	6 mos.	P/500 ml
Phenols	EPA 420.3	H_2SO_4 Cool, 4°C	28 days	G/500 ml
Chloride, Sulfate	EPA 300.1	Cool, 4°C	28 days	P,G/1L
GROUP C Parameters Used as Indicators of Groundwater Contamination, MW 1,2,3,4				
pH	EPA 150.1	Analyze immediately in field		
Conductivity	EPA 120.1	Analyze immediately in field		
TOC	EPA 415.2	H_2SO^4 or HCl Cool, 4°C	28 days	G,P/200 ml 4 replicates
TOX	SM506	HNO_3 Cool, 4°C	—	Amber Glass Teflon lid/1L 4 replicates

P=polyethylene, G=glass containers
Polyethylene containers are preferred over glass when both are useable.
Do not duplicate containers when Groups A & B are both requested (i.e. metals, inorganics).

Methods: EPA prefix designates methods from SW846 "Methods for Chemical Analysis of Water and Wastes", or any related updates.
SM prefix designates methods from "Standard Methods for the Examination of Water and Wastewater, 16th Edition".

Please contact me if you require additional information.

Sincerely,
Westinghouse HAZTECH, Inc.

Laura Harris

Laura Harris
Project Manager

cc: Lou Raasch, NARC
Randy Curtis, State of Tennessee

CERTIFIED MAIL #29,232
RETURN RECEIPT REQUESTED

Tennessee Department of Health and Environment
Bureau of Environment
1733 Sunset Drive
Johnson City, Tennessee 37601-3621

March 18, 1989

Dr. Lou Raasch, Environmental Services Manager
North American Rayon Corporation
West Elk Avenue
Elizabethton, Tennessee 37643

RE: Groundwater Compliance Evaluation Inspection
TND 09-505-1207

Notice of Violation

Dear Dr. Raasch:

This letter is written in regard to the Groundwater Compliance Evaluation Inspection conducted at North American Rayon Corporation on March 8 and 9, 1989. The enclosed inspection report details the violations noted during the inspection.

The violations noted in the inspection report must be corrected no later than June 15, 1989. A follow-up inspection will be conducted at the time of North American Rayon Corporation's next quarterly sampling event to ensure North American Rayon Corporation's compliance with Tennessee's Hazardous Waste Management Regulations.

If you have any questions or comments on the accuracy of this correspondence, please do not hesitate to contact me at 928-6487.

Sincerely,

Randy M. Curtis

Randy M. Curtis
Environmental Geologist
Division of Solid Waste Management

RMC/jl SWM-1

Enclosure

cc: Ms. Melissa McGuire,
Ms. Lori Hoskins, EPA, Region IV
Mr. Dwight Hinch, DSWM, Nashville
Mr. Bill Krispin, DSWM, Nashville
Mr. Ron Potts, DSWM, Jackson
Mr. D. Larry Gilliam, DSWM, Johnson City
Mr. Darrell Hale, DSWM, Johnson City
DSWM, Nashville 10-23 80

03/14/89

Groundwater Compliance Evaluation Inspection

Site/Operation Inspected:

North American Rayon Corporation
West Elk Avenue
Elizabethton, Tennessee 37643
TND 09-505-1207

Facility Status:

Interin Status Detection Monitoring

Owner/Operator/Primary Contact:

Dr. Lou R. Raasch, Environmental Services Manager

Date and Time of Inspection:

March 8, 1989 - 8:00 A. M. - 5:25 P. M.
March 9, 1989 - 8:50 A. M. - 12:00 P. M.

Other Inspection Participants:

Mr. Jim Deaton, North American Rayon Corporation
Ms. Laura Harris, Haztech
Mr. Eric Bruce, Haztech

Report Prepared By:

Randy M. Curtis, Environmental Geologist
Tennessee Division of Solid Waste Management
1733 Sunset Drive
Johnson City, Tennessee 37604-3621
615-928-6487

Purpose of Inspection:

This inspection was conducted to evaluate North American Rayon Corporation's compliance with "Tennessee's Hazardous Waste Management Regulations". This inspection does not address North American Rayon Corporation's compliance with generator Closure, and Post Closure requirements.

Inspection Findings:

The following violations of "Tennessee Hazardous Waste Management Regulations" were identified during this inspection:

2820 Rule 1200-1-11-.05(6)(b)1(i) requires owners or operators of hazardous waste management facilities that are required to have groundwater monitoring to have at

least one monitoring well installed hydraulically upgradient from the limit of the waste management area.

North American Rayon Corporation must alter the detection monitoring system in such a manner that data generated from a position hydraulically upgradient from the limit of the waste management area, and, from within the uppermost aquifer is available for comparison with the downgradient area.

2900 Rule 1200-1-11-.05(6)(c)1 requires owners or operators of hazardous waste management facilities that are required to have groundwater monitoring to develop and follow a groundwater sampling and analysis plan and to keep this plan at the facility.

North American Rayon Corporation has an approved plan on file at the facility, however, it was not strictly followed. The following deviations were noted:

1. TOC samples were collected in 250 ml. plastic containers and preserved with sulphuric acid. Head space was not avoided.

2. Nitrate was collected in a plastic 250 ml. container that was also dedicated to sulfate, fluoride, and chloride. No preservation procedure was observed.

3. Coliform bacteria was sampled in a 125 ml. capacity container.

4. TOX sample was placed in a 1000 ml. capacity amber glass bottle. No preservative was added and headspace was not avoided.

These instances are all deviations from the sample containers and preservation information listed in Section 2.4 Table 1 of the Plan. Additionally, the table lists trichloroethylene and tetrachloroethylene as parameters associated with North American Rayon Corporation's groundwater monitoring program. These samples were not taken. Also, Section 2.3 of the Plan calls for sample withdrawal in a defined sequence. This was not observed.

Due to these deviations, the Division of Solid Waste Management must regard the data generated for these parameters as suspect. North American Rayon Corporation must sample according to the Plan or justify the deviations and show why the data generated should be considered acceptable.

Remarks and Recommendations

Although the sampling was not observed to follow a definite sequence, it should be noted that Haztech personnel undertook steps to avoid unnecessary aeration of the sample. The competency of the Haztech personnel involved is not being questioned, but the deviations in containers and preservatives must be avoided in the future or the Division of Solid Waste Management will be forced to disregard the data thus generated.

The fact that the North American Rayon Corporation site is immediately downstream of a monitored Superfund site should be considered in addressing the question of a suitable upgradient well.

Signed Randy M. Curtis Date 02/14/89

RC/jl SWM-1 10-23 80

TENNESSEE DEPARTMENT OF HEALTH AND ENVIRONMENT

OFFICE CORRESPONDENCE

FROM	TO	DATE
RMC	File	09/26/88

DATE: September 22, 1988

TO: File

FROM: Randy M. Curtis

SUBJECT: Visit to North American Rayon Company with Bill Krispin, August 23, 1988

On August 23, 1988, I visited NARCO with Bill Krispen. We went to observe the installation of the groundwater monitoring system. When we arrived we met with the geologist for Haztech, Ms. Laura B. Harris. The drillers had not yet arrived, so we went with Ms. Harris to inspect the unit. The gate was locked and while we were waiting, Ms. Harris speculated on using the pea gravel and sand stockpiled at the clarification tanks as filler in the wells. Mr. Krispin expressed his concern over the possibility of contamination from airborne particles from the factory's smoke stack.

We later walked over the fly ash site and discussed possible well locations (technical assistance had been offered in a letter from Darrell Hale, Johnson City Division of Solid Waste Management).

R. M. C.

RMC/jl SWM-8 10-23 55

FROM	DATE

TO

PH-0001
SR 3/77

CERTIFIED MAIL #29,577
RETURN RECEIPT REQUESTED

Tennessee Department of Health and Environment
Bureau of Environment
1733 Sunset Drive
Johnson City, Tennessee 37601-3621

August 9, 1988

Ms. Melissa McGuire
Attorney-at-Law
Baker, Worthington, Crossley, Stansberry and Woolf
P. O. Box 3038 CRS
Johnson City, Tennessee 37602

RE: North American Rayon Company
Groundwater Monitoring for Surface Impoundment
TND 09 505 1207

Dear Ms. McGuire:

In correspondence, dated May 23, 1988, the Division of Solid Waste Management noted no deficiencies in the Groundwater Monitoring Plan and the Groundwater Sampling and Analysis Plan for the surface impoundment located at North American Rayon Company.

The groundwater monitoring system has not been installed and sampled as of this date. Therefore, North American Rayon Company must install and sample the groundwater monitoring wells as specified in the plans by September 12, 1988.

If you have any questions or comments, do not hesitate to contact me at 615/928-6487.

Sincerely,

Richard A. Whitson
Environmental Engineer
Division of Solid Waste Management

RAW/jj SWM-7

cc: Dr. Lou Raasch, North American Rayon Company
Mr. James H. Scarbrough, EPA, Region IV
Mr. Dwight Hinch, DSWM, Nashville
Mr. Ron Potts, DSWM, Jackson
Mr. D. Larry Gilliam, DSWM, Johnson City
Mr. Darrell Hale, DSWM, Johnson City
DSWM, Nashville 10-23 45

APPENDIX E

Field Notes, Photographs

TENNESSEE DEPARTMENT OF HEALTH AND ENVIRONMENT

OFFICE CORRESPONDENCE

FROM	TO	DATE
RMC	File	03/15/89

DATE: March 15, 1989

TO: File

FROM: Randy M. Curtis

SUBJECT: Transcript of Field Notes, NARCo, CME/CEI
March 8-9, 1989

8:00 - Check in at North American Rayon Company Guard Shack #2. Asked for Dr. Lou Raasch. He is in Washington. Backup is Jim Deaton. Haztech came in earlier and left, via Guard Shack #1.

8:10 - Guard Shack #1 - Avis Rent-A-Truck goes by driven by Haztech personnel. I signed in but did not sign release slip. Guard said that was my option when I refused.

8:15 - Back of plant, Haztech is busy around the fish building. Day is overcast, wind N or NE and cold. Temperature mid -30's.

8:25 - Begin checking water levels. MW-4, lid locked, well number is written on inside of outer casing lid. Concrete pad around casing is adequate - some cracking, not severe. Water level is measured from the top of the steel casing and measured with a Well Wizard Model 6000 audible depth sounder. W.L. 36.10'; T.D. 56.65'.

8:35 - P-5, lid locked and labeled, concrete pad cracking. Measured from top of steel casing, W.L. 13.15' and T.D. 38.475'.

8:40 - MW-7, lid locked and labeled, concrete pad in good shape. W.L. 34.60' and T.D. 45.23'.

8:48 - MW-6, lid locked and labeled, pad in good shape. W.L. 31.43' and T.D. 41.58'.

8:50 - P-3, lid locked and labeled, concrete pad spalling and cracking. W.L. 19.22' and T.D. 36.55'. Probe had mud on bottom 3" upon removal.

9:00 - MW-3 - Ms. Harris remarks that the sample tube needs to be replaced, interim measure will be to cut of dirty end (contaminated by rust from rubbing inside of steel casing). Lid locked and labeled, all elevations shot on locking hole in casing lid - Haztech measuring from that point. Concrete pad has some cracks. W.L. 18.78' and T.D. 30.65'.

FROM	DATE

10

PH-0001
SR 3/77

9:05 - P-4, lid locked and labeled. Pad integrity good but the concrete is discolored. W.L. 33.70'; T.D. 44.22'. Line of rapids nearby in river strikes N35°E. Water too dingy to tell if due to submerged bedrock. TVA not generating.

9:15 - MW-2, lid locked and labeled. Pad discolored, spalling and cracking. W.L. 28.21'; T.D. 55.77'.

9:22 - P-2, lid locked and labeled; pad spalling and cracking. Water level only taken, 32.65'.

9:25 - MW-1, lid locked and labeled, pad in good shape. W.L. 28.20; T.D. 56.28'.

9:30 - P-1, locked and labeled, pad in good shape. Water level only taken, 37.15'.

9:35 - MW-5, lid locked and labeled, pad in good shape. Water level only taken, 31.53'.

9:55 - Rigging to purge and sample MW-4, 9.9 gallons to be purged. Controller is Well Wizard #3013 portable pump air supply. Drop cloth (plastic sheet) laid down around well; well wizard set up downwind of well.

