607SERBSF10,635

607SERBSF10,635

Site Name (Subject):	UNION CARBIDE CORP/AGRIC PROD
Site ID (Document ID):	NCD980600274
Document Name (DocType):	Contractor Report (CONTR)
Report Segment:	
Description:	FIT Preliminary Reassessment
Date of Document:	12/13/1988
Date Received:	
Box: *Enter SF and # with no spaces*	SF10,635
Access Level:	PUBLIC
Division:	WASTE MANAGEMENT
Section:	SUPERFUND
Program (Document Group):	SERB (SERB)
Document Category:	FACILITY

Print Report for Record | **Go to New Blank Record** | **Go to New Record - (default to last record values)** | **Delete Record**

NUS CORPORATION
1927 LAKESIDE PARKWAY
SUITE 614
TUCKER, GEORGIA 30084
404-938-7710

received
DEC 20 1988

C-586-12-8-59

CERCLA

December 13, 1988

Mr. Narindar Kumar
Site Investigation and Support Branch
Waste Management Division
Environmental Protection Agency
345 Courtland Street, N. E.
Atlanta, Georgia 30365

Date: 1/31/89
Site Disposition: NFA
EPA Project Manager: RM

Subject: Preliminary Reassessment
Union Carbide Agricultural Products Company FIT
Research Triangle Park, Durham County, North Carolina
NCD 980600274
TDD No. F4-8809-13

Dear Mr. Kumar:

FIT 4 conducted a preliminary reassessment of the Union Carbide Agricultural Products Company, in Research Triangle Park, Durham County, North Carolina. The assessment included a review of EPA and state file material, a target survey, and an offsite reconnaissance of the facility and surrounding area.

Union Carbide Agricultural Products Company began operations at this facility in Durham County in 1980 (Ref. 1). The facility was purchased in 1987 by Rhone-Poulenc Ag Company, which has continued operations similar to that of Union Carbide (Ref. 2). This facility, since its inception, has conducted research and development, engineering, and marketing of agricultural products, including insecticides, herbicides, and plant growth regulators. No manufacturing has ever been done at this facility (Refs. 1, 2).

On July 2, 1981, Union Carbide applied for interim status under RCRA. The estimated quantity of waste generated listed in that application was 133,730 pounds per year. On January 6, 1982, Union Carbide withdrew this application and changed the facility's status from "storage" to "generator only" (Refs. 3, 4). State-conducted RCRA inspections have always found the facility in compliance with the standards (Refs. 5, 6, 7).

The Union Carbide facility is located north of Alexander Drive and east of the North-South Freeway in Research Triangle Park, North Carolina. An onsite reconnaissance of the area revealed the site is currently active and operated by Rhone-Poulenc Agricultural Company (Ref. 2). During the reconnaissance, there was no evidence of improper waste-handling practices or presence of hazardous substances deposited above ground (Ref. 8). The wastes generated at the facility in the past were primarily solvents and related lab waste. This includes acids, bases, non-halogenated solvents, solid contaminated lab waste (glassware, towels, etc.) and some pesticide material. Based on all available file information, all waste generated onsite has been shipped to the Chemical Waste Management Site in Emelle, Alabama for disposal (Ref. 5).

A private well that is no longer used for drinking water is located approximately 2,500 feet east of the facility and was found to be contaminated with various organic compounds such as 1, 1, 1 trichloroethane; 1, 1-dichloroethylene; 1, 1-dichloroethane and tetrachloroethene from an unknown source(s) (Refs. 9, 10, 11). During the offsite reconnaissance an attempt was made to identify the possible source(s) of contamination. However, no disposal areas could be identified at the facilities where drive-by reconnaissances were conducted (Ref. 8).

The Union Carbide facility is located in the Triassic Basin of North Carolina. This basin is a fault-bounded trough filled with sediments totalling 10,000 feet or more in thickness (Ref. 12, p. 2). This series of interbedded siltstones, sandstones, and shales and associated soil overburden has very low porosity and permeability. Diabase dikes and sills intruded the sediments after deposition. Physical and thermal fracturing occurred, greatly increasing the permeability of the dikes and sills. Groundwater flow within the Triassic basin is predominantly in the more permeable diabase dikes and sills which intruded the Triassic formation (Ref. 12, p. 2).

The average yield of wells completed in the Triassic rocks of Durham County ranges from 0 to 1 gallon per minute (gpm). Wells that intercept diabase dikes or sills typically yield from 10 to 80 gpm (Ref. 12, p. 2). Regionally groundwater flow is in a southern direction (Refs. 13, 14, p. 11). Locally, the shallow water table is a subdued reflection of surface topography. The permeable diabase dikes act as conduits for groundwater movement, and may influence the local groundwater flow direction (Ref. 12, p. 3). Depth to groundwater is estimated to be 20 to 30 feet at Airco (Ref. 14, Plate 5).

The surface water runoff from the Union Carbide site would be directed topographically east into an intermittently flowing tributary of Stirrup Iron Creek. Stirrup Iron Creek is the closest annual downgradient stream to the facility and is located approximately 1,300 feet east of the site. The creek flows approximately 9.5 miles southeast and converges with Crabtree Creek, which flows west as part of the Neuse River drainage system. (Ref. 11). There are no drinking water intakes along this 15-mile pathway; however, Crabtree Creek is occasionally fished (Refs. 15, 16).

A target survey conducted by NUS personnel revealed that municipal water is available to most all residents within 4 miles of the site (Ref. 17). The municipal water supply for Durham County is drawn from two active surface water intakes located on the Flat River and on the Little River, both of which are north of Durham, North Carolina (Ref. 15).

A Durham County Department of Water representative stated that a few individual homeowners are not using the municipal water service, although it is available (Refs. 15, 17). A house count of the area identified approximately 89 homes within 3 miles of the facility that were utilizing private drinking wells (Refs. 11, 18). The nearest private well is approximately 4,500 feet northeast of the Union Carbide facility (Ref. 11).

Access to the plant property at the Union Carbide (Rhone-Poulenc) facility is unrestricted. The majority of the surrounding area is forested, yet highways, homes, and other industries are located nearby (Ref. 8). No schools or day-care centers were identified within one mile of the facility (Ref. 8). The nearest residence is located approximately 1,600 feet northeast of the facility (Ref. 11).

Based on the enclosures and the results of the previous investigations, it is recommended that no further remedial action be planned for this site. If you have any questions or concerns regarding this site, please contact me at NUS Corporation.

Very truly yours,

Eric Corbin

Eric Corbin
Project Manager

EC/kw

Enclosures (5)

cc: Robert Morris

Approved:

Greg Schank

REFERENCES

1. Mark D. Durway, Solid and Hazardous Waste Management Branch, Environmental Health Section. Correspondence with Denise Bland, NC3012 Project Officer; Air and Hazardous Materials Division. Re: Preliminary Assessment Reports.

2. Research Triangle Park Directory, 1988. Research Triangle Park Foundation. Re: Rhone-Poulenc Ag Company.

3. EPA Hazardous Waste Permit Application, 1981. Union Carbide Agricultural Products Company, Research Triangle Park, N.C.

4. Joseph M. Fallon, 1982. Union Carbide Agricultural Products Company, Inc. Correspondence with Heather Ford, EPA Region IV, RCRA Activities. Re: Application withdrawal.

5. Larry D. Perry, 1982. Solid and Hazardous Waste Management Branch. Memorandum to O.W. Strickland, Solid and Hazardous Waste Management Branch. Re: Interim status inspection.

6. O. W. Strickland, 1982. Solid and Hazardous Waste Management Branch. Correspondence with Ed Levy, Union Carbide Agricultural Products Company. Re: RCRA inspection.

7. Larry D. Perry, 1983. Solid and Hazardous Waste Management Branch. Memorandum to O. W. Strickland, Solid and Hazardous Waste Management Branch. Re: Annual RCRA inspection.

8. Eric S. Corbin, 1988. Field Logbook No. F4-1085, TDD No. F4-8809-13. Documentation of facility reconnaissance, Union Carbide Agricultural Products Company, Research Triangle Park, N.C.

9. Jeff Crane, EPA Region IV, telephone conversation with Eric Corbin, NUS Corporation, November 9, 1988. Subject: Current use status of a private well.

10. Jeff Crane, Environmental Engineer, Environmental Protection Agency, Region IV. Memorandum to Kurt Lucius, Chief Site Investigation and Support Branch. Subject: Preliminary Assessment, Research Triangle Park, North Carolina, September 2, 1988.

11. USGS 7.5 minute series Topographic Quadrangle Maps of North Carolina: Southeast, Durham 1973 (Photorevised 1981), Green Level 1973 (Photorevised 1981), Cary 1973 (Photorevised 1987), Southeast Durham 1973 (Photorevised 1981).

12. K. S. Caldwell, R. J. Owens, and G. F. Pinder, Soils and Materials Engineers, Inc., letter report to IBM Corporation, January 6, 1984. Subject: Site Groundwater Protection Plan.

13. Draft RCRA Facility Investigation Report, M-Area Investigation, IBM Corporation, Research Triangle Park, North Carolina, NCD041463761. Prepared by IBM Corporation, July 11, 1988.

14. James J. Cullen, Craig G. Robertson, Groundwater Sciences Corporation, Review and Analysis of Groundwater Data, M-Area Investigation, Prepared for IBM Corporation, Research Triangle Park, North Carolina, July 8, 1988.

15. Terry Roland, Director of Water Resources, Durham County Water Department, telephone conversation with Eric Corbin, NUS Corporation, November 7, 1988. Re: Sources of water for Durham County Water System.

16. Don Baker, North Carolina Wildlife Commission, telephone conversation with Eric Corbin, NUS Corporation, November 7, 1988. Re: Surface water use.

17. NUS Corporation, Field Logbook No. F4-8804-25. Documentation of facility reconnaissance, April 26-27, 1988.

18. E. Corbin, P. Henderson, Well inventory forms. Completed during area reconnaissance of the Union Carbide facility on October 13, 1988.

REFERENCE 1

Ronald H. Levine, M.D., M.P.H.
STATE HEALTH DIRECTOR

DIVISION OF HEALTH SERVICES
P.O. Box 2091
Raleigh, N.C. 27602-2091

Ms. Denise Bland
NC 3012 Project Officer
Air & Hazardous Materials Division
U.S. Environmental Protection Agency
345 Courtland Street, N.E.
Atlanta, Ga 30365

Re: Preliminary Assessment Reports
Transmittal Letter

Aberdeen Pesticides Twin Sites Aberdeen, Moore Co., N.C.	NC D980843346
Aberdeen Pesticides Fairway Six Site Aberdeen, Moore Co., N.C.	NC D980843403
Daugherty Chemical Co. Durham, Durham Co., NC	NC D080885551
David Starling Property Farmville, Pitt Co., NC	NC D003185311
Union Carbide Agric. Prod. Co. Research Triangle Park, Durham Co., NC	NC D980600274
Union Carbide Corp. Greenville, Pitt Co., NC	NC D003184249
Waste Industries Raleigh, Wake Co., NC	NC D065302267

Dear Denise:

Submitted herewith are final Preliminary Assessment reports for the subject sites.

Based on the N.C. RCRA 3012 Program Review of the available data, we have concluded the following:

Aberdeen Pesticides Twin Sites is situated upgradient from a public lake and recreation area and a Jaycees Lodge. Samples collected on-site indicated DDT levels as high as 11,700 ppm; other toxic compounds were also identified, but in lesser quantities. The area surrounding and including the site is expected to be developed into a recreation area in the future. Priority assigned is Medium.

Aberdeen Pesticides Fairway Six Site soil samples indicated DDT levels as high as 2200 ppm; other toxic compounds were also identified, but in lesser quantities. Because of rural location, the priority assigned is Low.

Daugherty Chemical Company has effectively eliminated 75 or so drums of illegally stored hazardous waste. Contaminated dirt remains on site. Priority assigned is Low.

David Starling Property is presently being monitored and evaluated by Union Carbide Corporation, which is responsible for on-site disposal of 10,000 gallons barium carbonate, barium chromate, and chromic acid in 1971. Presently, UCC indicates that the waste represents no environmental hazard to surface or ground-water resources outside the immediate disposal area. It is believed that with time the contaminants will migrate off-site to areas where there are drinking water wells. Priority assigned is Medium.

Union Carbide Agriculture Products Company commenced operation in 1980. They function primarily as a pesticide research and development facility, and not as a manufacturer. Status assigned is No Further Action.

Union Carbide Corporation, Greenville, generates waste paper impregnated with mercury at a rate of less than 1000 kg/month. UCC officials indicate no history of on-site releases of hazardous substances. Status assigned is No Further Action.

Waste Industries is a transporter with no history of on-site releases of hazardous substances. Status assigned is No Further Action.

If further information is required, contact me at 919/733-2178.

Sincerely,

D. Mark Durway

D. Mark Durway, Geologist
Solid & Hazardous Waste Management Branch
Environmental Health Section

DMD/lw/1711A

DIRECTORY

REFERENCE 2

Research
Triangle
Park

1988

Research Triangle Park is the largest research park in the United States. Established in 1959, the Park covers 6,700 acres and is approximately eight miles long and two miles wide. Over 30,000 people work in the Park for more than 50 corporations and institutions.