10:05 - Ms. Harris takes 1st purge water in plastic jug. Water is brownish, slightly turbid in volumn, appears clear as flowing. Flow rate is about 1/3 gallon per minute.

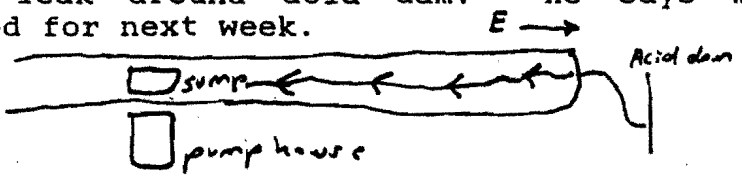
10:10 - Ms. Harris measures 2 gallon mark on metal bucket. Purge water disposed of into 55 gallon drum in back of the van.

10:20 - Photo #1; Ms. Harris catching purge water (note color), NPDS in far background.

Photo #2; empty acetone container on ground, Mr. Jim Deaton says it held diesel fuel for pump.

Photo #3; diesel continers and area of pump rented to empty basin water to acid sewer when main pumps went down.

10:25 - Mr. Deaton says flow westward to sump is not normal, may be leak around acid dam. He says maintenance is scheduled for next week.



10:35 - Prepare to sample, 12 bottles laid out.

1 1000 ml. amber glass for: TOX

1 1000 ml. clear glass for: Phenols

1 1000 ml. clear glass for: Phenoxy herbicide

1 250 ml. plastic for: TOC Run 1

1 250 ml. plastic for: TOC Run 2

1 250 ml. plastic for: TOC Run 3

1 250 ml. plastic for: TOC Run 4

1 250 ml. plastic for: Metals (Ag, BA, Cd,Cr, Fe, Mg, Na, Pb)

1 250 ml. plastic for: Metals (As, Se, Hg by atomic absorption).

1 250 ml. plastic for: F1, C1, SO_4, NO_3.

1 250 ml. plastic for: Coliform bacteria.

and one 1 gallon limber plastic container for; radium and gross alpha and beta.

10:40 - No effort made to avoid bubbles/head space. Mr. Bruce runs field parameter from a dedicated container using an Industrial Water Chemical push button cup meter, model EP-10 for specific conductance and a Chem Cadet pH/ion/temp meter for pH and temperature:

ph: 9.68, 9.70, 9.75, 9.83
cond: 920, 950, 930, 950
temp: 14.4, 13.0, 13.8, 13.8

Mr. Bruce washed the equipment with distilled water after use. Equipment calibrated once per day.

11:00 - Off location, MW-4 locked. Photo #4, MW-4, with MW-3 in far background.

11:10 - MW-2, start pumping. Water discharge tube has a little rust on the end, picked up from rubbing it against the inside of the outer casing. MW-2 needs to purge 13.2 gallons. 1st gallon flowed at approximately 3 minutes per gallon. Purge water was initially brownish, though clearing up from slightly turbid as purging proceeds. Well Wizard set up downwind.

Pulled sample plan and discussed TOX with Ms. Harris. I told her that I had seen TOX taken in 1000 ml. glass bottle

before, but preserved with sulphuric and with no head space or air bubbles.

11:30 - Purge water still slightly turbid.

11:45 - Last purge water almost clear. Begin sample. The sequence on MW2 is: field sample, phenols, (fl, Cl, NO_3, SO_4), TOC; (Note: Told Ms. Harris plan called for no air in TOC), (As, Se, Hg), then other metals, pesticide screen, phenoxy herbicide, TOX, radium. All bottles had some head space. 1000 ml. bottle to over 800 ml., not full.

Field parameter probes washed with distilled water.

pH: 5.67, 6.48; 6.47; 6.46.
temp: 17.3°C.
cond: 2100, 2050, 2100, 2100

Crew puts on new disposable gloves for each well.

11:55 - End sampling MW-2; samples go into cooler, Mr. Bruce says they will put ice in prior to shipping.

12:00 - Move off MW-2; Photo #5, MW-2 in foreground, piezeometer on right side, hill with outcrops in background. Photo centered on N3°W.

12:10 - Setting up on MW-3; Well Wizard on east side of well, wind from the north.

12:13 - Begin pumping, need 5 1/2 gallons, water slightly turbid.

12:16 - Photo #6, sample bottles laid out and Ms. Harris collecting purge water.

12:24 - Begin sampling;

cond: 2250, 2260
temp: 14.0
ph: 7.25, 7.30, 7.33 (rising?). No further measurements, Mr. Bruce went to assist Ms. Harris.

12:35 - Head space on all samples. Mr. Bruce cleans field equipment. Sample water very slightly turbid.

12:42 - Haztech to cafeteria. Photo #7, MW-3, note cracks in pad. Smoke stacks in background, left one is Bemberg's (Superfund site).

12:50 - Generating at Watauga; river level is high.

1:05 - Talked with Mr. Deaton. Told him that the only real problem thus far, other than some sampling discrepancies,

was the fact that the background well is not up-gradient. Crane on location for sludge sampling in narrow lagoon.

1:30 - Haztech rigging to sample sludge. Noticed that radium 1 gallon samples are placed in cardboard containers, not coolers.

2:00 - Photo #8, from east end of narrow lagoon, looking west; 2nd point being sampled, 1st point is disturbed area near edge of water in foreground. Ms. Harris says composting 3 out of each section.

2:20 - 3rd composite taken with unwrapped metal spoon -- had been wrapping them in aluminum.

3:05 - Photo #10, sheen on water after hand auger sample behind sediment/containment barrier.

3:40 - End sediment sampling, total of 4 composites. Talked with Mr. Deaton and Ms. Harris; Ms. Harris says MW-1 will be sampled Friday. Will complete CEI/CME then.

Murphy Crane and Rigging 929-8132, Johnson City, Tennessee. Eddie Bowan and Kim Woods.

4:05 - Ms. Harris takes coliform bacteria samples to Tri-State Analytical Labs in Kingsport.

4:10 - I provided transport for Mr. Bruce and samples to the fish building/lab where he will add preservatives.

4:15 - Mr. Bruce has all samples arranged by parameter on the work bench. Adds 1 ml of sulphuric to TOC's -- bottles still have air space.

4:25 - Adds 1 ml. nitric to metals, both sets, i.e., (As, Se, and Hg) as well as (Ag, Ba, etc.). Ask Mr. Bruce about concentration of acids he used. Information not available on labels.

J. T. Baker Chemical Co.
1037 Lower Brownsville Road
Jackson, Tennessee 38301

500 ml. bottles of sulphuric and nitric "Ultrex" acid. (Note: subsequesnt inquiry of Mr. Gary Dugan of J.T. Baker Chemical Co. yields the information that "Ultrex" is given to acid concentrated as much as possible without reaching the point of fuming. This is 70.5% in the case of nitric and 97% for sulphuric. Mr. Dugan was reached at 901-423-0204 for this information).

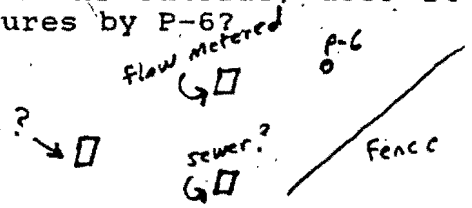
4:40 - Phenols receive 2 mls sulphuric each. Sample from MW-4 had still bottoms that had dropped/settled out. The

nitrate sample is in with the F1, C1, and sulfate and received no preservative.

4:45 - Ask about ice - Mr. Bruce says Ms. Haris indicated they would try to obtain some from the cafeteria.

5:05 - Took Mr. Bruce over to the cafeteria for ice.

5:15 - P-6, concrete pad is in good shape. Did not observe water level being taken this morning. It was 33.60'. There is a pvc cap cying on the outside, does it belong inside? What are three structures by P-6?



5:20 - Remind Mr. Bruce about checking pH and preserving radiation sample when van gets back.

5:25 - Check out at Guard Station #1

03/09/89

8:50 - Arrive at NARCo, check in with Guard Shack #1.

9:00 - Gate locked, no sign of Haztech.

9:10 - Haztech at back of cafeteria, loading ice.

9:15 - Haztech gets their sample bottles, on to MW1

9:25 - Water level in MW#1 is 28.35 (this is exactly 24 hours after 28.20' W.L. measurement).

9:30 - Photo #33, MW-1 environs end Haztech. Small area, out of direct sunlight in SE corner of the excavated area has standing water.

9:32 - 13.5 gallons to be purged, initial purge water moderately turbid.

9:35 - 2nd gallon was very turbid.

10:00 - purge water still turbid. Crew initially put drop cloth down and set Well Wizard to the west. Wind is from the south. Day is sunny.

10:04 - Start sampling.

10:07 - End sampling; all samples have bubbles or head space. Ask Ms. Harris if there are to be any field or trip blanks.

10:10 - Ms. Harris takes a duplicate of metals. Field parameters were:

ph: 7.48, 7.49, 7.51, 7.54
cond: 640, 638
temp: 13.2°C

10:50 - Fish house to preserve samples; Mr. Deaton will bring files over here to aid in going over CEI/CME checklists.

11:20 - Samples preserved and pH field checked with American Science Products pH indicator strips.

12:00 - Complete CEI/CME checklists, leave location.

R. M. C.

RMC/jl SWM-2 10-23 81 RMC

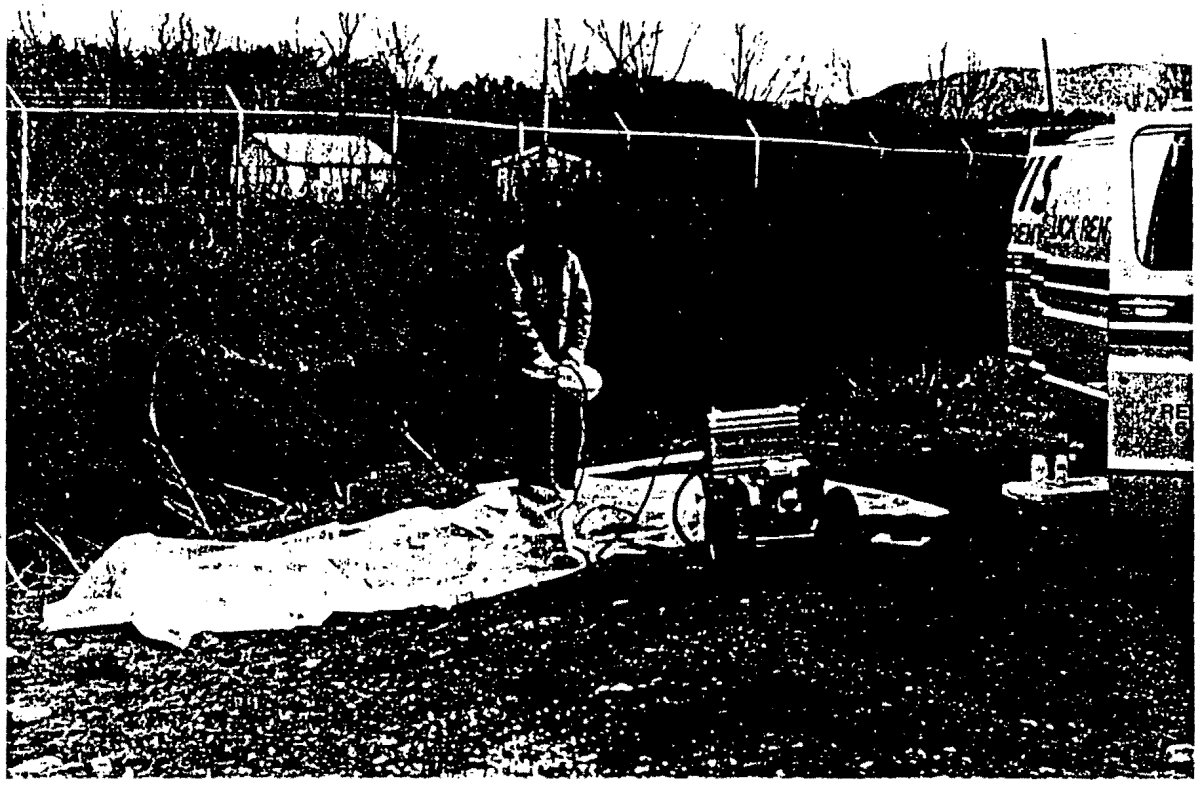
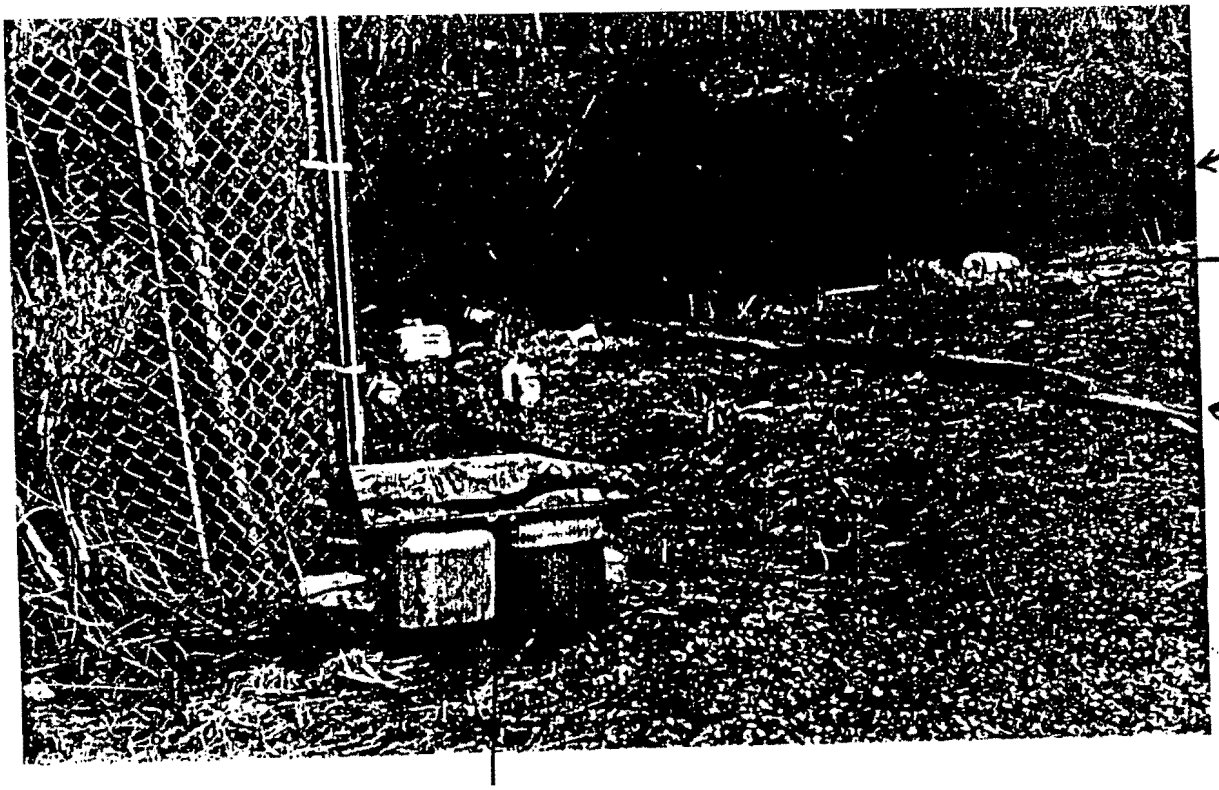