The Park is within 15 minutes of three doctoral research universities—N.C. State University in Raleigh, University of North Carolina at Chapel Hill, and Duke University in Durham—with 55,000 students.

The non-profit Research Triangle Foundation administers the Park, including requirements for attractive and protective use of land.

The Foundation has begun development of a 2,700-acre section in the Park that includes 40 heavily wooded sites ranging from eight to 180 acres.

Just five miles from the Park is Raleigh-Durham Airport, which has over 300 departures each day and is an East Coast hub.

Interstate 40 links the Park with surrounding cities, as does toll-free telephone service.

For additional details: Research Triangle Park Foundation
2 Hanes Drive
P.O. Box 12255
Research Triangle Park, N.C. 27709

Phone: 919-549-8181

The mailing address for all Park listings, unless otherwise noted, is Research Triangle Park, NC 27709.

Information in this directory is compiled from data submitted by organizations within the Park's boundaries. Every effort is made to ensure accuracy, but RTP cannot guarantee that all resident organizations and personnel listings are correct.

Research Triangle Park

1988

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Principal activities: Provides contract research—areas of capabilities span the physical, life and social sciences, including survey research, behavioral studies, chemistry, energy and environmental research, population, education, health systems, economics, statistics, state planning, engineering, technology applications, toxicology and toxic wastes. Clients include federal, state, and local government agencies, foundations, and private industry.

Corporate affiliation: Non-profit corporation created and incorporated by UNC, Duke, and N.C. State Universities, but operated under separate management and board of governors. Maintains close working ties with each of the universities.

Address: 3040 Cornwallis Road
P.O. Box 12194

Phone: 919-541-6000

RHÔNE-POULENC AG COMPANY

President & CEO . . . . . Thomas M. Dille
Director, Human Resources . . . . . F.A. Sefcovic
Purchasing Manager . . . . . G.S. Brown

Total employees: 485
Year established in Park: 1981 as Union Carbide Agricultural Products Co., Inc. Acquired by Rhone-Poulenc AG Co. in 1987.

Principal activities: Conducts research and development, engineering and marketing of agricultural products, including insecticides, herbicides, and plant growth regulators.

Corporate affiliation: Rhone-Poulenc Inc.
Monmouth Junction, NJ
Rhone-Poulenc Agrochimie
Lyon, France

Address: 2 T.W. Alexander Drive
P.O. Box 12014

Phone: 919-549-2000

SUMITOMO ELECTRIC RESEARCH TRIANGLE, INC.

President & Chairman . . . . . Noritaka Kurauchi
Senior Vice President . . . . . Kimio Tomo
Senior Vice President
Sales/Marketing . . . . . Robert J. Swirbul
Treasurer . . . . . Nobuo Makino
Senior Vice President
Production & Engineering . . . . . Yuichi Toda
Vice President Sales/Marketing . . . . Larry S. Corsello
Manager, Human Resources . . . . . Royce H. Davis
Purchasing Manager . . . . . Dennis M. Brown

Total employees: 300
Year established in Park: 1983

Principal activities: Conducts research and development and production of optical fiber and cable and related products.

Corporate affiliation: Sumitomo Electric Industries, Ltd.
Osaka, Japan
Sumitomo Electric USA, Inc.
New York, NY

Address: 78 T.W. Alexander Drive
P.O. Box 13445

Phone: 919-541-8100

TROXLER ELECTRONIC LABORATORIES INC.

President . . . . . William F. Troxler
Executive Vice President . . . . . William F. Troxler, Jr.
Vice President of
Administration . . . . . Suzanne Troxler Babcock
Buyer . . . . . D. Tim McFarland
Personnel Manager . . . . . George R. Propst

Total employees: 110
Year established in Park: 1974

Principal activities: Develops instruments and systems for measuring physical properties and characteristics of engineering materials through the use of radioactive isotopes, and manufacturing and distribution of these devices throughout the world. Also conducts research in the use of radiation for commercial and industrial application.

Related facilities: Sales and service offices in Bothell, WA; Lake Villa, IL; Denver, CO; Nashville, TN; Arlington, TX; Sacramento, CA; and Danbury, CT. European office in Munich, West Germany

Address: 3008 Cornwallis Road
P.O. Box 12057

Phone: 919-549-8661

UAI TECHNOLOGY, INC.

President . . . . . Dr. Steven F. Maier
Personnel Manager and
Purchasing . . . . . Mark E. Friedman
Public Relations Manager . . . . . David Bochnovic
Corporate Relations . . . . . Mark E. Friedman

Total employees: 53
Year established in Park: 1985

Principal activities: Produces databases, as well as consulting services, to the financial industry—specialists in cash management, consulting and educational services.

Corporate affiliation: Additional offices in Chicago, IL and Charlotte, NC

Address: 68 T.W. Alexander Drive
P.O. Box 13628

Phone: 919-541-9339

UNDERWRITERS LABORATORIES, INC.

Vice President and Officer in Charge . . . . Al Bernardi
Personnel Manager . . . . . Steve Cohan

Total employees: 271
Year established in Park: 1986

Principal activities: Tests for public safety.

Corporate office: Northbrook, IL

Address: 12 Laboratory Drive
P.O. Box 13995

Phone: 919-549-1400

FORM 1 GENERAL

EPA

GENERAL INFORMATION

Consolidated Permits Program

(Read the "General Instructions" before starting.)

I. EPA I.D. NUMBER: F

LABEL ITEMS

I. EPA I.D. NUMBER

III. FACILITY NAME

V. FACILITY MAILING ADDRESS

VI. FACILITY LOCATION

REFERENCE 3

PLEASE PLACE LABEL IN THIS SPACE

GENERAL INSTRUCTIONS

If a preprinted label has been provided, it in the designated space. Review the inf ation carefully; if any of it is incorrect, through it and enter the correct data ir appropriate fill-in area below. Also, if ar the preprinted data is absent *(the area to left of the label space lists the inform. that should appear)*, please provide it ir proper fill-in area(s) below. If the lab complete and correct, you need not com Items I, III, V, and VI *(except VI-B w must be completed regardless)*. Complet items if no label has been provided. Ref the instructions for detailed item de: tions and for the legal authorizations u which this data is collected.

II. POLLUTANT CHARACTERISTICS

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

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

III. NAME OF FACILITY

1 SKIP UNION CARBIDE AGRICULTURAL PRODUCTS COMP

IV. FACILITY CONTACT

A. NAME & TITLE *(last, first, & title)*	B. PHONE *(area code & no.)*
2 LEVY EDGAR BLDG SERV MGR	919 549 2266

V. FACILITY MAILING ADDRESS

A. STREET OR P.O. BOX

3 PO BOX 12014

B. CITY OR TOWN	C. STATE	D. ZIP CODE
4 RESEARCH TRIANGLE PARK	NC	27709

VI. FACILITY LOCATION

A. STREET, ROUTE NO. OR OTHER SPECIFIC IDENTIFIER

5 T W ALEXANDER DR

B. COUNTY NAME

DURHAM

C. CITY OR TOWN	D. STATE	E. ZIP CODE	F. COUNTY CODE *(if known)*
6 RESEARCH TRIANGLE PARK	NC	27709	

CONTINUE ON REVE

CONTINUED FROM THE FRONT

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

A. FIRST	B. SECOND
2879 (specify) Pesticides and Agricultural Chemicals	(specify) NA
C. THIRD	**D. FOURTH**
(specify) NA	(specify) NA

VIII. OPERATOR INFORMATION

A. NAME: UNION CARBIDE AGRICULTURAL PRODUCTS COMP

B. Is the name listed in Item VIII-A also owner? [X] YES [ ] NO

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

P (specify) NA

D. PHONE (area code & no.): A 919 549 2000

E. STREET OR P.O. BOX: P O B O X 1 2 0 1 4

F. CITY OR TOWN: RESEARCH TRIANGLE PARK

G. STATE: N C

H. ZIP CODE: 27709

IX. INDIAN LAND

Is the facility located on Indian lands? [ ] YES [X] NO

X. EXISTING ENVIRONMENTAL PERMITS

A. NPDES (Discharges to Surface Water)	N A	**D. PSD** (Air Emissions from Proposed Sources)	N A
B. UIC (Underground Injection of Fluids)	N A	**E. OTHER** (specify)	N A (specify) NA
C. RCRA (Hazardous Wastes)	N A	**E. OTHER** (specify)	N A (specify) NA

XI. MAP

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

XII. NATURE OF BUSINESS (provide a brief description)

This location is the research, design and engineering center for Union Carbide Agricultural Products Company. New insecticide, herbicide and plant growth regulator products are developed in laboratory and greenhouse facilities.

XIII. CERTIFICATION (see instructions)

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

A. NAME & OFFICIAL TITLE (type or print)	B. SIGNATURE	C. DATE SIGNED
. M. Fallon Vice President, Operations	J. M. Fallon	7/2/81

COMMENTS FOR OFFICIAL USE ONLY

U.S. ENVIRONMENTAL PROTECTION AGENCY

HAZARDOUS WASTE PERMIT APPLICATION

Consolidated Permits Program

(Information is required under Section 3005 of RCRA.)

EPA

I. EPA I.D. NUMBER: F

OFFICIAL USE ONLY

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

II. FIRST OR REVISED APPLICATION

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

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

☐ 1. EXISTING FACILITY *(See instructions for definition of "existing" facility. Complete item below.)*

FOR EXISTING FACILITIES, PROVIDE THE DATE *(yr., mo., & day)* OPERATION BEGAN OR THE DATE CONSTRUCTION COMMENCED *(use the boxes to the left)*

C	YR.	MO.	DAY
S			

☒ 2. NEW FACILITY *(Complete item be*

FOR NEW FAC PROVIDE THE *(yr., mo., & day* TION BEGAN EXPECTED TO

YR.	MO.	DAY
8 1	1 0	0 1

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

☐ 1. FACILITY HAS INTERIM STATUS

☐ 2. FACILITY HAS A RCRA PERMIT

III. PROCESSES — CODES AND DESIGN CAPACITIES

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

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

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

PROCESS	PROCESS CODE	APPROPRIATE UNITS OF MEASURE FOR PROCESS DESIGN CAPACITY
Storage:		
CONTAINER *(barrel, drum, etc.)*	S01	GALLONS OR LITERS
TANK	S02	GALLONS OR LITERS
WASTE PILE	S03	CUBIC YARDS OR CUBIC METERS
SURFACE IMPOUNDMENT	S04	GALLONS OR LITERS
Disposal:		
INJECTION WELL	D79	GALLONS OR LITERS
LANDFILL	D80	ACRE-FEET *(the volume that would cover one acre to a depth of one foot)* OR HECTARE-METER
LAND APPLICATION	D81	ACRES OR HECTARES
OCEAN DISPOSAL	D82	GALLONS PER DAY OR LITERS PER DAY
SURFACE IMPOUNDMENT	D83	GALLONS OR LITERS

PROCESS	PROCESS CODE	APPROPRIATE UNIT MEASURE FOR PRO DESIGN CAPACIT
Treatment:		
TANK	T01	GALLONS PER DAY C LITERS PER DAY
SURFACE IMPOUNDMENT	T02	GALLONS PER DAY C LITERS PER DAY
INCINERATOR	T03	TONS PER HOUR OR METRIC TONS PER H GALLONS PER HOUR LITERS PER HOUR
OTHER *(Use for physical, chemical, thermal or biological treatment processes not occurring in tanks, surface impoundments or incinerators. Describe the processes in the space provided; Item III-C.)*	T04	GALLONS PER DAY C LITERS PER DAY

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

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

		T/A	C
C	DUP		1

LINE NUMBER	A. PROCESS CODE (from list above)	B. PROCESS DESIGN CAPACITY 1. AMOUNT (specify)	B. PROCESS DESIGN CAPACITY 2. UNIT OF MEASURE (enter code)	FOR OFFICIAL USE ONLY	LINE NUMBER	A. PROCESS CODE (from list above)	B. PROCESS DESIGN CAPACITY 1. AMOUNT	B. PROCESS DESIGN CAPACITY 2. UNIT OF MEASURE (enter code)
X-1	S 0 2	600	G		5			
X-2	T 0 3	20	E		6			
1	S 0 1	13,860	G		7			
2					8			
3					9			
4					10			

III. PROCESSES *(continued)*

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

NA

DESCRIPTION OF HAZARDOUS WASTES

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

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

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

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

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

D. PROCESSES

1. PROCESS CODES:
   For listed hazardous waste: For each listed hazardous waste entered in column A select the code*(s)* from the list of process codes contained in Item to indicate how the waste will be stored, treated, and/or disposed of at the facility.
   For non—listed hazardous wastes: For each characteristic or toxic contaminant entered in column A, select the code*(s)* from the list of process coc contained in Item III to indicate all the processes that will be used to store, treat, and/or dispose of all the non—listed hazardous wastes that posse that characteristic or toxic contaminant.
   Note: Four spaces are provided for entering process codes. If more are needed: (1) Enter the first three as described above; (2) Enter "000" in t extreme right box of Item IV-D(1); and (3) Enter in the space provided on page 4, the line number and the additional code*(s)*.
2. PROCESS DESCRIPTION: If a code is not listed for a process that will be used, describe the process in the space provided on the form.

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

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

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

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

Copy this page before completing if you have more than 26 wastes to list.