Photo #1--Purging Mw #4. Measuring purge rate.

Photo #2--Purported diesel container..ACETONE on label
(see photo #3)



diesel fuel containers

Photo #3-- Area of rented pump

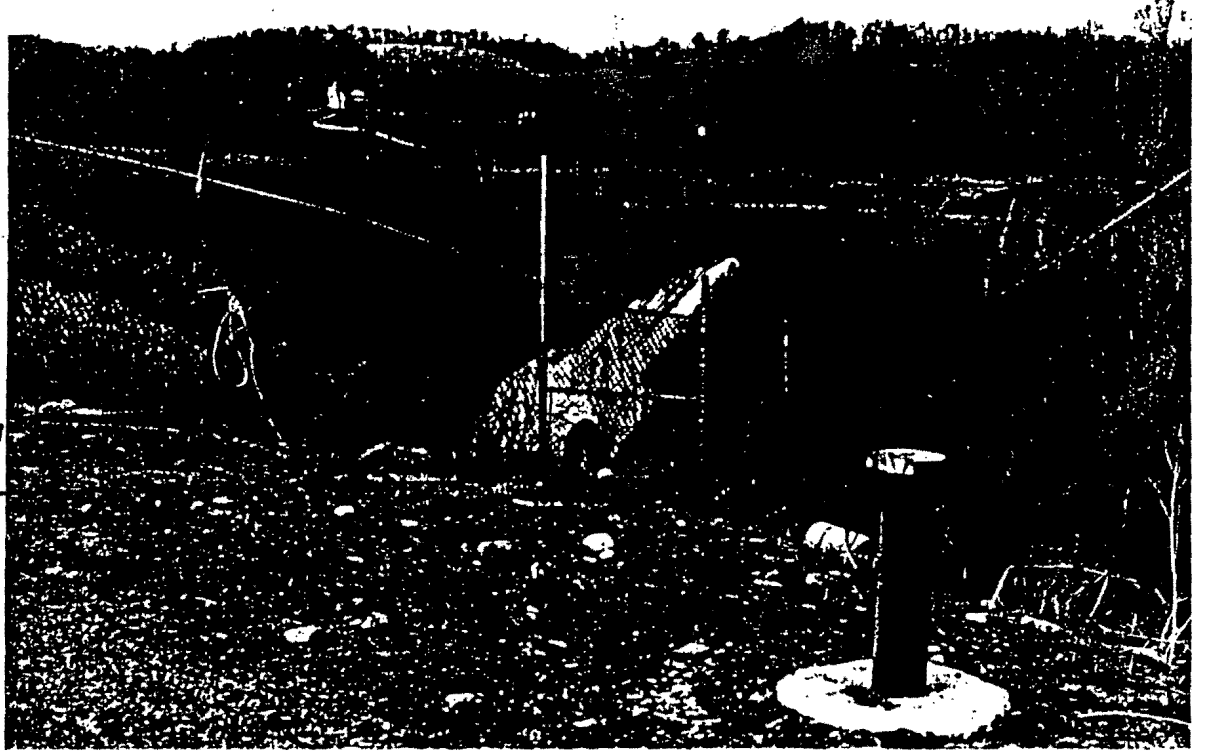


Photo #4-- MW #4 & impoundment

MW #2

Photo #5--MW #2

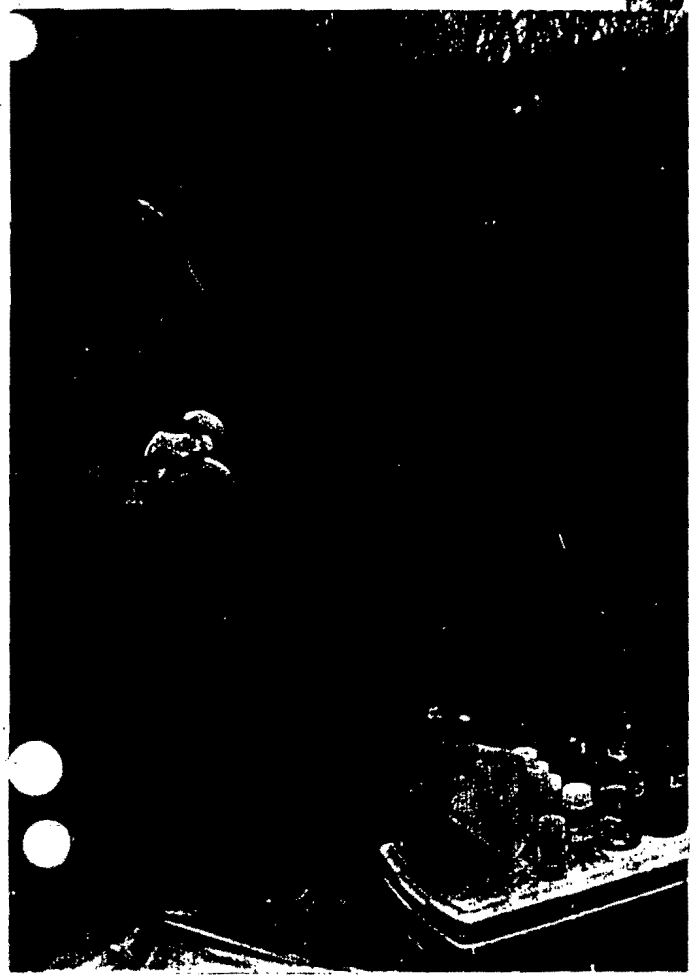
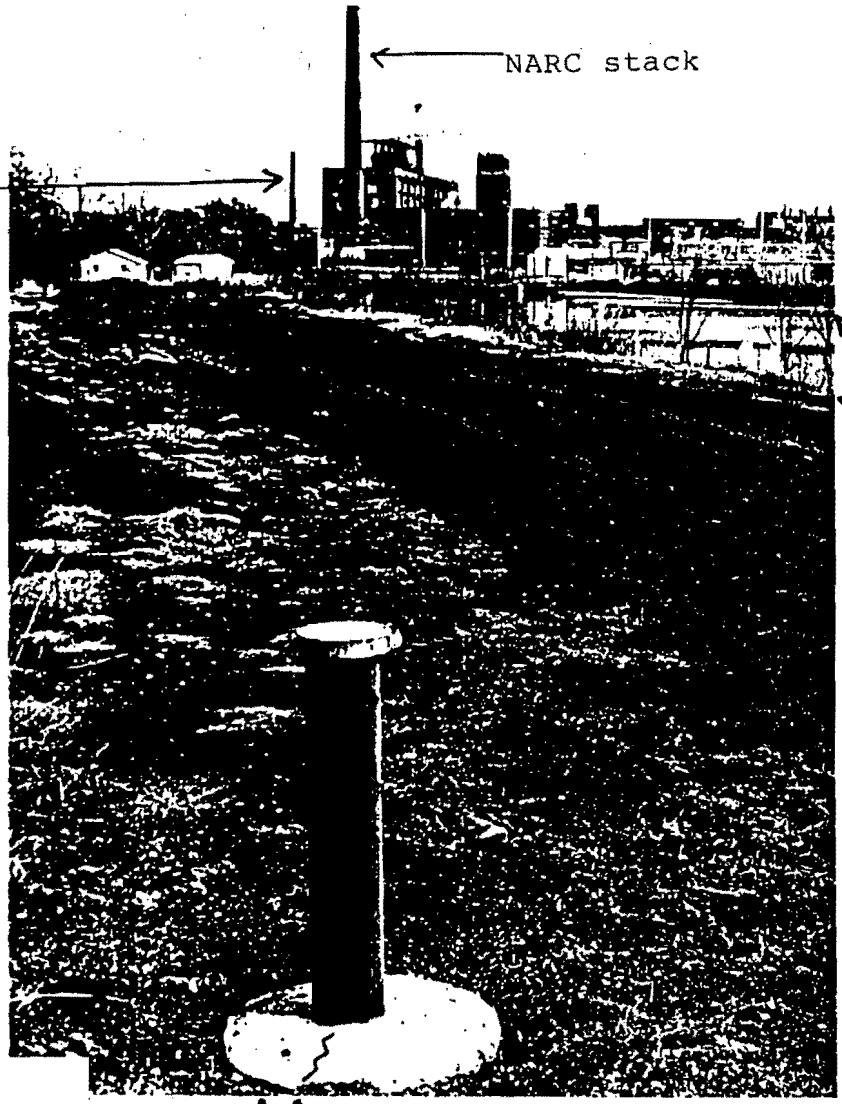