Form Approved OMB No. 158-S2000-4

I.D. NUMBER (enter from page 1): C 1

FOR OFFICIAL USE ONLY: S W DUP; T/N C 2 DUP

DESCRIPTION OF HAZARDOUS WASTES (continued)

LINE NO.	A. EPA HAZARD. WASTE NO (enter code)	B. ESTIMATED ANNUAL QUANTITY OF WASTE	C. UNIT OF MEASURE (enter code)	D. PROCESSES 1. PROCESS CODES (enter)	D. PROCESSES 2. PROCESS DESCRIPTION (if a code is not entered in D(1))
1	D001	42,000	P	S01	
2	D002	2,000	P	S01	
3					
4	F002	6,000	P	S01	
5	F003	72,000	P	S01	
6	F005	6,000	P	S01	
7					
8	P066	1,000	P	S01	
9	P070	2,000	P	S01	
10	P089	100	P	S01	
11					
12	U011	100	P	S01	
13	U019	200	P	S01	
14	U044	10	P	S01	
15	U056	2,000	P	S01	
16	U108	10	P	S01	
17	U165	100	P	S01	
18	U211	10	P	S01	
19	U232	100	P	S01	
20	U240	100	P	S01	
21					
22					
23					
24					
25					
26					

CONTINUE ON

Continued from the front.

IV. DESCRIPTION OF HAZARDOUS WAS[illegible] (continued)

E. USE THIS SPACE TO LIST ADDITIONAL PROCESS CODES FROM ITEM D(1) ON P[illegible] 3.

NA

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

S													T/N	C
F														6

V. FACILITY DRAWING

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

VI. PHOTOGRAPHS

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

VII. FACILITY GEOGRAPHIC LOCATION

LATITUDE *(degrees, minutes, & seconds)*	LONGITUDE *(degrees, minutes, & seconds)*
35 55 41 N	078 51 05 W

VIII. FACILITY OWNER

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

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

1. NAME OF FACILITY'S LEGAL OWNER	2. PHONE NO. *(area coc*
E	

3. STREET OR P.O. BOX	4. CITY OR TOWN	5. ST.	6. ZIP CODE
F	G		

IX. OWNER CERTIFICATION

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

A. NAME *(print or type)*	B. SIGNATURE	C. DATE SIGNED
J. M. Fallon	J. M. Fallon	7/2/81

X. OPERATOR CERTIFICATION

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

A. NAME *(print or type)*	B. SIGNATURE	C. DATE SIGNED

REFERENCE 4

URAL PRODUCTS COMPANY, INC.
OLD RIDGEBURY ROAD, DANBURY, CT. 06817

January 6, 1982

Ms. Heather Ford
EPA Region IV
RCRA Activities
345 Courtland, N.E.
Atlanta, Georgia 30308

Dear Ms. Ford:

On July 2, 1981, I sent you an application for a hazardous waste storage facility for Union Carbide Agricultural Products Company's new office and laboratories at the Research Triangle Park, North Carolina. At this time, I would like to withdraw this application.

Arrangements have been made to remove all hazardous waste from the site within 90 days or less. EPA Form 8700-12 is attached to notify you of this change to generator status only. We will, of course, meet all the requirements for a generator under 40 CFR part 262.

Very truly yours,

Joseph M. Fallon

JMF:jr
Encl

cc: Mr. Bill Mayer
North Carolina Department
of Human Resources
Bath Building
Raleigh, North Carolina 27611

RECEIVED
JAN 11 1982
SOLID WASTE MANAGEMENT BRANCH

REFERENCE 5

Ronald H. Levine, M.D., M.P.H.
STATE HEALTH DIRECTOR

DIVISION OF HEALTH SERVICES
P.O. Box 2091
Raleigh, N.C. 27602-2091

September 17, 1982

MEMORANDUM:

TO: O. W. Strickland, Head
Solid & Hazardous Waste Management Branch

FROM: Larry D. Perry, District Representative LDP
Solid & Hazardous Waste Management Branch

SUBJECT: Interim Status Inspection - Generator
Union Carbide Agri. Products Co.
Alexander Drive PO Box 12014
Research Triangle Park, NC 27709
EPA I.D. #NCD980600274
Contact: Ed Levy, Building Service Mgr.

An interim status inspection was made at Union Carbide Agri. Products Co. on August 25, 1982 to determine compliance with RCRA. There were no discrepancies observed at this site.

LDP:ns

INTERIM STATUS INSPECTION

1. Facility Information
   Union Carbide Agri Products Co. - Generator
   Alexander Drive
   Research Triangle Park, NC (Wake Co)
   EPA ID# NCD980600274

2. Responsible Official
   E. B. Shamlin, Waste Chemical Coordinator

3. Survey Participant
   Ed Levy, Building Service Manager
   Jack Fitzgerald, Environmental Manager for the Company
   Tony Hall, Waste Chemical Tech.
   Larry D. Perry, NC Hazardous Waste Management Branch

4. Date of Inspection
   August 25, 1982

5. Applicable Regulations
   40 CFR Parts 262 & 265, FR May 19, 1980 and amendments

6. Purpose of Survey
   An RCRA Interim Status compliance inspection was conducted at the Union Carbide facility by the NC Hazardous Waste Management Branch. The scope of the inspection was comprehensive including a site survey and record review. Regulatory requirements covered those contained in 40 CFR Parts 262 and 265 Generator Standards including containers.

7. Facility Description
   The Union Carbide facility is located off Alexander Drive in the Research Triangle Park. The facility is involved primarily in pesticide development and research. The waste generated is primarily solvents and related lab waste. This includes acids, bases, non-halogeneted solvents, solid-contaminated lab waste (glassware, towels, etc.) and some pesticide material. In checking the manifest and records, the waste generated to date could be categorized as the following: D002, F002, F003, and F005.

   To date three manifested shipments of waste had been shipped for disposal. All of this waste had been shipped to the Chemical Waste Management site in Emile, AL. All of the manifest were in proper order. The accumulation log also was in proper order. All material including solvents is disposed of at present. The prospect of solvent recovery is being considered for future purposes. All material is manifested within 90 days of accumulation start date. (The storage area is of excellent design and could easily comply with storage regulations, but the facility has chosen to keep material moving every 90 days.)

   TREATER ?

   The overall observation of the facility is considered excellent by this inspector.

8. <u>Site Deficiencies</u>

No discrepancies observed. All applicable RCRA regulation requirements are in full compliance.

IN[illegible]CTION FORM FOR INTERIM STATUS [illegible]ANDARDS FOR OWNER/OPERATOR OF HAZARDOUS WASTE MANAGEMENT FACILITIES

Union Carbide Agri. Pro. Co. — Name of Site
NCD 986600274 — EPA I.D.
Durham — County

Research Tri. Park — Location
Ernest B. Hamlin — Signature of Facility Contact

6-24-82 — Date
Larry D. Perry — Signature of Inspe~~ctor~~(s)

INSTRUCTIONS: Place a check to indicate Compliance (C), NonCompliance (NC) or Not Applicable (NA). Cite specific violation by Section No.

	C	NC	NA	Violation(s)
1. GENERAL	✓			
2. GENERAL FACILITY STANDARDS	✓			
3. PREPAREDNESS AND PREVENTION	✓			
4. CONTINGENCY PLAN AND EMERGENCY PROCEDURES	✓			
5. MANIFEST SYSTEM, RECORDKEEPING, AND REPORTING	✓			
6. GROUND-WATER MONITORING			✓	
7. CLOSURE AND POST-CLOSURE			✓	
8. FINANCIAL REQUIREMENTS			✓	
9. USE AND MANAGEMENT OF CONTAINERS	✓		✓	
10. TANKS			✓	
11. SURFACE IMPOUNDMENTS			✓	
12. WASTE PILES			✓	
13. LAND TREATMENT			✓	
14. LANDFILLS			✓	
15. INCINERATORS			✓	
16. THERMAL TREATMENT			✓	
17. CHEMICAL, PHYSICAL, AND BIOLOGICAL TREATMENT			✓	
18. UNDERGROUND INJECTION			✓	

	YES	NO
Imminent haz[illegible]d	( )	(✓)

DHS Form 3010 (7-81)
SOLID & HAZARDOUS WASTE

To full [illegible] on this date

REFERENCE 6

ıald H. Levine, M.D., M.P.H.
STATE HEALTH DIRECTOR

DIVISION OF HEALTH SERVICES
P.O. Box 2091
Raleigh, N.C. 27602-2091

ENTERED
SEP 30 1982

September 27, 1982

Mr. Ed Levy
Union Carbide Agri.
Products Company
P.O. Box 12014
Research Triangle Park, NC 27709

NCD980600274

Dear Mr. Levy:

On August 25, 1982 Mr. Larry Perry of the Solid and Hazardous Waste Management Branch conducted a RCRA inspection of your facility. You were found to be in compliance with the standards.

This office wishes to thank you for your cooperation and please do not hesitate to contact us if we may be of future assistance.

Sincerely,

O. W. Strickland, Head
Solid & Hazardous Waste Management Branch
Environmental Health Section

OWS:nlc

cc: Mr. Larry Perry

LOGGED TO E.P.A.
OCT 1 1982

REFERENCE 7

9/21/83

Ronald H. Levine, M.D., M.P.H.
STATE HEALTH DIRECTOR

DIVISION OF HEALTH SERVICES
P.O. Box 2091
Raleigh, N.C. 27602-2091

September 16, 1983

MEMORANDUM

TO: O. W. Strickland, Head
Solid & Hazardous Waste Management Branch

FROM: LDP Larry D. Perry, Waste Management Specialist
Solid & Hazardous Waste Management Branch

SUBJECT: Annual RCRA Inspection - Generator
Union Carbide Agricultural Products Co., Inc.
P.O. Box 12014
Research Triangle Park, N. C. 27709
NCD980600274
Contact - Ernest B. Shamlin, Supervisor Stores & Services

On September 13, 1983, an annual RCRA inspection was made at the Union Carbide facility. On this date, the facility was found to be in overall satisfactory compliance. Only one deficiency was found, that being:

265.16 - Need documentation of personnel training of Greg Christmas.

A compliance date of September 30, 1983, was agreed upon.

LDP:ct
Attachments

RCRA INSPECTION FORM

1. Union Carbide Agricultural Products Co., Inc.
   P.O. Box 12014
   T. W. Alexander Drive
   Research Triangle Park, NC 27709
   NCD980600274

2. Ernest B. Shamlin, Supervisor Stores & Services

3. Tony Hall, Waste Chemical Technician
   Steve Phibbs, Solid & Hazardous Waste Management Branch
   Larry D. Perry, Solid & Hazardous Waste Management Branch

4. September 13, 1983

5. No Change

6. No Change

7. No Change

8. 265.16 - Need documentation of personnel training on Greg Christmas

9. Compliance date of September 30, 1983, agreed upon.

RCRA INSPECTION FORM

1

Union Carbide Agri. Products Co. NCD 980 600 274 Durham
Name of Site EPA I.D. County

Res. Tri. Park 9-13-83 L Perry
Location Inspection Date Signature of Inspector(s)

9-30-83 Ernest B. Shamlin
Compliance Date Document by letter Signature of Facility Contact

INSTRUCTIONS: Place a check to indicate Compliance (C), NonCompliance (NC) or Not Applicable (NA). Cite specific violation by Section No.

GENERATOR STANDARDS (262.00)	C	NC	NA	Violation(s)
1. GENERAL (.10-.12)				
2. THE MANIFEST (.20-.23)	✓			
3. PRE-TRANSPORT REQUIREMENTS (.30-.34)	✓			
4. RECORDKEEPING/REPORTING (.40-.43)	✓			
5. SPECIAL CONDITIONS (.50-.51)				
TRANSPORTER STANDARDS (263.00)				
1. GENERAL (.11-.12)				
2. MANIFEST/RECORDKEEPING (.20-.22)				
3. HAZARDOUS WASTE DISCHARGES (.30-.31)				
TSDF STANDARDS (265.00)				
1. GENERAL (.1-.4)			✓	
2. GENERAL FACILITY STANDARDS (.10-.17)		✓		(265.16)
3. PREPAREDNESS AND PREVENTION (.30-.37)	✓			
4. CONTINGENCY PLAN AND EMERGENCY PROCEDURES (.50-.56)	✓			
5. MANIFEST SYSTEM, RECORDKEEPING, AND REPORTING (.70-.77)	✓			
6. GROUND-WATER MONITORING (.90-.94)			✓	
7. CLOSURE AND POST-CLOSURE (.110-.120)			✓	
8. FINANCIAL REQUIREMENTS (.140-.145)			✓	
9. USE AND MANAGEMENT OF CONTAINERS (.170-.177)	✓			
10. TANKS (.190-.199)			✓	
11. SURFACE IMPOUNDMENTS (.220-.230)			✓	
12. WASTE PILES (.250-.257)			✓	
13. LAND TREATMENT (.270-.282)			✓	
14. LANDFILLS (.300-.315)			✓	
15. INCINERATORS (.340-.351)			✓	
16. THERMAL TREATMENT (.370-.382)			✓	
17. CHEM., PHYS./BIO. TREATMENT (.400-.406)			✓	
18. UNDERGROUND INJECTION (.430)			✓	

RCRA STATUS

GENERATOR ☒ TRANSPORTER ☐ TREATER ☐ STORER ☐ DISPOSER ☐

IMMINENT HAZARD: YES ☐ NO ☒

DHS Form 3010 (Rev. 12-82)
SOLID & HAZARDOUS WASTE

Facility in very satisfactory level of compliance

The below instructions are applicable to Interim Status Inspection Forms Numbers 3014(7-81)

Purpose: To provide information on the compliance status of facilities handling hazardous waste. A written summary will be developed from this data and forwarded to the facility.

Preparation: A field inspector will prepare one copy of the appropriate inspection form(s) on each facility to be inspected. Information regarding county, name, address, and E.P.A. I.D. number may be completed prior to the site visit.

Distribution: The field inspector should write a written summary and forward it to the below address within one week after the site visit.

Mailing:

Mr. O. W. Strickland, Head
Solid & Hazardous Waste Management Branch
Environmental Health Section
Department of Human Resources
P.O. Box 2091
Raleigh, North Carolina 27602

Retention: It is recommended that the inspection report be retained as a part of a facilities permanent record.

Additional forms may be ordered from:

Solid and Hazardous Waste Management Branch
Environmental Health Section
Department of Human Resources
P.O. Box 2091
Raleigh, North Carolina 27602

REFERENCE 8

[illegible]

[illegible]

[illegible]

Eric Corbin - Project Manager

LOGBOOK REQUIREMENTS
REVISED - JANUARY 6, 1988

NOTE: ALL LANGUAGE SHOULD BE FACTUAL AND OBJECTIVE

1. Record on front cover of the Logbook:

   TDD No., Site Name, Site Location, Project Manager

2. All entries are made using ink.
3. Provide statement referencing Equipment Location Log.
4. Statement of Work Plan, Study Plan, and Safety Plan discussion and distribution to field team with team member signatures.
5. Sign and date each page. Project Manager is to review and sign off on each logbook daily.
6. A single line is drawn through error. Each correction is dated/initialed.
7. Report weather conditions. Provide general site description and remarks.
8. Document all changes from project planning documents.
9. Provide a site sketch with sample locations.
10. Document all calibration and pre-operational checks of equipment.
11. Provide reference to Sampling Field Sheets for detailed sampling informaiton.
12. Maintain photo log by completing the stamped information at the end of the logbook.
13. If no site representative is on hand to accept the receipt for samples an entry to that effect must be placed in the logbook.

					01

10/12/88

0700 Weather forecast calls for many areas with highs in the low to mid 70s

1000 Meet at Airport to leave for Raleigh-Durham N.C.

1150 Arrive in Raleigh-Durham N.C.

1300 Arrive at State office to make copies of site files.

1500 Arrive at the Research Triangle Park area to conduct private well inventories. EJC

1530 Interviewed Mr. Jim Rich who stated EJC lives on Miami Blvd. and he stated that he has a private well and the resident beside him, Mrs. Davis also has a private well.

1545 Travelled to the Core residence and interviewed Mr. Core's daughter however she was unable to tell us the depth of the well or whether they were still using it or not.

EJC
~~1600~~-
1700 Attempted to interview other residents in the vicinity of the Core residence to confirm whether or not they were using private wells, however we were unable to speak with them because they were not at home. Only two private wells were identified today. Returned to motel 03

C.2 10/12/88 E.J. Corbin

10/12/88 EJ Corbin

0700 Wind from present Calif. for sunny skies with highs in the low to mid 60's. Robert Morris of EPA has joined the reconnaissance along with Unidine Johnson of EPA.

0900 Travel to Water Dept. in Durham to obtain copies of the water distribution line maps from Mr. Billy Walker. He showed us the locations of the surface water intakes and gave us copies of the water distribution line maps and we traced their locations on our topo map. The billing dept. was contacted and we found that 51,000 active accounts exist for this

4 10/13/88 E J Carlin

system.

1100 Arrive at the site. According to a pamphlet produced by the Research Triangle Foundation, Union Carbide was acquired in 1987 by Rhone Poulenc Ag Company. This is the ~~first time which~~ E.C. name on the entrance sign to the facility which is Rhone-Poulenc. The facility consists of one large building. ~~Some of~~ A drum storage area was noticed in the back of the facility. No signs of poor housekeeping were noticed. No spills, improper discharges or disposal areas could be identified. Most of the rear of the facility was accessible by a main drive. The nearest identified

10/13/88 E J Carlin 05

well to the facility is the David Well. However, the Core well may be closer and should be confirmed.

1140 - Travel to Airco Industrial Gases

1300 Break for lunch.

See the Burroughs Welcome logbook for information concerning the remainder of the reconnaissance.

It should be mentioned that the Union Carbide facility was unfenced. Access is most easily available through a main entrance to the facility up the main entrance drive. No fences surrounding the facility were identified. The ares surrounding the facility was forested, yet homes + various industries can be found in the near vicinity. No schools or day-care centers could be located near the site.

REFERENCE 9

NUS CORPORATION AND SUBSIDIARIES — **TELECON NOTE**

CONTROL NO:	DATE: 11/9/88	TIME: 1244

DISTRIBUTION:

BETWEEN: Jeff Crane	OF: EPA	PHONE: 347-5065 (404) ~~338-77~~

AND: Eric Corlin, NUS Corp.

DISCUSSION:

I asked Jeff if Mr. Jasper Core who's well had been found to be contaminated, if he had converted over to city water or was he still using the well. He stated that to his best knowledge that Mr. Core had converted over to city water.

Eric Corlin 11/9/88.

ACTION ITEMS:

NUS 067 REVISED 0685

Enclosure for 9/2/88 memo.

REFERENCE 10

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

REGION IV

345 COURTLAND STREET
ATLANTA, GEORGIA 30365

MEMORANDUM AUG 1 1988

SUBJECT: Preliminary Assessment
Research Triangle Park, North Carolina

FROM: Jeff Crane, Environmental Engineer
NC/SC Unit
Waste Engineering Section

TO: Kurt Lucius, Chief
Site Investigation and Support Branch

THRU: John Dickinson, Chief
NC/SC Unit
Waste Engineering Section

The Waste Engineering Section (WES) is currently investigating a contaminant plume that appears to be emanating from an industrial area of Research Triangle Park, North Carolina. As shown in the attached Figure 1, the groundwater contamination was discovered along the north side of International Business Machines (IBM) property (M-Area), near the corner of Alexander Drive (SR 2028) and Miami Boulevard (SR 1959). IBM is currently undergoing remediation of a contaminant plume of similar constituents at the main area of their plant site. A recent investigation indicates that the groundwater contamination found in the M-Area is up-gradient to IBM's main plant area contaminant plume, and that the M-Area is down-gradient to an industrial area north of Alexander Drive. The industrial facilities up-gradient to the M-Area are currently not regulated under RCRA.

Private residences are located on Miami Boulevard north of the Alexander Drive intersection. Seven of these residences remain on private wells and have not chosen to connect with the available City of Durham Water System. These seven residential wells were tested and all, except one, were clean. Mr. Jasper Core's drinking water well , located approximately 400 feet north of the Alexander Drive, Miami Boulevard intersection, is contaminated with the same constituents found at the IBM M-Area. Mr. Core's well currently shows higher contaminant levels than detected in the M-Area. The constituents detected in Mr. Core's well include 1,1-Dichloroethylene, 1,1-Dichloroethane, (Cis) 1,2-Dichloroethylene, Chloroform, 1,1,1-Trichloroethane, 1,2-Dichloroethane, 1,1,2-Trichloroethane, Tetrachloroethene. The hazardous constituent with the highest concentration in Mr. Core's well was 1,1,1Trichloroethane, at 286 ppb. This concentration exceeds the Final MCL of 200 ppb, promulagated in the July 8, 1987, Federal Register.

The WES is currently working with IBM and the North Carolina Department of Human Resources (NCDHR) in continuing to evaluate the M-Area of IBM and in assessing the potential for hazardous constituents having been released from any of the industrial facilities adjacent to the M-Area.

If you have any information on sites adjacent to the IBM facility or would like to discuss the potential need for performing a Preliminary Assessment in this area, please contact me at x3433.

Attachment
cc [illegible]
cc: William Hamner, NCDHR

■ - Private Well @ 150' North of location shown (Can Well)

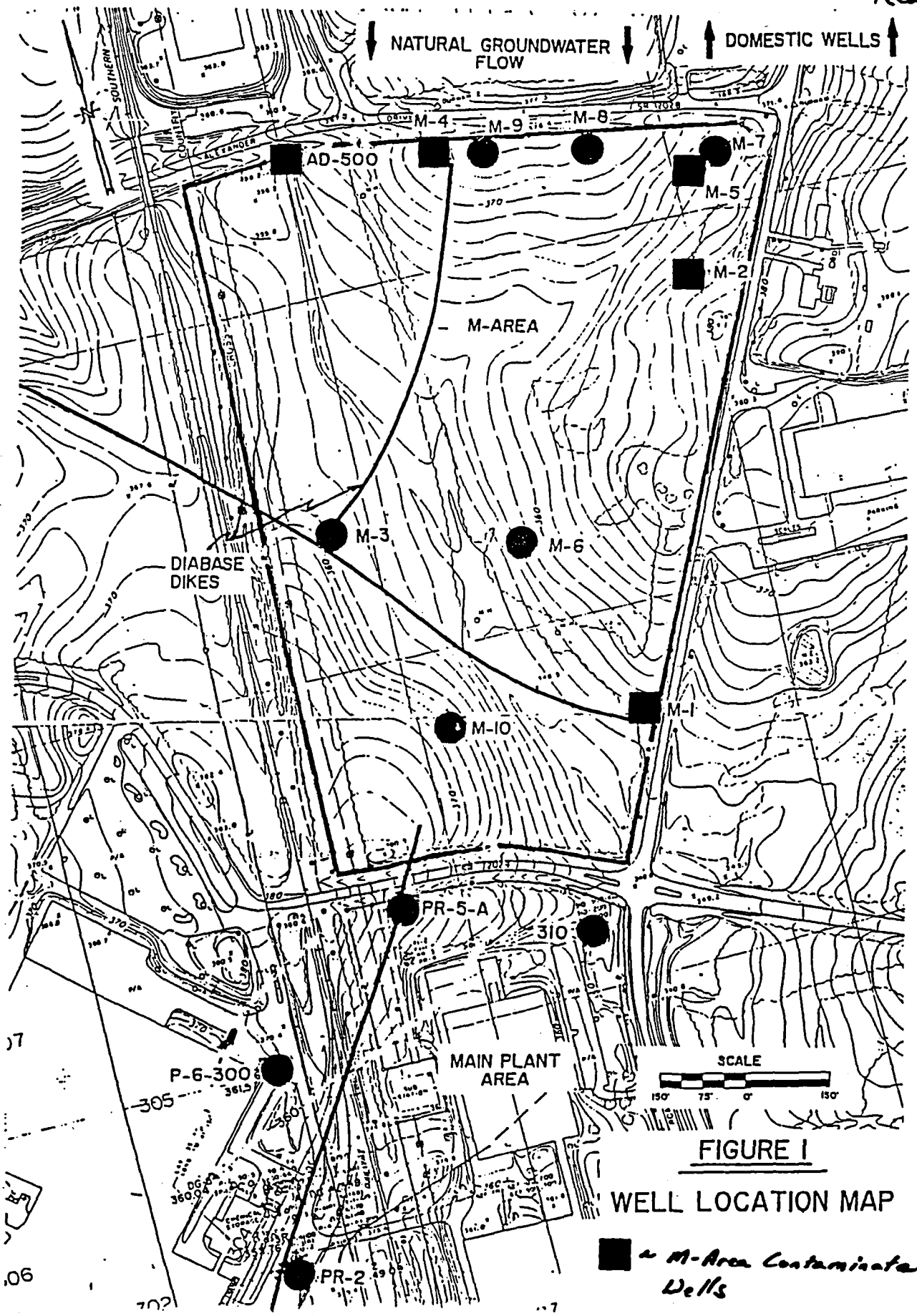
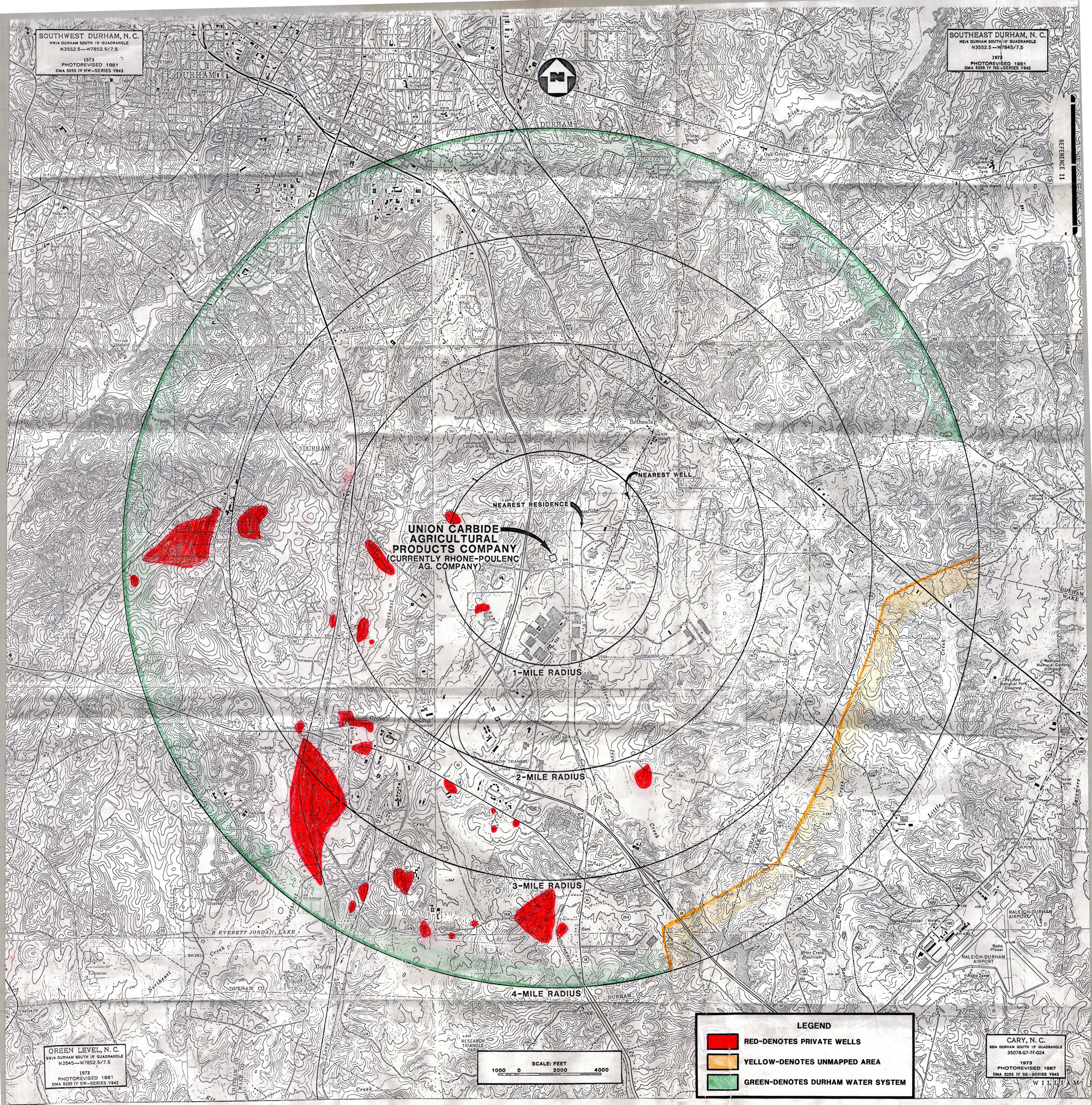