Photo #6--Sample session MW #3


NARC stack
Bemberg stack
crack highlighted
MW-3
Fly-ash pond

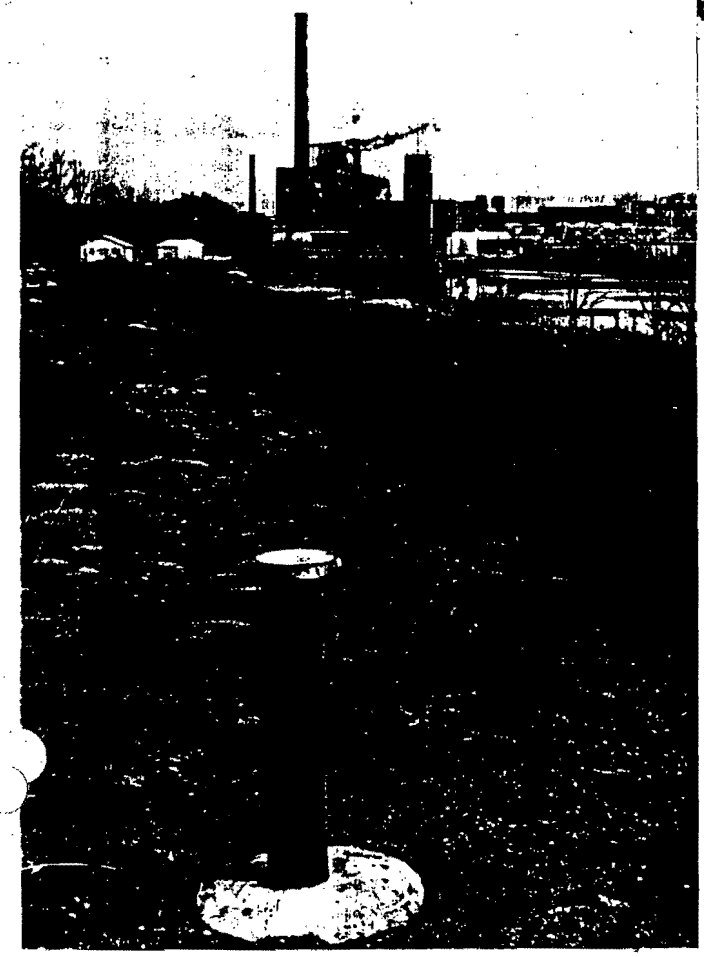


Photo #7--MW #3

Sump

Sample Platform

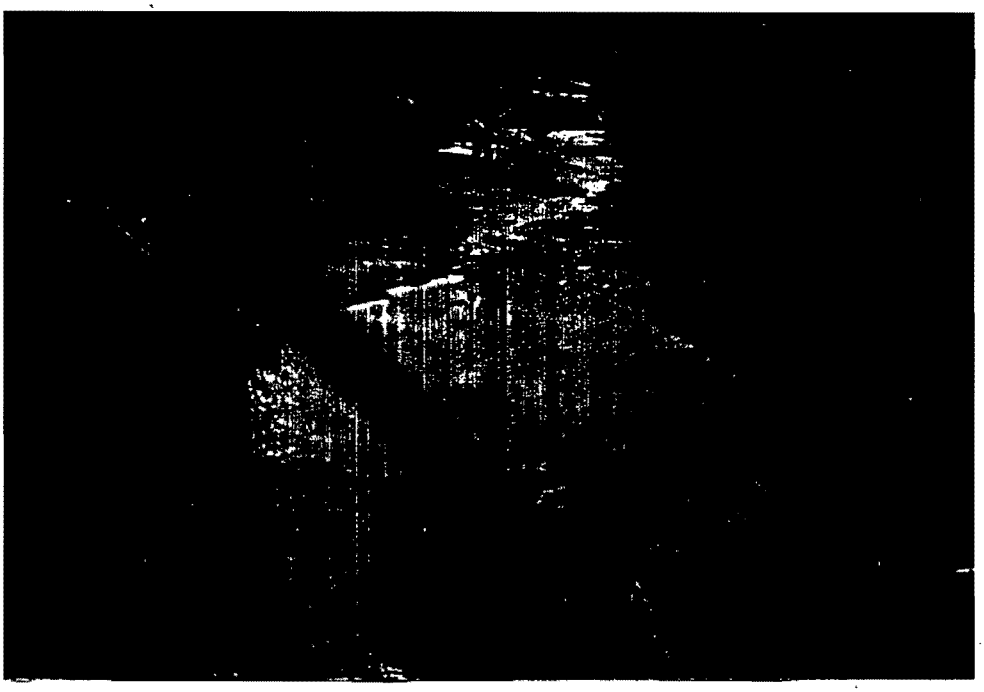
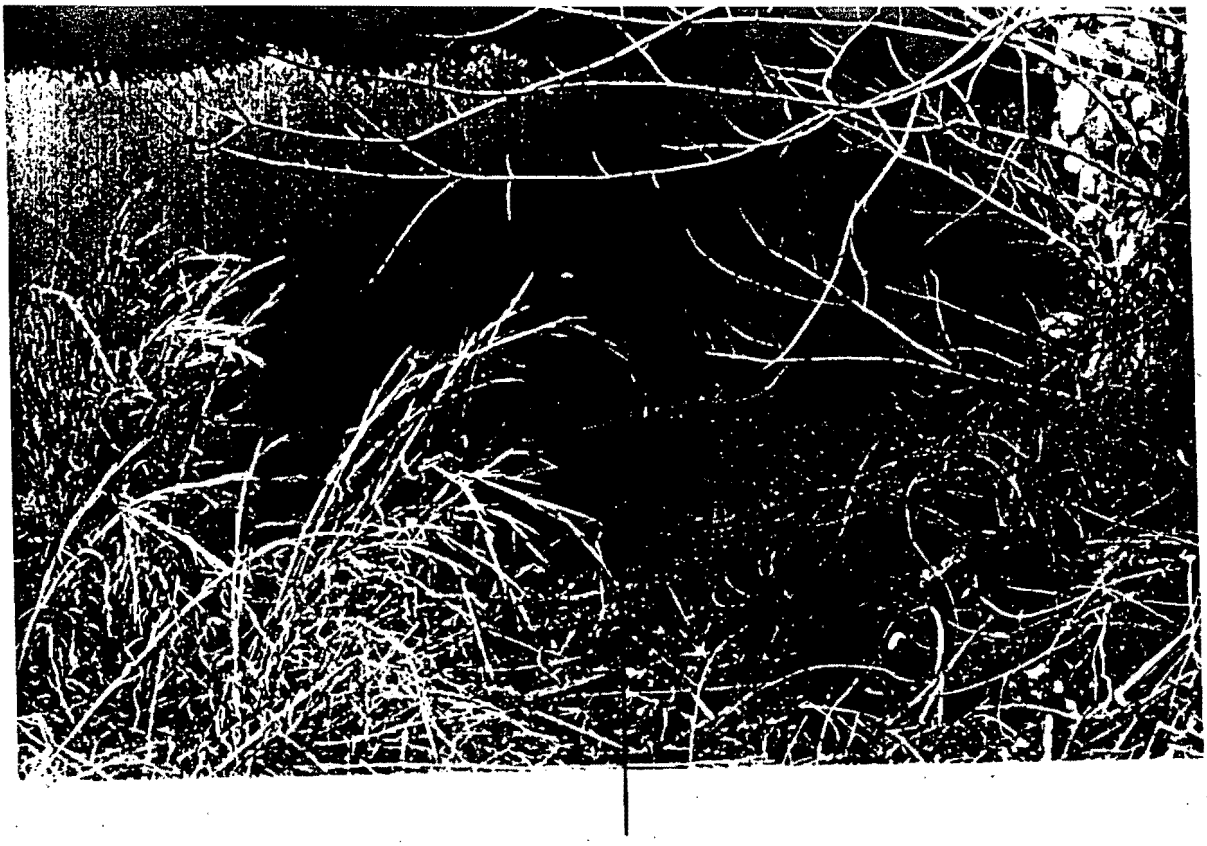
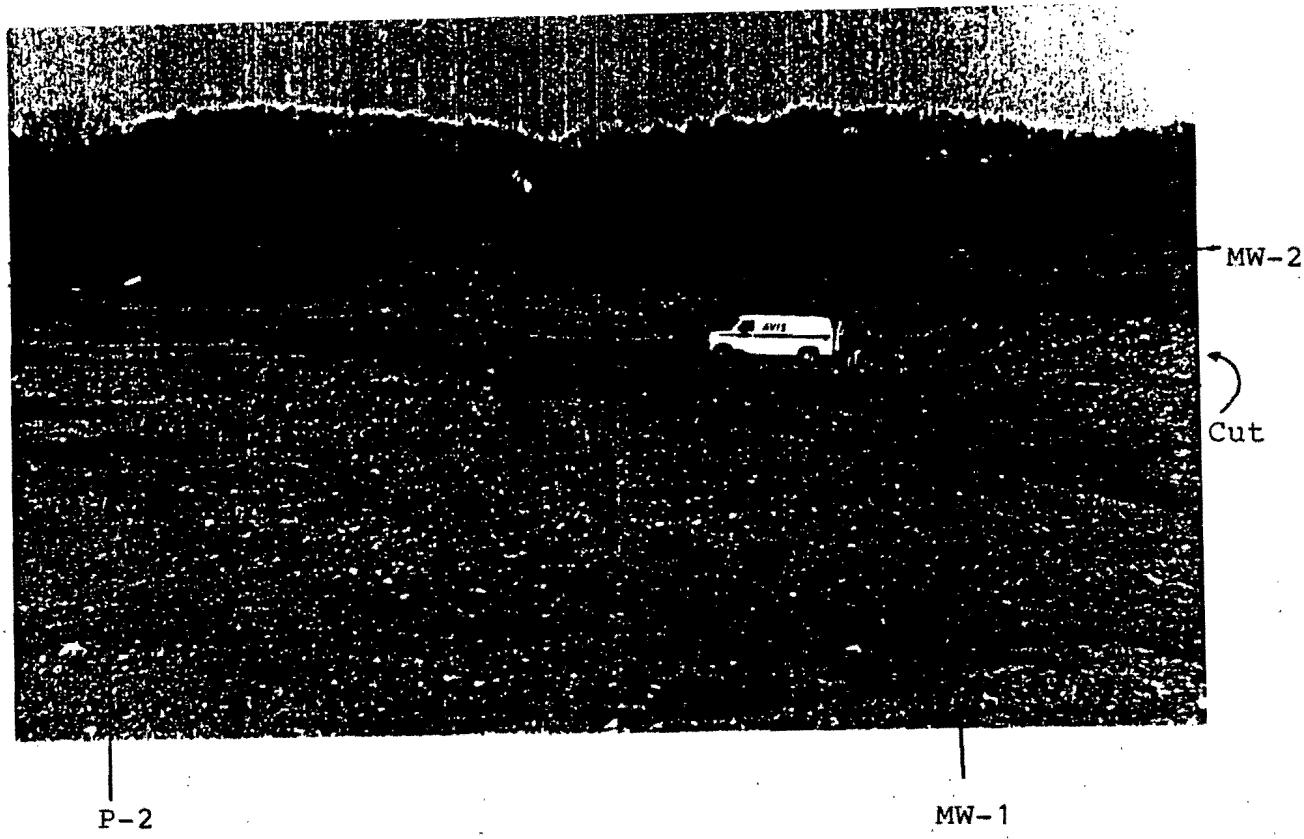


Photo #8--From East end of impoundment



Sheen on water

Photo #10-- Sheen on water after sludge sampling at impoundment



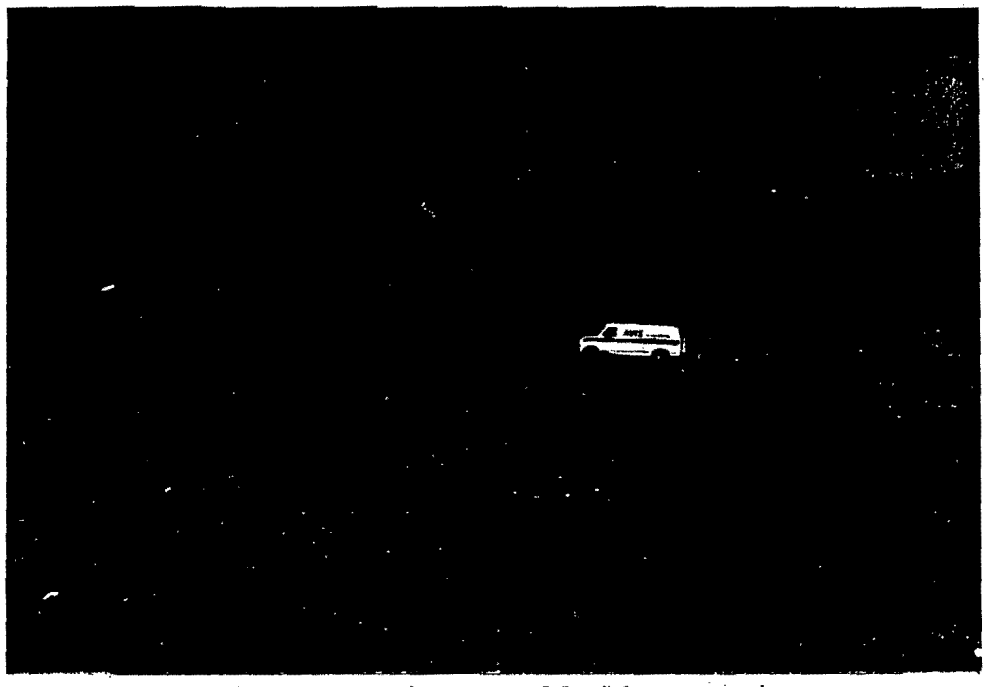


Photo #11-- Monitor well #1 & environs

3/6/87 Grand Calendsill

Vertical beds 1:, S 54°W to NE corner Bern
S 58°W to NE corner house

3/8/89 Cloudy, mud 30's start
wind NE or N

North American Rayon Corp. CME/EEI

8:00 check in at Grand Shack #2, Ask for Lou Rawin, he is in Washington, Jim Deaton is backup. Haztech came in earlier and left, via Grand Shack #1.