FIGURE I

WELL LOCATION MAP

■ - M-Area Contaminated Wells


SOUTHWEST DURHAM, N. C.
NW/4 DURHAM SOUTH 15' QUADRANGLE
N3552.5—W7852.5/7.5
1973
PHOTOREVISED 1981
DMA 5255 IV NW—SERIES V842
SOUTHEAST DURHAM, N. C.
NE/4 DURHAM SOUTH 15' QUADRANGLE
N3552.5—W7845/7.5
1973
PHOTOREVISED 1981
DMA 5255 IV NE—SERIES V842
REFERENCE 11
NEAREST WELL
NEAREST RESIDENCE
UNION CARBIDE AGRICULTURAL PRODUCTS COMPANY (CURRENTLY RHONE-POULENC AG. COMPANY)
1-MILE RADIUS
2-MILE RADIUS
3-MILE RADIUS
4-MILE RADIUS
LEGEND
RED-DENOTES PRIVATE WELLS
YELLOW-DENOTES UNMAPPED AREA
GREEN-DENOTES DURHAM WATER SYSTEM
SCALE: FEET
1000 0 2000 4000
GREEN LEVEL, N. C.
SW/4 DURHAM SOUTH 15' QUADRANGLE
N3545—W7852.5/7.5
1973
PHOTOREVISED 1981
DMA 5255 IV SW—SERIES V842
CARY, N. C.
SE/4 DURHAM SOUTH 15' QUADRANGLE
35078-G7-TF-024
1973
PHOTOREVISED 1987
DMA 5255 IV SE—SERIES V842

REFERENCE 12

SOIL & MATERIAL ENGINEERS INC. ENGINEERING-TESTING-INSPECTIO

3109 Spring Forest Road, Box 58069, Raleigh, NC 27658-8069, Phone (919) 872-2660

January 6, 1984

IBM Corporation
Post Office Box 12195
Dept. 559/002
Research Triangle Park, N. C. 27709

Reference: December 1983 Summary
Site Groundwater Protection Plan

Gentlemen:

As requested Soil and Material Engineers, Inc. has summarized the Groundwater Remedial Program at the IBM, Research Triangle Park Facility. The following paragraphs and enclosed figures briefly describe the site investigations, site hydrogeology and the ongoing remedial scheme.

PROBLEM DEFINITION

Subsequent to the installation of several underground steel storage tanks, a tank testing program was implemented by IBM. This program revealed that two 5000 gallon tanks containing 1,1,1 trichloroethane adjacent to building 304 were leaking. After detecting the leaks, the tanks and adjacent soils were removed and disposed of. The soils and tanks were transported by Chemical Waste Management to the hazardous waste landfill at Emelle, Alabama. A total of 435 tons of soil was disposed of in this fashion.

Replacement tanks were installed in two new underground concrete vaults. These vaults are equipped with an underdrain system which can be pumped to recover any and all accidently spilled chemicals and groundwater in close proximity to the vaults. This vault/sump is a fail safe system to prevent accidentally discharged chemicals from entering the groundwater and acts as a localized recovery system in the immediate area of the detected leak(s).

PROJECT INVESTIGATIONS

A comprehensive investigation was initiated to assess the potential impact related to the release of 1,1,1-trichloroethane within the subsurface environments of the IBM Facility, and to recommend remedial measures and a long term monitoring program once the magnitude and extent of the problem was defined. As part of the overall program various staged field investigations were implemented including: soil and rock tests, installation of deep and shallow monitoring wells, groundwater level monitoring, groundwater quality analyses, soil and rock permeability tests, aquifer pumping tests,

geophysical surveys, down-hole geophysical logging, and subsurface fracturing. Data obtained from the ongoing field investigations has been assimilated to define the hydrogeologic characteristics of the site.

SITE HYDROGEOLOGY

The IBM site is located in the Durham sub-basin of the Durham-Wadesboro Triassic Basin. The Durham Triassic Basin is a fault-bounded trough in which continental sediments were deposited between 180 and 230 million years ago. Subsequent consolidation resulted in interbedded siltstones, sandstones, and shales which are the primary rock types of this formation. The thickness of the Triassic Basin in the area of this site is on the order of 10,000 feet. The native rock formation and native soil overburden have very low porosity and permeability. Subsequent to deposition diabase dikes and sills were intruded into the Triassic formation resulting in physical and thermal fracturing. Groundwater flow within the Triassic is predominantly in the more permeable dike and sills and through the base formation as fractured media flow.

Although gross lithologies of sediments are similar on the IBM site and in the Durham basin, the strata change rapidly in thickness and texture both vertically and laterally. The only stratum which appears to be continuous over a relatively large area is a black carboniferous shale bed which was observed in the vicinity of buildings 304, 310, and 627. Some of the diabase dikes can be mapped over long distances while some are more isolated.

Geophysical methods were used to trace a long diabase dike and several short diabase dikes across the site. The dikes and sills are composed of dark grey, fractured, fine-grained diabase; often the fractures are healed with calcite. The dikes appear roughly vertical and are approximately 2-8 feet wide near the ground surface. Unlike some dikes intruded during this time, which act as groundwater barriers, the fractured dikes on the IBM site are associated with more groundwater than is normally found in the Triassic formations. The average yield of wells in the Triassic rocks in Durham County is very low (0 to 1 gal per minute) while wells completed in a diabase dike have produced from approximately 10 to 80 gallons per minute (gpm). For example at this IBM facility, no significant drawdown was observed in Triassic wells only 200 feet from a diabase pumping well (PR-2) during a 24 hour pump test. This extremely weak response is assumed to be a result of the very low permeability of the Triassic deposits and the tortuous nature of fractured media flow, not the presence of some hydrologic barrier between the formations.

There is an exception to the above described phenomenon; the aforementioned shale strata is apparently hydraulically connected to the major northeast-southwest trending diabase dike. This is evidenced by the responses observed in the building 310 wells during a 24 hour pump test.

The groundwater table aquifer exists within the residual soil zone and is continuous to depth through interconnecting joints and bedding planes

within the weathered rock and the unweathered rock. The shallow water table aquifer is, over most of the site, a subdued reflection of the land surface. With greater depths, groundwater flow tends to be less related to the surface topography. Vertical gradients in the Triassic deposits are generally downward suggesting that portions of the IBM site are "recharge zones"; the quantity of recharge being limited by the relatively low permeabilities of the surface soils. Groundwater movement in the Triassic sediments, as measured in field permeability tests, appears to be relatively slow. Fractures in the geologic formations particularly the deeper materials are likely responsible for any significant groundwater movement. Groundwater travels a very circuitous route; traveling through fractures and along bedding planes. The diabase dikes apparently act locally as highly permeable groundwater conduits but do not significantly effecting regional groundwater flow.

MONITORING WELLS

Monitoring wells have been installed across the site to collect hydrogeological data and serve as groundwater sampling points. The 25 monitoring wells specified in the RCRA Groundwater Monitoring Plan (submitted to you September 25, 1981) range in depth from approximately 15 feet to approximately 300 feet. These wells are divided into two groups; an inner ring of wells and an outer ring of wells (see Figure 1). Because of the character of the site the monitoring network consists of wells which are down-gradient of the building 304 area.

The monitoring well network was designed by Dr. Eric Wood (Princeton University) utilizing a technique known as "kriging". This technique was used to statistically estimate the water table elevations for areas on the site where no actual data was available. After estimating the groundwater elevation at each point, groundwater flow vectors were computed. These vectors were used to determine the likely direction of chemical movement, and therefore, the necessary location of monitoring wells.

REMEDIAL SCHEME

The site groundwater investigation has confirmed the presence of 1,1,1-trichloroethane in the subsurface at several locations on the site. Site renovation is complicated by the fact that the site rests on a topographic high and groundwater flows from the site in several directions. Various remedial schemes have been considered and evaluated. In selecting a suitable strategy the low permeability of both the overburden and the bedrock, relative to the fracture zones, was given careful consideration.

It was demonstrated through field investigation that the large diabase dike east of building 304 was many times more permeable than the adjacent native formation. Several wells were installed in the diabase dike after much trial and error in locating the dikes. Submersible pumps were installed in wells P-6-300 and PR-2 which are completed in the

northeast-southwest trending dike. Well PR-2 is pumped continuously at a rate of approximately 10 to 15 gpm. The objectives of pumping this dike are threefold: 1) to draw the water level down in the dike creating a gradient or head differential forcing groundwater flow in the surrounding area towards the dike, and 2) to minimize or eliminate by altering the groundwater flow regime (forcing flow towards the dike), the potential for off-site movement of chemicals in the general area of building 304, 310, and 627, and 3) to remove chemicals for subsequent treatment and reclamation.

In addition to the pumping well, two concrete sumps are being pumped at building 304 to remove contaminated groundwater. To augment this sump system, a 48 inch diameter corrugated metal pipe was installed at building 304. Although the groundwater yield to these sumps is not expected to approach that of the pumping well in the dike, they are effectively removing high concentration contaminants at or near the source.

Recently, a sprinkling system was installed at building 304 in an effort to accelerate the flow of contaminant to the scavenger sumps and wells. Basically, this system is designed to increase the groundwater gradient towards the sumps and to flush contaminates from the unsaturated zone to the groundwater for removal by the sumps (this process would be done more slowly by rainfall-infiltration).

PROJECT STATUS

In summary, the ongoing remedial program is functioning as expected. As required by regulation the groundwater monitoring wells are monitored quarterly as per the aforementioned RCRA Groundwater Monitoring Plan at which time water levels are recorded and samples are taken for chemical analyses. Relatively high concentrations of 1,1,1-trichloroethane are still detected near building 304, but no significant concentrations have been detected at the wells comprising the inner and outer ring of monitoring wells (See Figure 3 and Table 1).

The typical vectors shown on Figure 2 illustrate the effect the remedial program has had on the groundwater flow regime. Groundwater flow vectors are plotted for May, 1981 (before pumping was initiated) and for November, 1983 (during pumping). Pumping has been essentially continuous since September, 1981. As shown, not only has the groundwater flow been reversed in the critical area around buildings 304, 310, and 627, but the gradients have been increased significantly. The vectors shown at building 310 were computed using two sets of wells; wells 627-100, PR-3, and 310-100, and wells 627-100, PR-3 and 310-shallow.

The data obtained from the monitoring program is periodically evaluated to assess the effectiveness of the current remedial program. Again, the remedial scheme is functioning as anticipated. To maintain this system, continued pumping of PR-2 and the sumps is planned. Additional remedial actions in the form of large diameter wells are being considered for the diabase dikes to enhance the clean-up program. These well(s) are planned for first quarter of 1984.

If you have any questions regarding the above summary, please contact us.

Very truly yours,

SOIL & MATERIAL ENGINEERS, INC.

Kevin S. Caldwell, P.E.