8:10 Grand Shack #1, Pris rent-a-truck with Haztech personnel goes by. ~~Sign~~ ~~and~~ I signed in, did not sign release slip. Grand said that was my option.

8:15 Back of plant, by truck, ~~[illegible]~~ Haztech
Haztech people are entering building by [illegible]

8:25 check water levels: MW #1, adequate pad, some cracking, not serious; well number is written on inside of outer casing lid; 36.10 wl. 56.65 T.D. measured from top of steel casing. probe well measured model 6000 [illegible] depth sounder, wash probe with distilled water; lid locked

8:35 P-5, on inside lid, concrete pad, cracking; 13.15, 38.475, measured from top of steel casing, lid locked;

8:40 MW-7, pad in good shape, 34.60 wl. 45.23 T.D. top locked, well ~~#~~ inside lid;

8:48 MW 6, lid locked, ~~[illegible]~~ numbered 31.43, 41.58 T.D. pad in good shape;

8:50 P3, lid locked, labeled, pad ~~[illegible]~~ spalling & cracking 17.22, 36.55 T.D. probe had mud on bottom ~~[illegible]~~ 3° upon removal;

9:00 Mr. Hamm remarks that the sample MW-3 tubes need to be replaced, interim measure will be to cut off dirty (contaminated by mst) end, MW 3, lid locked and labeled, pad has some cracking, all wells start on ~~to~~ elevation key (30.54 T.D.) locking hole. water 18.78

9:05 P4, lid locked & labeled, pad integrity good but discolored 33.70 wl. 49.22 T.D. line of rapids in river strikes N 35° to ~~and~~ water dirty, can't tell if due to bedrock or not.

9:15 MW 2, lid locked & labeled, pad discolored and spalling ~~[illegible]~~ and ~~major cracks~~ cracking 28.21 wl, 55.77 T.D.

9:20 P2, lid locked & labeled, 32.65, water level only; pad spalling & cracking,

9:25 MW 1, locked and labeled, 28.20 wl. 56.28, pad in good shape.

9:30 P1, locked & labeled, 31.15, water level only
pond in good slope,
9:35 Mw 5, 31.73 water level, lid locked and
labeled, pond in good slope,
9:50 Ready to sample mw #4; well without
controller ~~[illegible]~~ #3013 provide pump or supply, set
up downwind of well, drop cloth laid
down, will have to purge 97 gallons,
10:05 Leave tubes 1st purge water in plastic
jug, water is brownish, slightly [illegible]
in volume appears clear as flowing,
flow rate about 1/3 gallon per minute,
10:10 Sample bottles lab packed,
North Ann Raymond
MRN: Lou Raasch
West Ell Ave, Elizabeth; 37643
Leave measures 2 gallon mark on metal bucket,
purge water disposed of in 55 gallon drum
in back of ~~[illegible]~~ Van. P.6, 3360' W.2
Sample bottles
10:22 Photo #1, Leave Hornet catching purge
water (note color) NPDS is for back
ground.
Photo #2, empty acetone container
Jim Porter says held diesel fuel
for pump.
Photo 3 diesel container and area of
pump sented to empty basin white

main pumps were down, pumped to acid sewer
10:25 Jim says flow westward to sump is not
normal; may be leak around acid drum
Maintenance scheduled for next week
10:35 Prepare to sample, 10 bottles
1 1000 ml amber, plastic TOX
1 1000 ml clear glass pesticide screen
1 1000 ml clear glass phenols
1 1000 ml clear glass phenoxy herbicide
1 plastic 250 ml TOC Run 2
1 " " TOC Run 1
1 " " TOC Run 3
1 " " TOC Run 4
1 " " metals Ag, Ba, Cd, Cr, Fe, Mg, Na, Pb
1 " " metals As, SE, Hg by Atlantic [illegible]
1 " " Fl, Cl, SO4, NO3
~~[illegible]~~
1 125 ml plastic Coliform bottom
Radiation in 1 gallon bulk plastic jug
Reading Grass Rhyn & Bottom
10:40 No effort to avoid bubbles, head space,
ph 9.65, 9.70, 9.75, 9.87
cond 920, 950, 933, 950
Temp 14.4, 13.9, 13.8, 13.8
Industrial Water Chemicals (Cattle Dim) peach
bottom [illegible] EP-10 temp meter, Chemcadet ph/ion/temp
meter, Cole Palmer meter, Calibration 7x6 buffer
per day

~~Pb~~

11:00 Looked up off location MW4, 1st located,
Photo 4, MW4 to MW 3 in for background,
11:10 start purging, motor discharge tube has a
little mud in the end from rubbing, [illegible]
[illegible] of the casing top
Labels have facility name
RCRA #
Collector DATE
Location
Parameter,
MW 2, needs to purge 13.2 gallons, 3 minutes
per gallon rate, ≅ on 1st gallon;
purge rate is [illegible] clamping up (from [illegible]) as
purging proceeds
Discussed TOX with [illegible], I told him
that I had seen TOX [illegible] in 1000 ml
[illegible] preserved with [illegible], but without
head space or air bubble
well [illegible] set up [illegible]
11:30 purge rate still slightly [illegible]
11:45 last purge rate almost clear,
begin sample, sequence → field sample,
[illegible], Fl, Cl, [illegible], TOC, told [illegible]
plan called for no air in TOC, [illegible]
As, SE, [illegible] other [illegible], [illegible]
[illegible], [illegible], TOX, [illegible]
All bottles had some head space;

1000 ml [illegible] to [illegible] 800 ml not full
pH 5.67, 6.48, 6.47, 6.46
temp 17.3°C
cond 2100, 2150, 2100, 2100

all probes washed with distilled water, [illegible]
wear new disposable gloves for each well.
11:55 End sampling MW #2
samples go into cooler, [illegible]
they will put ice in prior to shipping
12:00 Move off MW #2 photo 5, MW 2 [illegible]
on PZ on right side, hill with [illegible]
in background, photo [illegible] on N 3°W
12:10 setting up on MW #3; well [illegible] East of
well, wind from North.
12:13 begin purging, need 5½, [illegible] slightly
[illegible],
12:16 Photo 6, sample bottles laid out and [illegible]
Harris collecting purge water;
12:24 Begin sampling;
Cond 2250, 2260
Temp 14.0
Ph 7.25, 7.30, 7.33 (mostly?)
No further measurements, [illegible] want to
help [illegible],
12:35 head space on all samples, [illegible]
clean, field equipment,
sample water very slightly [illegible].

12:40 Hoztech to cafetoria, photo #7, MW 3, Note cracks in pad, crack other in background, left one is Bentley (Supportive);

12:50 Commenting at [illegible], [illegible] is [illegible].

1:05 Talked with Jim Deaton, Told him that the only real problem thus far, other than some [illegible] sampling discrepancies was the fact that the background well is not up-gradient. Crane on location for sludge sampling in narrow lagoon.

1:20 Hazard rigging to sample sludge — Noticed that radius 1 gal samples are placed in cardboard containers, not solvent;

2:00 Photo 8 from east end of narrow lagoon looking west, 2nd point being sampled, 1st point is disturbed over [illegible] edge of wall in foreground, Lawrence says ~~compositing~~ compositing 3 out of each section

2:20 3rd composite, [illegible] [illegible] [illegible] had been wrapping them in [illegible];

3:05 Photo #10, Sheen on water after hand auger sample behind sed. [illegible] [illegible];

3:40 End Sed sampling, total of 4 [illegible] talked with Jim & Lawrence, Lawrence says MW #1 sampled Friday, [illegible] CET, [illegible] [illegible].

Murphy Crane at Rigging 929-8132 Johnson City.

Eddie Bowen
Kim Woods

4:05 Lawrence takes coliform samples to Tri-state Analytical in Kingsport;

4:10 dite I transport Brice & samples to lab where he will add preservatives.

4:15 Brice has all samples arranged by parameter on work bench. ~~[illegible]~~

1ml Add H_2SO_4 to TOC, still have air spots

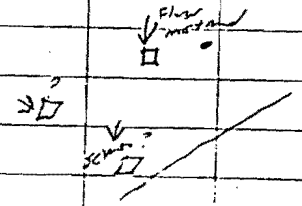
4:25 HNO_3 to metals As, SE, Hg 1
1ml (over 40%) Ag, Ba, etc, 1
J.T. Baker chem co 901-423-0204
1037 Lower Brownsville Road Mr Gary Dugan
Jackson, TN 38301
Nitric Acid Ultrax 70.5% ← H_2SO_4 97% ← only but not [illegible]
500ml [illegible]

4:40 Phenols, Sulfuric, 2mls each; MW 4 had still bottom that had dropped [illegible] out, NO_3 is in with Pb, Cl, and SO_4 (not preservative?)

4:45 Ask about ice; Mr. Bruce says Mrs. Harris indicated they would try to obtain some from the cafetoria

5:05 Took Mr. Bruce over to cafetoria for ice.

5:15 Concrete pad round PZ6, good seal
PVC cap lying outside, does it belong
inside?
What are 3 structures by PZ6? 33.60 in arm.



5:20 Remind Mr. Bruce about checking pH and
Production sample yet to be pressured.
5:25 Check out at ground elevation #1
3/9/89
8:50 Arrive NARCO, check in with ground, he didn't
ask me to sign anything today
9:00 Gate locked, no sign of Hoetech.
9:10 Hoetech at back of cafeteria loading ice;
9:15 Hoetech has their sample bottles loaded
onto MW1
9:16 After they get the gate open
9:25 28.35' water level in MW #1 (28.20 24 hours ago)
9:30 Photo #11, MW1 and Hoetech.
standing water in SE corner of excavation,
small area out of direct sunlight
9:32, begin purging, initial purge water moderately
turbid. Pump calculates 13½ gallons to
be purged.
9:35 and gallon was very turbid.

10:00 Drop cloth down, well upward to west, wind
from south. Purge water still turbid.
10:04 Start sampling
10:07 End sampling, all samples have bubbles or
head space; Ask Ms. Harris if there
were going to be antifreeze or trip blanks.
10:10 Leave [illegible] deposits of metals;
pH 7.48, 7.47, 7.51, 7.54
Cond 640, 638,
temp 13.2°C
10:50 Go to fish house to preserve samples,
Jim Boston will bring paper [illegible]
11:20 Samples preserved and field checked
with Arm. E. Products pH indicator strips.
12:00 Complete CME&CEI checklist

3/09/89

Reset printer to top of page and press return when ready. >

TENNESSEE HAZARDOUS WASTE NOTIFICATION SUMMARY REPORT 09/01/88

1. SITE NAME: NORTH AMERICAN RAYON CORP
   EPA ID CODE: TND 09-505-1207

2. MAILING ADDRESS
   WEST ELK AVE ELIZABETHTON TN 37643
3. GENERATOR: NO TRANSPORTER: TSDF: NO
4. SITE LOCATION
   WEST ELK AVE
5. COUNTY NAME: CARTER SWM FIELD OFFICE LOCATION: JOHNSON CITY
6. OWNER: NORTH AMERICAN RAYON CORPORATION (615) 542-2141
7. MANAGER: J C BOYD (PLANT MANAGER) (615) 542-2141
8. CONTACT: LOU R RAASCH (ENV SERV MGR) (615) 542-2141
9. EMPLOYEES: 1,300 YEAR BEGAN: 1928
   SIC CODES: 2823, , , JOB SHOP: NO
11. WASTE STREAMS THAT HAVE BEEN DESCRIBED TO THE DEPARTMENT.

WASTE STREAM	WASTE NAME / PHYSICAL FORM / GENERATION PROCESS	WASTE CODE	STATUS
(1)	WASTE NON-HALOGENATED DEGREASING SOLVENT(VARSOL1)	-	HAZARDOUS

LIQUID, OTHER BASED (pH:9.2 FL:) ANL. AVE: 1,000
INVESTIGATION HAS REVEALED THAT THE BARIUM SOURCE IS WET SCRUBBER DISCHARGE. BARIUM, PER SE, IS NOT USED IN ANY MANNER IN THE PRODUCTION OF RAYON FIBER BY THE VISCOSE PROCESS. VARSOL IS USED IN AREA DEGREASING UNITS TO CLEAN VARIOUS METAL PARTS. PERIODICALLY THE VARSOL BATH IS CHANGED AND A NEW BATH IS PUT IN. GENERATION RATE IS DEPENDENT ON USE OF EACH PARTICULAR DEGREASER.

(2)	WASTE HERESITE S-215-D SOLVENT (DENATURED ETHYL ALCOHOL)	-	HAZARDOUS

LIQUID, OTHER BASED (pH: FL:57 F) ANL. AVE: 200
HERESITE S-215-D SOLVENT IS USED IN LACQUER SHOP TO CLEAN SPRAY GUNS. LACQUER SHOP OPERATION IS EPISODIC. THERE MAY BE MONTHS WHEN THERE IS NO ACTIVITY IN THIS AREA.

(3)	WASTE XYLENE	-	HAZARDOUS

LIQUID, OTHER BASED (pH: FL:) ANL. AVE: 200
XYLENE IS USED AS A SOLVENT TO CLEAN SPRAY GUNS WHEN USING AIR DRY LACQUER.

(4)	LEAD DROSS	-	HAZARDOUS

OTHER SOLID (pH: FL:) ANL. AVE: 500
DROSS FROM LEAD MELTING POT. LEAD POT OPERATION IS PERODIC, NOT CONTINUOUS, HENCE OPERATION RATE VARIES.

(5)	ISOPROPANOL AND AMMONIA	-	ACCIDENT

LIQUID, OTHER BASED (pH: FL:) ANL. AVE:
PLANT CLEAN-UP! ONE TIME GENERATION

(6)	MIXED SOLVENTS	-	ACCIDENT

LIQUID, OTHER BASED (pH: FL:) ANL. AVE:
ONE TIME GENERATION: CLEAN UP OF PAINT LAQUER AREAS

(7)	WASTE SOLVENT CHLORINATED	-	ACCIDENT

LIQUID, OTHER BASED (pH: FL:) ANL. AVE:
PLANT CLEAN UP ONE TIME OPERATION

(8)	SULFURIC ACID	-	HAZARDOUS

LIQUID, OTHER BASED (pH: FL:) ANL. AVE: 1,080,000
WASTE ACID FROM RAYON PRODUCTION, IF RECEIVED AT THE WASTEWATER TREATMENT PLANT IN EXCESS OF NEUTRALIZATION CAPACITY, A PORTION OF THE INFLUENT WAS DIVERTED INTO THE HOLDING BASIN. IT WAS THEN PUMPED BACK AND NEUTRALIZED AS PART OF THE NORMAL PROCESS. DIVERSION SYSTEM IS NOW INOPERATIVE. NEUTRALIZATION CAPACITY HAS BEEN INCREASED.

Hazardous Waste Notification

Tennessee Department of Health and Environment, Division of Solid Waste Management.
Customs House - Fourth Floor, 701 Broadway, Nashville, Tennessee 37219-5403

1. Organization's full name at facility. North American Rayon Corporation			EPA identification code TND095051207	
2. Mailing address West Elk Avenue	City Elizabethton		State abbrev. TN	ZIP code 37643
3. Facility physical location or address. West Elk Avenue			Facility county name Carter	
4. Owner name North American Rayon Corporation			Phone with area code (615) 542-2141	
5. Manager or operator name J. C. Boyd (Plant Manager)			Phone with area code (615) 542-2141	
6. Principal technical contact Lou R. Raasch (Env. Serv. Mgr.)			Phone with area code (615) 542-2141	
7. Number of employees 1300	Date operation began 1928	SIC codes (Primary SIC first,etc.) 2823		Job shop Yes No

8. Emergency contacts for 24 hours per day and 7 days per week.

	Name	Time period covered	Phone with area code
a.	Lou R. Raasch		(615) 542-6231
b.	Clint Perkins		(615) 542-6231
c.	The phone number listed above (542-6231) is the Medical Department at North American Rayon and they will contact the above listed personnel.		
d.			

9. Current environmental permits for air water, solid waste and radiological permits. Give permit type, number and expiration date. In a range of related permits, summarize by giving the first and last permit.

Water NPDES TN0004421

Air 024156P, 024570P-024589P, 024596P, 024680P-024684P

10. Certify that the information given in this document is true, accurate and complete by signing and dating.

Signature of authorized representative	Title	Date
Lou R. Raasch	Eng. Serv. Mgr.	4/4/88

Below is for Department use only.	11. Date received	County code	Priority	Generator	Small generator	Major generator

12. Date closed	Date regulated	Date deregulated

13. Comments

APPENDIX F

HAZTECH Well Construction Report

10-25 70

BAKER, WORTHINGTON, CROSSLEY, STANSBERRY & WOOLF

ATTORNEYS AT LAW

NORTHEAST TENNESSEE OFFICE
207 MOCKINGBIRD LANE
POST OFFICE BOX 3038 CRS
JOHNSON CITY, TENNESSEE 37602

TELEPHONE 615 928-0181
TELECOPIER 615 928-5694

JES F. BAKER (1864-1924)
VARD H. BAKER (1902-1964)
DWARD H. BAKER, JR.
ROBERT F. WORTHINGTON, JR.
ROBERT L. CROSSLEY
DON C. STANSBERRY, JR.
LOUIS C. WOOLF
ROBERT G. McCULLOUGH
CHARLES W. BONE
WILLIAM H. SKELTON
ERNEST A. PETROFF
ROBERT G. McDOWELL
JOHN A. McREYNOLDS, JR.
RODGER B. KESLEY
SAM J. McALLESTER, III
RICHARD T. SOWELL
A. HARRISON JOHNSON, JR.
ED E. WILLIAMS, III
DENNIS R. McCLANE
RICHARD E. HEROD
W. LEE RAWLS
HUGH B. BRIGHT, JR.
JAMES L. BECKNER
C. MICHAEL NORTON
HOWARD E. JARVIS
W. KYLE CARPENTER
L.H. (BILL) ARMISTEAD, III
DAVID C. ANDREW
KENNETH P. EZELL, JR.
JAMES E. DRINNON, JR.
STEPHEN A. MARCUM
JAMES A. DELANIS
J. RANDOLPH BIBB, JR.
H. BRUCE GUYTON
STEVEN J. EISEN
ANTHONY M. IANNACIO
GARY C. SHOCKLEY
WANDA G. SOBIESKI
WILLIAM R. WRIGHT
JAMES A. McINTOSH
NICHOLAS A. DELLA VOLPE
ROBERT C. REID
ROBYN JARVIS ASKEW
JANET P. MEDLIN
M. DENISE MORETZ
JEFFREY H. BENEDICT
EDWARD A. COX, JR.
STEPHEN M. CRAMPTON
JANIE C. PORTER
K. JOI TIPPS
KIMBERLY K. WHALEY
VANCE L. BROEMEL
KEITH D. FRAZIER
MARTHA M. GENTRY
JUDITH L. KARES
MICHAEL B. KINNARD
MELISSA M. McGUIRE
GREGORY M. McWHORTER
DANIEL J. MOORE
RICHARD H. ROBERTS
MONTY L. WALTON
JEFF W. ANDERSON
BEN A. BURNS
PATTI T. COTTEN
KELLY R. DUGGAN
DIANE M. MESSER
ROBERT D. VAN DE VUURST
KEITH C. DENNEN
ROBERT K. GIESELMANN
SUSAN R. LIMOR
P. EDWARD PRATT
AMY E. SPENCER
JAMES C. BRADSHAW
TRACIE A. GROVE
CYNTHIA K. MANCEBO
JULIAN M. OLEJNICZAK
JOHN B. WHITESELL
DURWARD S. JONES
WILLIAM E. ANDERSEN
OF COUNSEL

KNOXVILLE, TENNESSEE 37902
BANK OF EAST TENNESSEE BUILDING
TELEPHONE 615 549-7000
TELECOPIER 615 525-8569

WASHINGTON, D.C. 20004
1001 PENNSYLVANIA AVENUE, N.W.
TELEPHONE 202 347-4360
TELECOPIER 202 347-4540

NASHVILLE, TENNESSEE 37219
1700 NASHVILLE CITY CENTER
TELEPHONE 615 726-5600
TELECOPIER 615 726-0464

HUNTSVILLE, TENNESSEE 37756
COURTHOUSE SQUARE
TELEPHONE 615 663-2321
TELECOPIER 615 663-2111

HENDERSONVILLE, TENNESSEE 37075
MAPLE GLEN OFFICE BUILDING
TELEPHONE 615 822-8822
TELECOPIER 615 824-4684

February 6, 1989

HAND-DELIVERED

Mr. Randy Curtis
Tennessee Department of
Health and Environment
1733 Sunset Drive
Johnson City, Tennessee 37601

RE: Report on Monitor Wells and Piezometers Installed at North American Rayon Corporation

Dear Mr. Curtis:

Enclosed please find one copy of the above-referenced report prepared by Westinghouse HAZTECH. Please feel free to call Laura Harris or me if you have any questions on this report.

Sincerely yours,

Melissa M. McGuire

Melissa M. McGuire

ssr
Enclosure

REPORT ON
MONITOR WELL AND PIEZOMETER INSTALLATIONS
AT NORTH AMERICAN RAYON CORPORATION
AUGUST-SEPTEMBER 1988

FEBRUARY 2, 1989

Prepared for
Baker, Worthington, Crossley,
Stansberry and Woolf

Prepared by
Westinghouse HAZTECH, Inc.
Decatur, Georgia

Project No. 2322-88-1107

Laura Harris
Laura Harris
Project Manager

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1 North American Rayon site plan. Monitor well and piezometer locations.....3

2 Generalized diagram of monitor well construction..5

3 Generalized diagram of piezometer construction....6

1.0 INTRODUCTION

The Tennessee Department of Health and Environment (TN DHE) has required North American Rayon Corporation (NARCo) of Elizabethton, Tennessee to develop and implement ground-water monitoring programs for 2 waste management units located at the Elizabethton facility. One of the waste management units is a surface impoundment (SI) which had received untreated wastewater containing spent sulfuric acid, therefore being subject to regulation as a hazardous waste management unit. The second waste management unit is a closed industrial landfill regulated by TN DHE as a non-hazardous solid waste unit.

NARCo retained Westinghouse HAZTECH, Inc. of Decatur, Georgia to develop and implement ground-water monitoring programs for the landfill and SI. A ground-water monitoring plan for the SI (under separate cover) was submitted to TN DHE, and approved on May 23, 1988. Westinghouse HAZTECH submitted a ground-water monitoring plan for the landfill (under separate cover) to TN DHE and received approval on July 12, 1988. On August 23, 1988 Westinghouse HAZTECH and Wilson Bros. Well Drilling, of Gray, Tennessee, began installation of 6 piezometers and 7 monitor wells at the site. Installation of ground-water monitoring systems for both waste management units was completed on September 11, 1988.

2.0 DISCUSSION OF DRILLING AND WELL CONSTRUCTION

On August 23, 1988 through September 11, 1988 Wilson Bros. conducted borings and installed 6 piezometers and 7 monitor wells at the locations shown on figure 1. Two Schramm air/wet rotary rigs were used during the project, one being a model T685 and the other a modified T64. The air compressors providing airflow to the drill stem produce 850 cubic feet of air per minute (cfm) under 350 pounds per square inch (psi) pressure. On several occasions the saturated soil choked air circulation and it was necessary to circulate water. When air circulation is lost, no soil cuttings are delivered to the surface and the borehole fills with its own cuttings. Water was obtained from a fire hydrant located on site and stored in steel water tanks mounted on trucks. When used, water was pumped at a rate of 30 gallons per minute (gpm).