Robert J. Owens, P.E.
Executive Vice President

Dr. George F. Pinder
Consulting Hydrologist

KSC/RJO/GFP:bsp

REFERENCE 13

DRAFT RCRA FACILITY INVESTIGATION REPORT

M-AREA INVESTIGATION

IBM Corporation
Research Triangle Park, North Carolina
NCD 041 463 761

July 11, 1988

Prepared by
IBM Corporation
P. O. Box 12195, 559/002
Research Triangle Park, North Carolina

International Business Machines Corporation

P. O. Box 12195
Research Triangle Park, N.C. 27709

July 11, 1988

Mr. James H. Scarbrough
U.S. Environmental Protection Agency, Region IV
345 Courtland Street, N.E.
Atlanta, Georgia 30365

Reference: Draft RCRA Facility Investigation Report
Permit NCD 041 463 761-M1

Dear Mr. Scarbrough:

IBM has completed the RCRA Facility Investigation (RFI) of the undeveloped northeast quadrant of the plant site (M-Area). The Draft RFI Report has been prepared pursuant to the Federal Permit Condition II.D.3. and is enclosed for your review. The RFI Report shall be developed in final format within thirty days of receipt of EPA comments on this submission.

We would like to have the opportunity to discuss the findings of the M-Area investigation with your agency, the North Carolina Department of Human Resources and Division of Environmental Management, and the Durham County Environmental Health Department in a meeting planned for July 21, 1988 at 1 p.m. at our IBM, Research Triangle Park, North Carolina facility. Please let me know if you or someone in your agency can attend.

If you have any questions concerning this investigation report, please contact Jennifer Kelvington at (919) 543-3192.

Sincerely yours,

Fred Langenbach
Energy and Environmental
Engineering Manager

Enc:

cc: Mr. Ed Berry, NC DEM
Mr. Jeff Crane, US EPA
Ms. J. Kelvington, IBM
Mr. Rob McDaniel, NC DHR
Mr. William Meyer, NC DHR
Mr. Mike Moore, Durham County EHD

CERTIFICATION FOR: RCRA Permit No. NCD 041 463 761-M1
Draft RCRA Facility Investigation

I certify under penalty of law that this information was prepared under my direction or supervision in accordance with a system designed to assure qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

Richard D. Sampere

Date: 7/8/[illegible]

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I. BACKGROUND INFORMATION

The RCRA Permit NCD 041463761 M-1 issued by the U. S. EPA and the State of North Carolina to IBM Corporation in Research Triangle Park, North Carolina requires the complete assessment of all contaminant plumes potentially associated with a solid waste management unit (SWMU) at the permitted facility. At the time the permit became effective (October 25, 1988) the chemical plume in the northeast area (M-Area) of IBM's Research Triangle Park site had not been fully defined. The plume consists of chemicals similar to those associated with the historical release from SWMU No. 2 and to those found in a residential water supply well north of the area. Subsequently, IBM has been required to fully investigate the M-Area chemical plume through the implementation of an RCRA Facility Investigation (RFI) Workplan submitted to the U. S. EPA on February 25, 1988 with revisions on April 28, 1988.

Preliminary investigations of the M-Area in 1987 and early 1988 have included a pump test at well PR-5-B, a detailed magnetometer survey, and an evaluation of groundwater flow and chemistry conditions. These studies have shown the direction of groundwater flow is predominantly from the north (off-site) to the south (M-Site) and have not revealed a pathway for chemicals to migrate from the main site to the northern half of the M-Area. The absence of volatile organic compounds in observation wells located between the main site and the M-Area chemicals suggests separate plumes.

The principal examination of the M-Area occurred between April and June of 1988. The following report summarizes the action taken and data collected during this study as well as conclusions on groundwater and chemical flow in the M-Area based upon all information collected to date.

II. WORKPLAN IMPLEMENTATIONS

A. New Well Installations

Ten new observation wells were drilled in the M-Area at the onset of the investigation. They include AD-50, M-2-100, M-3-50, M-4-50, M-4-Dike, M-7-300, M-8-200, M-9-300, M-10-50, and M-10-300. Wilson Brothers Well Drilling installed the wells under the direction of S&ME using an air rotary rig from May 4 to May 16, 1988. A geologist from S&ME was present throughout the drilling operation to geologically log each well and to insure no contaminants were introduced to the wells. For decontamination purposes, the drill pipe and bit were steam cleaned before each well.

The geologic log for each new well is included in Appendix I. The boreholes were located in mostly siltstone and sandstone formations. A diabase dike was encountered in M-4-Dike and was probably just missed in M-10-50 and M-10-300. M-10-50 encountered a 5 foot shallow interval of diabase with no appreciable water. M-10-300 penetrated a thin interval of diabase around 80 feet below ground surface and yields an estimated 5 to 10 gallons per minute of water. Small lenses of formation oil were noted by the geologist in M-2-100, M-4-Dike, and M-9-300, however, no samples were collected to confirm the presence of a carbonaceous material.

A summary of the water bearing zones of the new M-Area wells is listed below. Typically, the better yielding water bearing zones are intervals of diabase, baked zones associated with the diabase intrusions, and sand units. No discrete water bearing zones were noted in AD-50, M-2-100, M-3-50, and M-10-50.

Monitoring Well	Zone Interval
M-4-50	22' - ?'
M-4-Dike	Diabase 12' - 93'; Sandy Zones 126'-132', 152'-156', 171'-175', 190'-193', 213'-216', 222'-224', 336'-238', 247'-249'
M-7-300	81'-88', 92'- ?', 173- ?'
M-8-200	83'-87', 112'-?'
M-9-300	140'-150', 219'- ?'
M-10-300	290'-292'

The geology of the wells is characteristic of the Durham Triassic Basin. The Triassic sedimentary rocks consist predominantly of silty sandstones and siltstones which commonly grade abruptly into each other vertically and laterally. The rock types vary greatly in lithology and thickness, thus making it difficult to trace stratigraphic units between wells. Dikes of dark igneous rock intruded into fractures in some of the Triassic sedimentary rocks. (Parker, 1979)

Three lithologic cross-sections were constructed from the new and existing monitoring wells in the M-Area. Two of the cross-sections run parallel to South Miami Boulevard and the third runs along Alexander Drive. The cross-sections as presented on Plates 1, 2, and 3 were drawn from the wells:

A-A'	B-B'	C-C'
310-500	PR-3	AD-500
M-1-300	PR-5-A	M-4-Dike
M-6-300	M-10-300	M-9-300
M-2-300	M-3	M-8-200
M-7-300	M-4-Dike	M-5-300
		M-7-300

As illustrated on cross-section C-C' (Plate 3), the soil and rock encountered changes from chiefly silt/siltstone to more sand/sandstones in the east to west direction along Alexander Drive. This change is consistent with the geologic study of the southeast and southwest 7.5 minutes quadrangles of the Durham Triassic Basin conducted by the Geological Survey Section of the North Carolina Department of Natural Resources and Community Development. (Hoffman and Gallagher, in preparation) The geologic map on display in the Geological Survey Office shows the formation generally changes along the portion of Alexander Drive between Southern Railroad and S. Miami Boulevard from a predominate sandstone unit to a predominate siltstone unit. The sandstone unit encompasses the northwest section of the M-Area where both M-4 and AD series wells are located and lies to the north of the M-5, M-7, M-8, and M-9 series wells.

No dikes or sills were encountered during the drilling of wells M-7-300, M-8-200, and M-9-300. However, the previous magnetic survey conducted by S&ME on April 4 and 5, 1988 did indicate the presence of diabase near M-8-200 and M-9-300. The geological map prepared by Hoffman and Gallagher does not show the existence of any dikes in this area or in the area immediately north of the site. The U. S. Geological Survey aeromagnetic anomaly map also does not indicate the presence of any dikes in either area (U.S.G.S., 1974). Both maps were, however, able to interpret the presence of the major dikes at the IBM facility.

B. Continuous Water Level Monitoring

A continuous water level monitor was setup on well M-1-300 to observe possible hydraulic interconnections to other wells which may be revealed during the drilling process. A significant drop in water elevation was observed in well M-1-300 during the drilling of the M-10 wells. The installation of the remaining eight wells had no effect on M-1-300.

C. Borehole Geophysical Study

To supplement geologic logging, a borehole geophysical study using the natural gamma ray log was conducted immediately after drilling. The gamma logs are included in Appendix I with the geologic logs. The natural gamma tool is a good method of lithologic determination, especially in defining diabase intervals.

The natural gamma method determines the approximate amount of gamma radiation within a formation caused by unstable isotopes within the rocks mineral constituents. In general, unstable isotopes within the formations in the studied area are potassium and carbon. These two elements are often found in the mineralogies of clays which are present in the sediments of the Triassic Basin. Clay is present in local silts and sands in varying amounts. The diabase dikes are unique to this log, as a low radiation mass. The dikes mineralogy consisting mainly of magnetite, hornblende, and plagioclase feldspar is relatively free of unstable isotopes. Therefore, extremely little gamma radiation is released from this rock type. Often associated with the diabase intrusions is the baking of the host rock. On the natural gamma log these "baked zones" occur as increased gamma radiation zones.

The geophysical logging was conducted by S&ME using a Widco Model 1200 borehole logging unit with the natural gamma tool. The truck mounted unit was set up about twenty feet away from the well. A tripod was set over the boring to guide the tool and to prevent drag between the cable and the well. The unit was calibrated to insure that the signature of the log was within the chart so that relative changes in gamma radiation would be noted. The log was then conducted while the tool was raised out of the well with a line speed of approximately 15 feet per minute. As the cable was raised from the well, it was rinsed with distilled water to remove any contaminants. Logs were then interpreted and compared with the geologic logs for determination of screen placement.

From the natural gamma log, diabase was determined to be present in wells AD-500 (374'-379'), M-6-300 (58'-61'), M-4-Dike (12'-93'), and M-10-50 (12'-17').

D. Recovery and Drawdown Tests

Two aquifer tests were conducted at IBM's Research Triangle Park, North Carolina facility in order to investigate the hydraulic and transport properties of the fractured bedrock aquifer underlying the site.

1. Production Well PR-2 Recovery Test

The main site's recovery well PR-2 and pumping well 304-48 were shut down on May 24, 1988 at 10:15 a.m. in order to monitor the effect of PR-2 in the M-Area. PR-2 has an average pumping rate of 16 gallons per minute of water, draws the water table in the main dike down normally 60 to 80 feet, and appears to affect almost all of the wells on the main site. Prior to this test, the influence of PR-2 in the M-Area was unknown since all but one of the M-Area observation wells were drilled after its start up.

Sumps L-5 and R-2 remained in operation throughout the recovery test to prevent groundwater from penetrating the spill containment vaults outside of Building 304. All other pumping on site was delayed until the completion of the test. Prior to the test, IBM obtained the written approval of the U. S. EPA to shut down production well PR-2 for a two week period and to delay the regulated plume monitoring scheduled from May to June.

Water levels were measured frequently in 38 observation wells by IBM and S&ME personnel to the nearest 1/100th of a foot using an electronic water level indicator. The wells include CO-150, L-300, 401-M, PR-1, PR-2, PR-3, P-6-300, PR-5-B, X-1-100, 310-SH, 310-70, 310-100, 310-200-R, 310-300, 310-500, 627-100, DO-5, DO-5-70, SO-6-A, AD-50, GTE-Sh, GTE-500, M-1-55, M-1-150, M-2-100, M-2-300, M-3-50, M-3-300, M-4-50, M-4-200, M-4-Dike, M-5-50, M-6-50, M-6-55, M-6-300, and M-10-50.

The station barometric pressure readings and precipitation measurements are based upon the National Weather Service observations at the Raleigh-Durham Airport. These data were logged for each hour of the test to account for natural water level fluctuations. The pressure changes and rainfall over each 24 hour period of the test are listed below.

Date (May, 1988)	Barometric Pressure Change (inches of Mercury)	Precipitation (inches)
24-25	- 0.070	0.19
25-26	+ 0.385	0.11
26-27	+ 0.040	0.00
27-28	- 0.155	0.00
28-29	0.000	0.00
29-30	+ 0.060	0.00
30-31	- 0.050	0.00
Total	+ 0.210	0.30

2. M-4-Dike Drawdown Test

A drawdown test was performed on well M-4-Dike starting at 9:30 a.m. on May 31, 1988 and ending at 8:40 a.m. on June 7, 1988. The function of this test was to investigate the hydraulic response of the aquifer underlying the M-Area in order to predict the impact of off-site pumping to the northeast on predicted solute migration paths.

Well M-4-Dike was selected for the drawdown test due to its relatively high yield, its intersection with a northeast trending dike, and its north perimeter location. A flow rate of 6 gallons per minute was selected on the assumption that an additional five residential wells may have been in operation prior to the start up of PR-2 and water usage was twice the normal family rate of 800 gallons per day. IBM obtained the approval of the City of Durham to discharge the pumped groundwater into a nearby sanitary sewer manhole.

During the drawdown test, water levels were measured manually by IBM and S&ME in wells CO-150, L-300, 401-M, PR-1, PR-2, PR-3, P-6-300, PR-5-B, X-1-100, 310-SH, 310-70, 310-100, 310-200-R, 310-300, 310-500, 627-100, DO-5, DO-5-70, SO-6-A, AD-50, GTE-Sh, GTE-500, M-1-55, M-1-150, M-2-100, M-2-300, M-3-50, M-3-300, M-4-50, M-4-200, M-4-Dike, M-5-50, M-6-50, M-6-55, M-6-300, M-8-200, M-9-300, and M-10-50.