An 8 1/4-in diameter roller cone bit was routinely used for drilling the wells, exceptions are noted in the discussion of individual wells

Tri-Loc brand Schedule 40 2-in PVC casing and screen were used in well construction, except as indicated in the text. Screens have 0.01 in slots and are 10 ft long.

In most cases boreholes collasped when the drilling tools were removed from the borehole. A 6 5/8-in outside diameter (O.D.). steel casing was driven through the collasped material and a 6 1/8-in air percussion hammer bit was used to evacuate the material within the steel casing. The outer casing was constructed by welding sections of the pipe together. The PVC well pipe was positioned in the outer casing. The filter pack was placed by alternately adding sand and pulling the outer casing up to allow the sand to empty from its base. In most instances where collaspe of the borehole was encountered, the filter pack extends to a point where saturated, fluid clay would not displace the bentonite pellets when they were released from the base of the outer casing. Some boreholes were so unstable that the outer casing could not be completely removed until the bentonite had had time to saturate, increasing its density and coherence to a point that it could support the borehole wall. If the pellets were placed above the level of water in the bore hole, water was added from a water truck. Bentonite pellets were allowed to set for a minimum of 3 hr before grouting the remainder of the borehole annulus.

Sand for filter packs was taken from a stockpile kept on site for the sand filters associated with NARCo's wastewater treatment system. Bagged sand was used for MW2 only. All filter packs are comprised of coarse quartz sand. Filter packs commonly had to be extended 10 to 20 ft above the screen so that the bentonite pellets could be

placed in a horizon as competent as practicable The more fluid clay soils would displace the bentonite pellets, preventing formation of a seal.

Bentonite seals are constructed of Pel Plug High Yield Western Bentonite pellets supplied by Polymer Drilling Systems of El Dorado, Arkansas.

Wells and piezometers were grouted with Coplay Type I portland cement, mixed with approximately 3% Aquagel sodium (Na) bentonite powder. This mixture is less likely to crack upon drying than cement alone. Grout was pumped into the borehole annulus by tremie method.

Protective steel covers, 6 5/8-in O.D., were secured in the grout to a depth of 3 ft below grade. In most instances protective covers were spray painted orange before placement at the well. In the event that protective covers were painted following placement at the well, a well seal was used to seal off the opening of the protective casing. Finally, weep holes were drilled approximately 2 1/2 in from the base of the protective cover.

Wells and piezometers were air jetted for 30 min to 1 hour (hr). A Smith 100 air compressor, in conjunction with 1-in O.D. PVC pipe positioned just above the base of the well, was used to air jet wells. The air compressor had a 100 psi maximum pressure, 60% of which was delivered to the well. A low pressure surge was used initially, gradually building up to a steady air flow. Air jetting continued until ground-water showed no further decrease in turbidity.

2.1 Discussion of Wells and Piezometers

Wells and piezometers are discussed individually in the following subsections in the order in which they were drilled. Generalized diagrams of a piezometer and a monitor well are included as figures 2 and 3. Depths quoted in the text are relative to ground surface.

2.1.1 Monitor Well MW2

MW2 was drilled on 8-23-88 to a depth of 47.5 ft with the T685 rig. Road fill was penetrated for 19 ft, at which depth a cobble layer was encountered. This cobble layer is prominent over the site. The cobble layer continued to 24 ft at this location. Gravelly clayey sand was encountered beneath the cobble layer and extends to a weathered shale at 47.5 ft. The outer casing was set to 40 ft. On 8-24-88 the outer casing was found to be filled with mud to a depth of 27 ft. Attempts to clear the hole were unsuccessful. A decision was made to drill into bedrock. From 47.5 ft to the bottom of the borehole weathered tan sandy shales are interlayered with a 1-ft layer of unconsolidated clay soil. The hole was terminated at 60 ft

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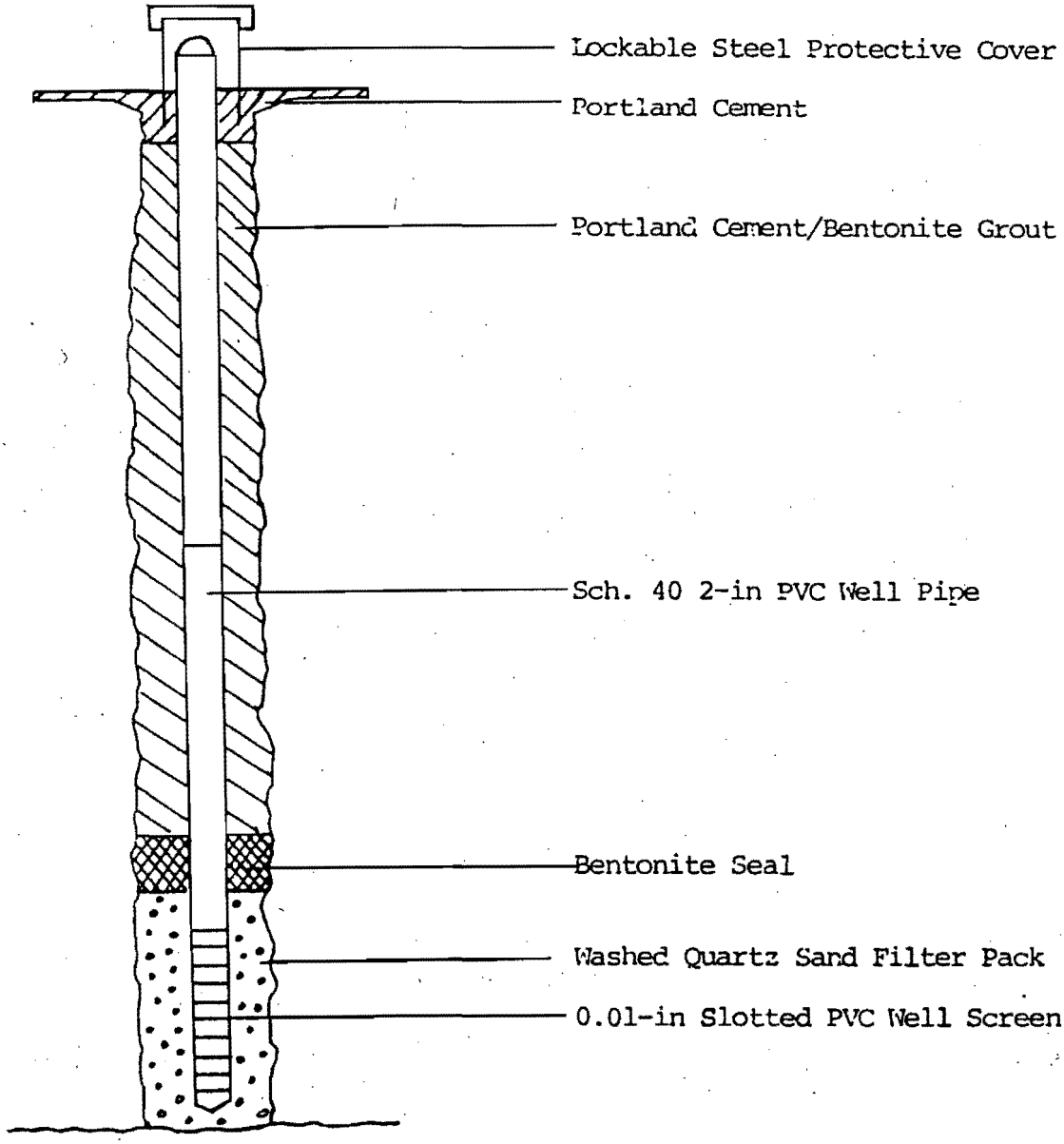

Figure 2. Generalized diagram of monitor well construction.

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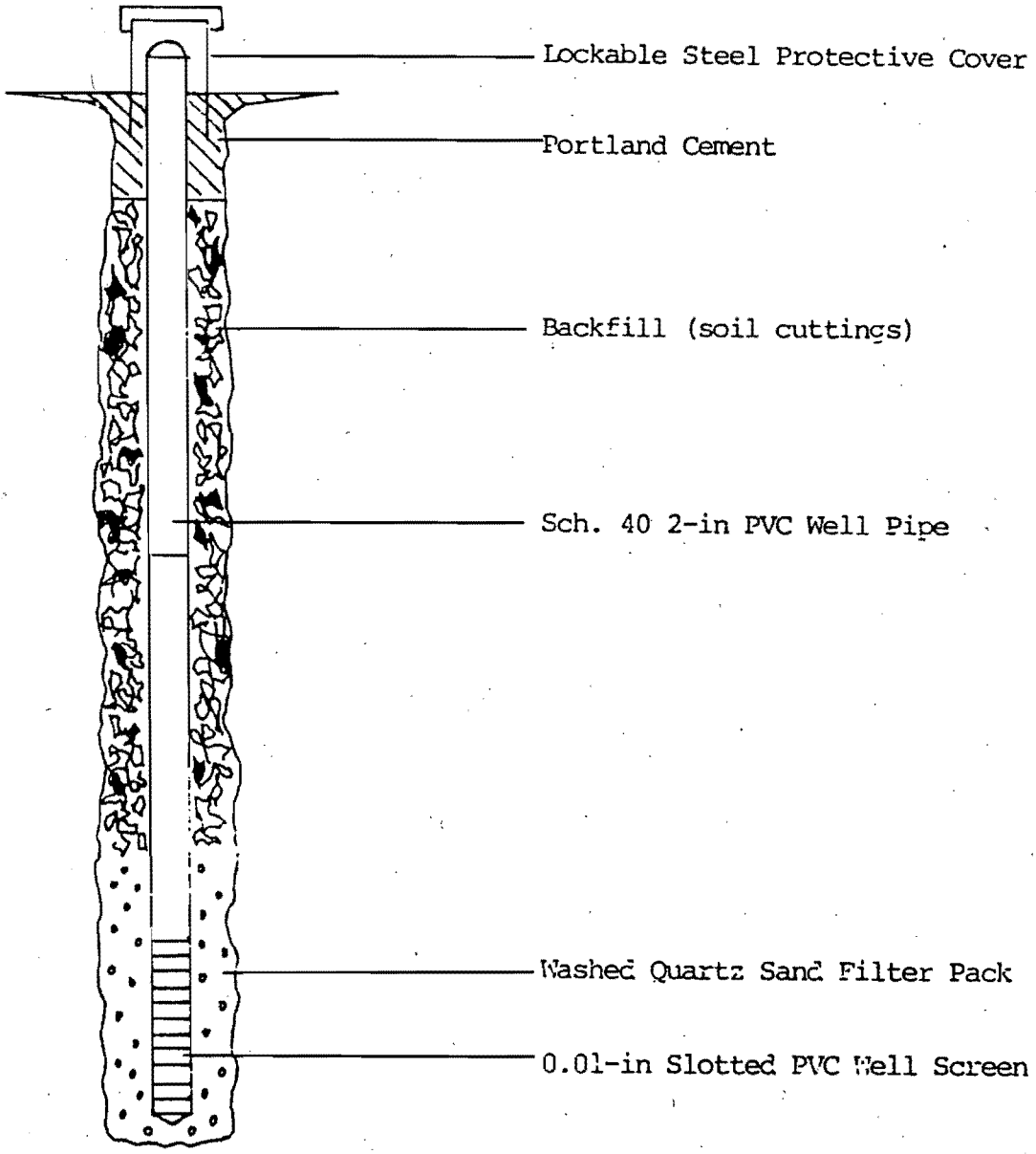

Figure 3. Generalized diagram of piezometer construction.

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and the outer casing driven to 59 ft. This well is screened from 58.5 to 48.5 ft. The filter pack extends to 34 ft, and the bentonite seal from 34 to 31.5 ft.

2.1.2 Piezometer P3

Piezometer P3 was originally drilled on 8-24-88 to 50 ft with the T64 rig. The outer casing was difficult to drive through the cobbles which had fallen into the borehole. The pipe was later found to be broken at a depth of 25 ft below surface. Attempts to salvage the borehole were unsuccessful. P3 was relocated several ft west of its original position on 8-25-88 and drilled to 35 ft. Fill material was encountered to a depth of 14 ft at which time black and tan clay was penetrated. The cobble layer occupies from 17.5 to 29 ft. Beneath the cobbles are layers of cobbley clayey sands. Bedrock was not encountered. The screened interval of P3 is 34.5 to 24.5 ft, with a filter pack extending to 16 ft.