The monitoring frequency was based upon a logarithmic scale. At the onset of the test, frequent water level measurements were collected to develop the early portion of the pump curves and to compute transmissivity values for the wells. As time went on, the time between measurements steadily increased. For example, a water level reading was taken in M-4-Dike every half minute for the first five minutes, every minute for the next five minutes, every five minutes for the next fifty minutes, hourly the next seven hours, twice a day the next three days, and finally daily for the remainder of the test.

Steven's Recorders, continuous water level float monitors, were setup by S&ME on wells AD-500, M-1-300, M-7-300, M-10-300, and PR-5-B. A Keck unit, an electromagnetic device which controls the float, was used in conjunction with the Steven's recorder for the 2 and 4 inch diameter wells M-1-300 and PR-5-B. Initial, inter-mediate, and final manual water level readings were collected for each well to calibrate the recorders.

During the test, M-4-Dike pumped an average of 6.4 gpm and experienced a 10.5 foot decline in water elevation. Well PR-2 remained shut down and continued to recover. During the test no well purging occurred in the M-Area, however, wells M-1-150, M-2-100, M-3-300, and M-5-300 were still recovering from purging to sample in April and May. The six shallow compliance wells for the regulated units at the main site were purged on June 2, 1988 and sampled on June 3, 1988. All other wells on the main site were left undisturbed.

Again the station barometric pressure readings and precipitation measurements were logged to account for natural water level fluctuations. The pressure changes and rainfall over each 24 hour period of the test are shown on the following page.

Date (May/June,1988)	Barometric Pressure Change (inches of Mercury)	Precipitation (inches)
31-1	- 0.125	0.00
1-2	- 0.165	0.00
2-3	- 0.025	0.00
3-4	+ 0.250	0.00
4-5	+ 0.120	0.00
5-6	- 0.145	0.00
6-7	- 0.125	0.00
Total	- 0.215	0.00

3. M-4-Dike Recovery Test

M-4-Dike was shut off at 8:40 a.m. on June 7, 1988. To help support the data collected during the drawdown test, the recovery effects of M-4-Dike were observed for the next eight hours.

The observation wells included CO-150, L-300, 401-M, PR-1, PR-2, PR-3, P-6-300, PR-5-B, X-1-100, 310-SH, 310-70, 310-100, 310-200-R, 310-300, 310-500, 627-100, DO-5, DO-5-70, SO-6-A, AD-50, AD-500, GTE-Sh, GTE-500, M-1-55, M-1-150, M-1-300, M-2-100, M-2-300, M-3-50, M-3-300, M-4-50, M-4-200, M-4-Dike, M-5-50, M-6-50, M-6-55, M-6-300, M-7-300, M-8-200, M-9-300, M-10-50, and M-10-300.

E. Groundwater Monitoring

Two rounds of sampling were conducted during the investigation to define the boundaries of the volatile organic constituents present in the groundwater in the M-Area and to observe any changes in constituents and concentration brought about by the recovery of well PR-2 or drawdown of well M-4-Dike,

The initial sampling round was conducted by IBM personnel in three phases. First, existing wells, M-1-55, M-1-150, M-1-300, M-2-300, M-5-50, M-5-300, M-6-50, M-6-55 and M-6-300 were sampled April 5-12, 1988 and sent to Industrial & Environmental Analysts, (IEA), for analysis. A field blank FB-1 and a duplicate sample of M-2-300, DM-2, were also submitted to the IEA. Next, on April 22, 1988, newly screened well, M-4-200 was purged and sampled. An attempt was made to purge M-3-300 at the same time. However, due to the purging requirements, the low yielding properties of the formation in which M-3-300 was screened, and the limitations of the sampling equipment, M-3-300 was not sampled until May 17, 1988. Finally, samples were collected from new wells AD-50, M-2-100, M-3-50, M-4-50, M-7-300, M-8-200, M-9-300, M-10-50, and M-10-300 and existing well AD-500 from May 13-19, 1988 and submitted to IEA for analysis.

For the post-recovery/drawdown tests monitoring round, samples were collected by IBM personnel from June 7-12, 1988 from a selective group of wells which appeared to have been influenced by the recovery of PR-2 or the drawdown of M-4-Dike. These wells included AD-50, AD-500, M-1-300, M-3-50, M-4-50, M-4-Dike, M-5-50, M-6-55, M-7-300, M-8-200, M-9-300, and M-10-300. Additionally, wells 310-200-R, PR-3, PR-5-B, and P-6-300 were sampled as part of the main site plume monitoring program. A set of samples from all wells was submitted to IEA for analysis. Duplicate samples of 310-200-R and AD-500 where sent to Compuchem Laboratories to confirm IEA's results.

The collection and analysis of all groundwater samples followed the protocol outlined in the M-Site RCRA Investigation Workplan. Field testing was performed to determine the pH and specific conductivity of the groundwater. Laboratory analysis was conducted to measure the concentration of the following constituents using modified method SW 846 8010 (FID) and/or EPA Method 601/602 (PID):

1,1,1-Trichloroethane	Tetrachloroethene	Freon 11
1,1,2-Trichloroethane	Trichloroethene	Freon TF
1,1-Dichloroethane	1,1-Dichloroethene	Benzene
1,2-Dichloroethane	1,2-Dichloroethene	Toluene
Methylene Chloride	MEK	Acetone
Chlorodibromomethane	Ethyl Benzene	Chloroform
1,1,1,2-Tetrachloroethane		

Duplicate analysis of the chlorinated hydrocarbons including vinyl chloride was performed for all wells sampled after May 13, 1988 using the two different test methods.

During the sampling and analysis process, the samples were exposed to two chemicals which may have affected some of the samples. The first is acetone which may have be introduced to the sample during the sampling process. The isopropyl alcohol which is used as the final rinse solution during the decontamination of the teflon bailers changes very readily to acetone. If any isopropyl alcohol or acetone remained on the bailer, it could have easily shown up in the chemical results. The second contaminant originates in the laboratory. IEA frequently detects up to 15 ug/L of methylene chloride in its lab blanks as the result of the extraction tests using methylene chloride they perform on other samples.

III. DATA EVALUATION

A. Recovery and Drawdown Tests

Two aquifer tests were performed in order to (1) establish the existence, if any, of major conductive pathways between the main plant and the M-Area, and (2) to determine if off-site pumping northeast of the M-Area could have historically reversed natural hydraulic gradients to the point that solute migration could have followed a northerly route, from the main plant, across the M-Area, and off site. A detailed analysis of the data collected during both test was performed by Dr. James Cullen and Mr. Craig Robertson of Groundwater Sciences Corporation and is included as an attachment to this report. The actual time-water level data for each well is included in Appendix II, III and IV.

1. PR-2 Recovery Test

The groundwater flow direction in the M-Area at the start of the recovery test was from the north (off-site) to the south (M-Area). Initial water level readings are shown on Plates 4. Shallow groundwater level contours are illustrated on Plate 5.

During the recovery test, only four wells recovered sufficiently such that their response was considered to result from the shut down of PR-2. They include PR-2, L-300, P-6-300, and 401-M. Wells CO-150, PR-1, 310-300, and 627-100 may have exhibited a slight recovery; however, this is uncertain. The responses of the remaining wells were sufficiently small as to be indistinguishable from effects caused by other forces such as earth tides or changes in barometric pressure. Wells M-1-150, M-2-100, M-3-50, M-3-300, and M-5-300 exhibited apparent recoveries. However, these wells were recently sampled and are believed to be recovering from purging operations. Plate 6 indicates the recovery response for each well.

Due to the nature of the site geology, analysis of the results of the recovery test by the traditional methods is not possible. For this reason, the PR-2 recovery test should be viewed as a "connectivity test" more than anything else. Application of a traditional analysis, such as the method of C.V. Theis (1935) is predicated on numerous assumptions, many of which do not apply on the main plant site: the aquifer is strongly anisotropic (i.e., the geologic structure exerts strong directional control on the movement of water and dissolved constituents), dikes and possibly sills act as high-conductivity conduits for the movement of groundwater and the bedrock is of low permeability in comparison to the dike structure.

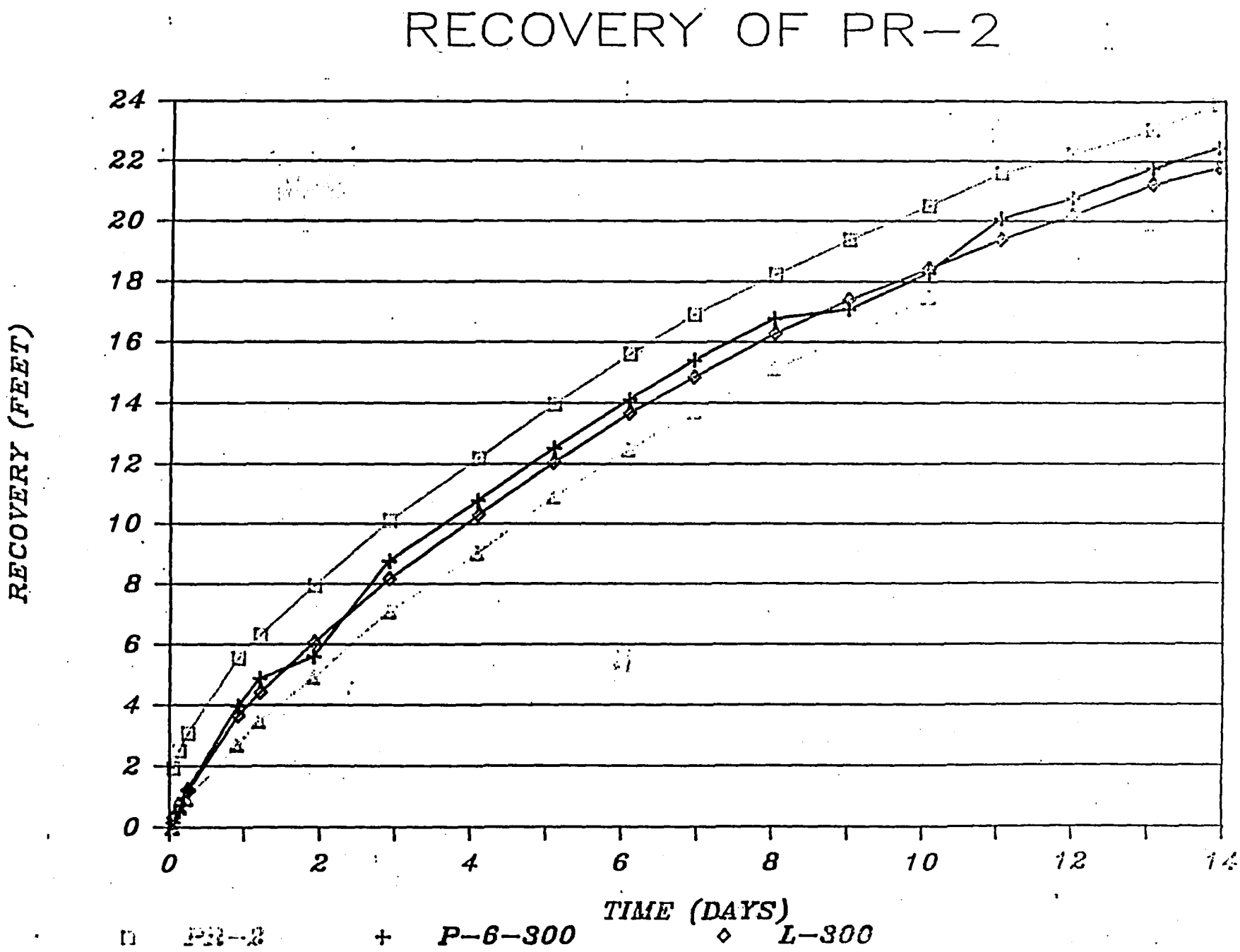
Figure 1 shows time-recovery plots for wells P-6-300, L-300, PR-2, and 401-M. The fact that the four curves are nearly superimposable is very significant. All four of these wells are located along one of the two intersecting dikes underlying the main plant. Radial distances from PR-2 exceed (in the case of 401-M) 1400 feet. Wells which are located much closer to PR-2 but off the dikes (for example PR-1 and CO-150) exhibit a much slower time-recovery response. This behavior indicates that the dike structures are highly transmissive and that the surrounding country rock is far less so. The near-simultaneous response of L-300, P-6-300, PR-2, and 401-M indicates that the dikes act as a linear collection system or "drain" when pumped. Water levels fall rapidly within the dikes until slow leakage from the surrounding bedrock into the dike can keep up with the pumping demand. such systems, while uncommon, are not unheard of (Jenkins & Prentice, 1982).

Well P-6-300 represents the northern-most point at which conclusive recovery was measured. Well 310-300, just south of the M-Area, most likely experienced a slight recovery, as historical water level data for 310-300 illustrates a definite response to the initial pumping of PR-2. Any recovery in wells M-1-150, M-2-100, M-3-50, M-3-300, and M-5-300 would have been masked by purge recovery. A test was conducted to characterize the purge-recovery behavior of well M-3-50 in order that this effect could be subtracted from the recovery observed during the PR-2 test to see if any residual recovery remains. The recovery observed in M-3-50 during purge recovery was not significantly different from that exhibited during the PR-2 test.