2.1.3 Monitor Well MW3

Monitor Well MW3 was drilled on 8-25-88 to 34 ft with the T685 rig. The borehole remained open when the tools were removed and the well was constructed without using an outer casing. Subsurface characteristics at MW3 are similar to those at P3. MW3 is screened from 33.5 to 23.5 ft. The filter pack extends to 21 ft, and is overlain by a 3-ft thick bentonite seal.

2.1.4 Piezometer P4

Piezometer P4 was drilled on 8-25-88 to 49 ft with the T685 rig. The subsurface at this location is similar to MW3 and P3. From 34 to 49 ft cobble layers and sand layers, each layer being 2 or 3 ft thick, are interbedded. The hole remained open to a depth of 42 ft and the piezometer was constructed without using outer casing. P4 is screened from 41.5 to 31.5 ft. The filter pack extends to 17 ft.

2.1.5 Piezometer P2

Piezometer P2 was originally drilled on 8-25-88 to a depth of 35 ft with the T64 rig. The cobble layer extends from 2 to 12 ft below surface. Saturated gravelly clayey sand was encountered at 12 ft. The piezometer was constructed on 8-25-88. On 8-26-88 the water level in P2 was 25 ft below surface. Suspecting the screen to be clogged, the piezometer was air jetted. However, this failed to produce a higher water level. The saturation encountered at 12 ft has been attributed to discharge from a nearby SI. A decision was made to pull the well materials from P2 and drill the borehole to greater depth. On 9-1-88 P2 was extended to 60 ft. Grey sandy limestone/dolostone was encountered at 57 ft. The PVC well pipe rose 3 ft during

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T095051207

the course of pulling the outer casing. P2 is screened from 56.5 to 46.5 ft. The filter pack extends to 29 ft.

2.1.6 Piezometer P1

Piezometer P1 was drilled on 8-26-88 to a depth of 49 ft with the T685 rig. The cobble layer extends from 6 to 32 ft, where a weathered tan shale was penetrated. Grey crystalline limestone/dolostone was encountered at 35 ft. Due to the slow progress made by the roller cone bit and no evidence of the water table, a decision was made to case off the top 40 ft and continue with a hammer bit. At 41 ft weathered shale was encountered. At 49 ft the borehole produced substantial amounts of ground water and the hole was terminated. After pulling the tools, the uncased portion of the borehole remained open to 48.5 ft. The piezometer is screened from 48 ft to 38 ft. A filter pack extends to 30 ft. A 2-ft thick bentonite seal was inadvertently placed above the filter pack. The seal will not affect the performance of the piezometer. The borehole annulus was backfilled with soil cuttings above the bentonite seal.

2.1.7 Monitor Well MW1

Monitor well MW1 was drilled on 8-26-88 to a depth of 57 ft with the T64. Cobbles and coarse sand occur to a depth of 12 ft where the texture became clayey and silty. On 8-29-88 this borehole was extended to 62 ft. From 57 to 62 ft the texture became gravelly and less fluid. Chert and tan shale fragments were evident in the cuttings. Bedrock was not encountered. Outer casing was driven to 61 ft. The well pipe, sand, and bentonite pellets were put in place. The portion of the borehole above the pellets was unstable and it was felt the the outer casing should be pulled only enough to allow room for the pellets to swell. The pellets swelled more than expected and entered the outer casing, wedging the PVC well pipe inside the outer casing. After many attempts to dislodge this bridge, a decision was made to pull the well and clear the borehole. On 8-30-88 MW1 was rebored to 61 ft and the well reconstructed. MW1 is screened from 60 to 50 ft. The filter pack extends to 33 ft and is overlain by a 2.5-ft thick bentonite seal.

2.1.8 Monitor Well MW4

Monitor well MW4 was drilled on 8-29-88 to a depth of 59.7 ft with the T685. Outer casing was driven the full length of the borehole. From the surface to a depth of 14 ft coarse gravelly sand grades to clayey silt. Saturated gravelly clayey sands were encountered from 14 ft to 59.7 ft. When the well pipe was placed in the borehole the sand would not support the PVC pipe and it sank. Quartz pea gravel and sand (both stockpiled at the water treatment

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T095051207

area) were put in the borehole until the bottom would support the PVC pipe.

MW4 is screened from 59.2 to 49.2 ft. A filter pack extends to 37 ft. A 4-ft thick bentonite seal overlies the filter pack.

2.1.9 Piezometer P6

Piezometer P6 was drilled on 8-30-88 to a depth of 75 ft with the T685 rig. Clayey silt and clayey sand occur to the top of the cobble layer at 13.5 ft. At 18 ft tan gravelly clayey sandy silt was encountered. At 49 ft the bit slowed, possibly due to a boulder, as there was no change in cuttings. Limestone/dolostone was encountered at 62 ft. At 64.5 ft a cherty shale was penetrated. Outer casing was set to 42 ft and the borehole cleared to 61.5 ft. P6 is screened from 61.5 to 51.5 ft.

2.1.10 Piezometer P5

Piezometer P5 was drilled on 9-2-88 with the T64 rig. Grey crystalline limestone/dolostone was encountered at 11.5 ft and is overlain by cobbles and coarse sand. Due to the slow progress of the roller cone bit the borehole was cased and the roller cone bit replaced by an air hammer bit. A gravel filled void was encountered at 13.5 ft. This gravel continued to 40 ft, excluding 3 in of limestone/dolostone encountered at 27.8 ft. The borehole was terminated at 41.5 ft in a grey crystalline limestone/dolostone encountered at 40 ft. The borehole was cased with a smaller diameter casing. The piezometer was constructed and all outer casings were removed. The piezometer is screened from 36 to 26 ft. A filter pack extends to 15 ft.

2.1.11 Monitor Well MW5

Monitor well MW5 was initially drilled on 9-1-88, but the borehole was relocated when the outer casing broke off 39 ft below the surface. Attempts to retrieve the pipe were unsuccessful. The present location of MW5 is 21.4 ft east of the abandoned borehole. The second borehole was drilled to 59 ft on 9-8-88. Gravelly sandy silty clay with sandstone fragments yields to sandy silty clay with shale fragments at 12 ft. Grey crystalline limestone/dolostone interbedded with weathered tan sandy shale occurs from 25.8 ft to the bottom of the borehole.

The borehole remained stable when the drilling tools were removed from the borehole. Outer casing was not used during well construction. MW5 is screened from 58.5 ft to 48.5 ft. The filter pack extends to 27.5 ft and is overlain by 2 ft of bentonite.

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2.1.12 Monitor Well MW6

Monitor well MW6 was drilled on 9-8-88 with the T64 rig. The borehole was drilled to 50 ft in depth, however it collasped to 47 ft. Drilling proceeded through the clay cap of the closed landfill. An old road bed was penetrated at 14 ft. Waste from the landfill (flyash, cinders, rayon) was drilled from 16 to 30 ft. At 30 ft river cobbles, some very large, were encountered Cobbles, interlayered with sand deposits extend the remaining length of the borehole.

Outer casing was used during the construction of this well. When the lower 20-ft section was removed from the borehole, the pipe had a curvature of approximately 1 ft over its length. It is thought that a large boulder became loosened and fell against the outer casing. The monitor well most likely has a curvature also.

Unlike the other wells and piezometers, MW6 is constructed of well pipe and screen purchased from Driller Service, Hickory, North Carolina. This pipe conforms to specifications of the Tri-Loc pipe and screen.

MW6 is screened from 46.5 to 36.5 ft, in the river cobbles and sand beneath the landfill. The filter pack extends to 33.5 ft. The bentonite seal lies above the filter pack and is 3.5 ft thick.

2.1.13 Monitor Well MW7

Monitor well MW7 was drilled on 9-10-88 with the T685 rig. The subsurface at this location is similar to MW6. The landfill was penetrated at a depth of 14 ft and extends to 50 ft. River cobbles and sand were encountered below the landfill.

MW7 is screened from 49.5 to 39.5 ft, in the river sediments beneath the landfill. The filter pack extends to 33 ft and is overlain by 3 ft of bentonite.

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FIGURE 1

North American Rayon Site Plan. Monitor Well and Piezometer Locations

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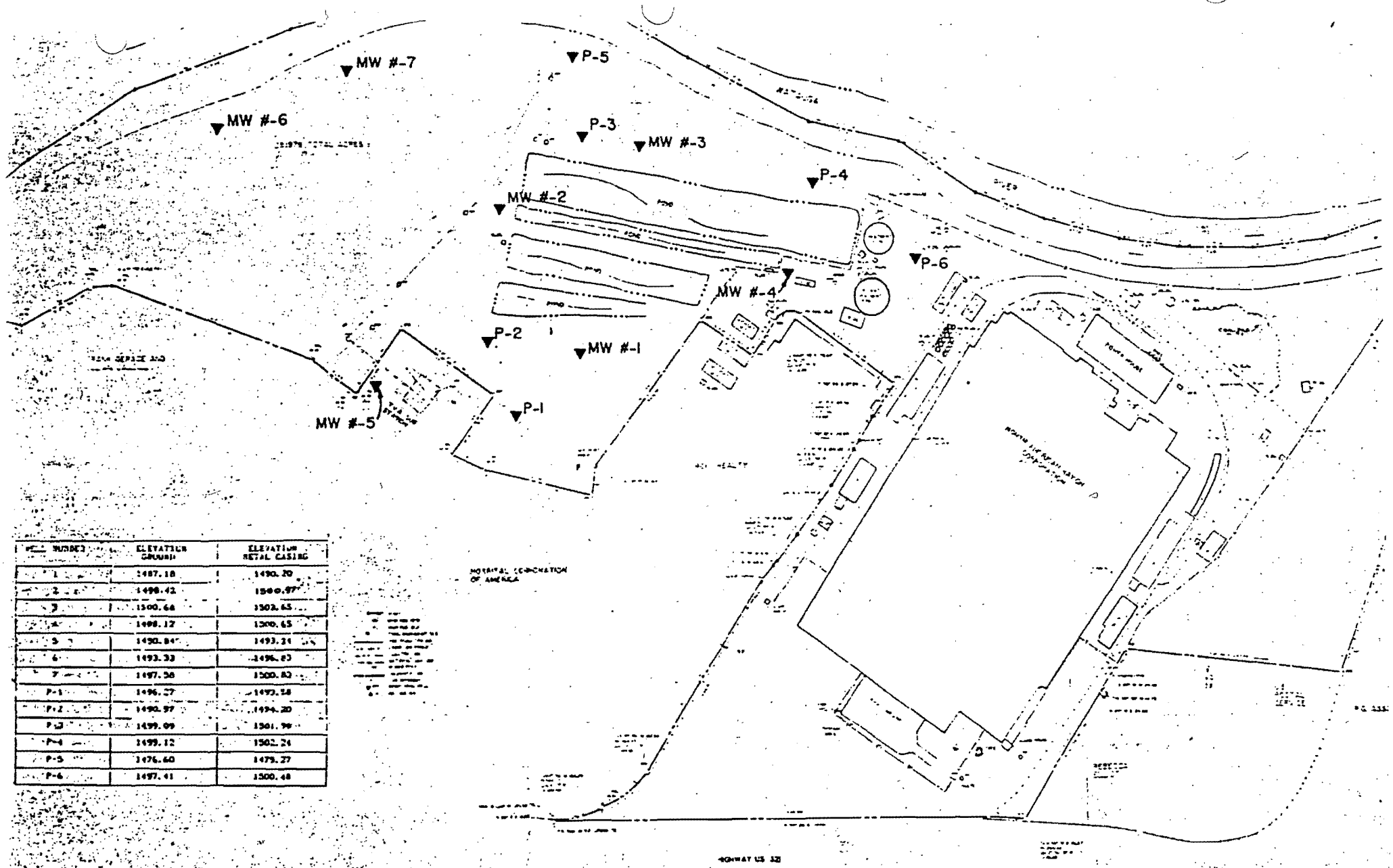

WELL NUMBER	ELEVATION GROUND	ELEVATION METAL CASING
1	1487.18	1490.70
2	1498.42	1500.97
3	1500.66	1503.65
4	1498.12	1500.65
5	1490.84	1493.21
6	1493.33	1496.83
7	1497.50	1500.82
P-1	1496.27	1499.58
P-2	1490.97	1494.20
P-3	1499.09	1501.90
P-4	1499.12	1502.24
P-5	1476.60	1479.27
P-6	1497.41	1500.48

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