2. M-4-Dike Pumping Test

During the pumping test, eleven wells are believed to have responded to the drawdown of M-4-Dike. They include AD-50, AD-500, M-3-50, M-4-50, M-4-200, M-5-50, M-6-50, M-6-55, M-7-300, M-8-200, and M-9-300. Well M-1-55 and M-6-300 did drawdown but it is unclear whether or not this was a response to the test. These two wells experienced similar drawdown during the PR-2 test. Wells CO-150, L-300, M-1-150, M-5-300, P-6-300, PR-1, PR-2, PR-3, X-1-100, and 401-M recovered either as purge recovery from sampling operations or as continued recovery from the PR-2 test. Well M-10-300 exhibited water level fluctuations on the magnitude of 2 to 3 feet; possibly the result of an off site pumping stress to the east. However, no overall decrease in water elevation was noted in M-10-300 and fluctuations continued after the pumping test. See Appendix VII. The responses of the remaining wells were undistinguishable from background effects. Plate 7 displays the drawdown response for each well. A cross-section showing the effect of M-4-Dike on the groundwater level in the wells parallel to Alexander Drive is presented on Plate 8.

FIGURE 1


RECOVERY OF PR-2
RECOVERY (FEET)
24
22
20
18
16
14
12
10
8
6
4
2
0
0
2
4
6
8
10
12
14
TIME (DAYS)
PR-2
P-6-300
L-300

The response of the aquifer during the test was noteworthy in that the presence of one or more geophysical anomalies, thought to be dikes, caused no noticeable influence on the drawdown response. The hydraulic behavior of the M-Area is very different from the response of the main plant site. It appears that traditional analytical approaches will be acceptable in characterizing the hydraulic response of the M-Area.

It is highly unlikely that off-site pumping could ever develop sufficient drawdown to cause a gradient reversal from the main plant area, across the M-Site and off site to the north. The M-4-Dike test was conducted at a pumping rate comparable to the combined estimated off-site pumping rate. Drawdowns of less than one foot were measured at radial distances of about 500 feet from M-4-Dike as shown on Plate 7. If a pumping center off site operated at a similar rate, similar drawdown response would be expected. Such drawdown would be far too small to create the gradient reversal necessary to cause northerly migration of the solutes.

B. Characterizations of the M-Area Chemistry

A summary of the chemicals detected in each M-Area wells during the two sampling rounds is presented on Table 1 and the latest chemical data for the M-Area is displayed on Plates 1, 2, 3, and 9. Chloroform and methylene chloride at less than 10 ug/L, acetone, and methyl ethyl ketone are omitted from the plates as they are not expected to be representative of the formation water. No data contouring was performed since the concentrations for the types of volatile constituents present vary from well to well.

As illustrated on Plates 2 and 9, with the exception of the chemicals detected in well P-6-300, no detectable level of volatile chlorinated hydrocarbons were measured between the main site chemical plume and the M-Area chemicals. P-6-300 contains only low levels of 1,1-dichloroethane and 1,1-dichloroethene at 13 ug/L and 8 ug/L, respectively. Wells P-6-300, 310-200-R, PR-3, PR-5-B, M-10-50, M-10-300, M-3-50, and M-3-300 effectively monitor the most probable pathways for solute migration from the main site and thus, establish a complete separation between the two areas.

Similarly, the wells along the northeast boundary of the M-Area have very low to non detectable concentrations of volatile chlorinated hydrocarbons. (Note, methylene chloride less than 10 ug/L is considered a laboratory contaminant.) The wells include M-5-50, M-5-300, M-7-300, M-8-200, and M-9-300. As indicated on Plate 3, these wells encountered mostly silts and siltstones which have a characteristic low hydraulic conductivity.

Table 1. SUMMARY OF M-AREA CHEMISTRY
April - June, 1988

WELL NAME	CONSTITUENT	CONCENTRATION (ug/L) April/May, 1988	June, 1988
AD-50	Benzene	< 5	12
	1,1-Dichloroethane	< 1	2
	1,1-Dichloroethene	1	< 1
	trans 1,2-DCE	4	< 1
	Vinyl Chloride	1	< 1
	Trichloroethene	1	1
AD-500	1,1-Dichloroethane	4	5
	1,1-Dichloroethene	11	8
open hole well	Vinyl Chloride	27	12
	Trichloroethene	4	2
	Freon 11	4	< 1
	Tetrachloroethene	3	< 1
	Chloroform (1)	2	< 1
	trans 1,2-DCE	4	< 1
M-1-55	All	< 5	NS
M-1-150	1,1-Dichloroethane	84	NS
	1,2-Dichloroethane	31	NS
	Toluene	220	NS
M-1-300	1,1,1-Trichloroethane	5	< 1
	Methylene Chloride (2)	8	< 1
M-2-100	All	BDL	NS
M-2-300	1,1,1-Trichloroethane	150	NS
	1,1-Dichloroethene	13	NS
	Methylene Chloride	100	NS
	Toluene	34	NS
	Acetone (3)	100	NS
M-3-50	Acetone (3)	< 5	8
M-3-300	Acetone (3)	41	NS
M-4-50	1,1,1-Trichloroethane	13	5
	1,1-Dichloroethane	13	9
	1,1-Dichloroethene	18	10
M-4-200	Acetone (3)	7	NS

Table 1. Continued.

WELL NAME	CONSTITUENT	CONCENTRATION (ug/L) April/May, 1988	June, 1988
M-4-Dike	1,1-Dichloroethane	6	5
	1,1-Dichloroethene	7	10
	1,1,1-Trichloroethane	3	2
	Trichloroethene	1	1
	Methylene Chloride (2)	< 1	5
	Vinyl Chloride	9	15
	Acetone (3)	11	< 5
M-5-50	Methylene Chloride (2)	< 5	5
M-5-300	Freon TF	15	NS
	Chloroform (1)	6	NS
	Acetone (3)	90	NS
M-6-50	Methylene Chloride (2)	6	NS
M-6-55	All	< 5	BDL
M-6-300	Acetone (3)	50	NS
M-7-300	1,1-Dichloroethane	< 1	1
M-8-200	Acetone (3)	< 5	20
M-9-300	All	< 5	BDL
M-10-50	All	BDL	NS
M-10-300	All	BDL	BDL
P-6-300	1,1-Dichloroethane	NS	13
	1,1-Dichloroethene	NS	8
	Acetone (3)	NS	7
PR-3	All	NS	BDL
PR-5-B	Methyl Ethyl Ketone (4)	NS	2900
310-200-R	All	NS	BDL

Table 1. Continued.

NOTES

1. Chloroform is a constituent expected to have been introduced during the development process of the wells. The incoming city water supply to the IBM site contains up to 100 ug/L of chloroform.
2. The methylene chloride is expected to be present as the result of laboratory contamination. Sample blanks contain up to 15 ug/L of methylene chloride.
3. The acetone is expected to have been introduced during the sampling process. The isopropanol used to decontaminate the sampling equipment changes rapidly to acetone. If any isopropanol remains on the sampling equipment, it could easily be detected in the samples as acetone.
4. The methyl ethyl ketone (MEK) in well PR-5-B was a component of the glue used to join the casing fittings during the well's installation.
5. NS means not sampled and BDL means below detection limit.

The clean northeast boundary is important for two reasons. First, it further separates IBM's main site organic plume from the residential well located immediately north of this boundary. Secondly, it isolates the M-2-300 well from a potential off-site source.

Upon review of the data, it appears the chemicals present in M-2-300 are from a localized source, cross-contamination with another well, or contamination introduced during its screening. Interesting enough, no volatile organic constituents were measured above the detection limit of 10 ug/L when sampled on May 23, 1985 prior to screening. Volatile organics appeared in M-2-300 immediately after screening in June, 1985 and reached a peak in December, 1985. Since that time, the concentrations of volatile organics have been steadily declining. IBM plans to further explore the possibility that contaminants may have been introduced to M-2-300 during the screening or sampling process with the drilling of an identical well approximately 10 feet away.

The chemicals in well M-1-150 may be related to similar cross-contamination or screening contamination as in M-2-300. Both wells were drilled by N. W. Poole Well Drillers within a day of each other and screened by S&ME/Heater Well at roughly the same time. Both wells were also sampled about the same time and possibly with the same equipment. The slow rate of recovery in M-1-150 (approximately 6 months to full recovery) would tend to cause contaminants added to the well to remain for a long time.

The area encompassing AD-50, AD-500, M-4-50, M-4-200, and M-4-Dike does contain elevated volatile organic constituents in the shallow portion of the aquifer. The presence of volatile chlorinated hydrocarbons at deeper elevations is not known for wells AD-500 and M-4-Dike open hole wells. However, M-4-200 shows no detectable values.

Historical analytical data is available for well AD-500 for the years 1981 to 1988 . Table 2 shows the maximum, minimum, and average values of 1,1,1-trichloroethane, 1,1-dichloroethene, and 1,1-dichloroethane for each of these years. When five or more samples were collected during the year, the maximum and minimum values when not used to compute the average. The historical data shows (1) the total volatile organic constituent levels are greater now than they were prior to the start-up of the PR-2 production well operation in September 1981, (2) the transformation of 1,1,1-trichloroethane to 1,1-dichloroethene, 1,1-dichloroethane, and vinyl chloride is occurring, and (3) the level of chemicals in AD-500 have always been less than the concentrations measured recently in the off-site residential well of concern.

TABLE 2. AD-500 HISTORICAL ANALYTICAL DATA

YEAR	NO. OF SAMPLES	STAT	1,1,1-TCA (ug/L)	1,1-DCA (ug/L)	1,1-DCE (ug/L)
1981	20	Maximum	6.1	BDL	BDL
		Minimum	BDL	BDL	BDL
		Average	0.5	BDL	BDL
1982	20	Maximum	8.3	BDL	0.5
		Minimum	BDL	BDL	BDL
		Average	1.0	BDL	0.2
1983	12	Maximum	31	4.0	376
		Minimum	BDL	BDL	BDL
		Average	6.6	0.4	BDL
1984	10	Maximum	14	9.5	2.0
		Minimum	BDL	BDL	BDL
		Average	5.4	3.1	BDL
1985	5	Maximum	28	BDL	BDL
		Minimum	BDL	BDL	BDL
		Average	BDL	BDL	BDL
1986	2	Maximum	BDL	10.0	BDL
		Minimum	BDL	BDL	BDL
		Average	BDL	5.0	BDL
1987	3	Maximum	BDL	8.0	BDL
		Minimum	BDL	BDL	BDL
		Average	BDL	6.0	BDL
1988	2	Maximum	BDL	11	5
		Minimum	BDL	8	4
		Average	BDL	10	5

In summary, it appears that the chemicals present in the M-Area and in the off-site residential well are unrelated to the chemical plume at the main plant site. The chemicals in M-2-300 may be present as the result of a localized source. The chemicals in the AD and M-4 series wells and in the residential well seem to originate from an off-site source to the north of the M-Area.

C. Historical Groundwater Flow Data Evaluation

PR-5-B Drawdown Test

A two week long drawdown test began on May, 18, 1987 in well PR-5-B and ended on June 1, 1987. The test was performed to establish the existence, if any, of major conductive pathways between the main plant site and the M-Area and to evaluate the effectiveness of PR-5-B as a second production well.

During the test, PR-5-B pumped approximately 15 gpm and experienced a 66 foot drop in water elevation. Production well PR-2 remained in normal operation. Water level measurements were collected from the observation wells on site at least six different days during the test and from a few of the wells on eight separate occasions. Frequent early readings for PR-5-B and other influenced wells were not obtained.

The total drawdown monitored from May 18, 1987 to June 29, 1987 in observation wells of significance to the M-Area is noted below.

WELL NAME	DRAWDOWN (Feet)	COMMENTS
AD-500	0.42	Questionable
GTE-SH	7.06	Fluctuated
GTE-500	0.42	Fluctuated
L-300	0.24	No Response
M-1-55	0.17	Fluctuated
M-1-150	+ 6.7	Purge Recovery
M-1-300	63.93	Interconnection
M-2-300	+ 0.59	Purge Recovery
M-3	35.19	Interconnection
M-4	0.15	Questionable
P-6-300	0.79	No Response
PR-2	+ 3.55	No Response

Interconnection between PR-5-B, M-1-300, and M-3 was determined to be very good as expected. Historically, the water elevation in these three wells remains within a foot of each other.

No significant interconnection was found between PR-5-B and other wells in the M-Area. The number of data points collected for AD-500 and M-4 was not sufficient to assess other possible variables affecting the well such as an off-site residential well. M-1-150 and M-2-300 were undergoing purge recovery and thus no interconnection could be observed. The fluctuations observed in M-1-55, GTE-Sh, and GTE-500 make it impossible to determine an interconnection without the collection of more data for the well. These wells may have continued to fluctuate after the test as the result of another unknown pumping stress.

AD-500/PR-2 Historical Water Elevation Comparison

AD-500 is a 484 foot open hole well located in the northwest corner of the M-Area. The well was drilled on September 18, 1980 for perimeter monitoring. During installation, AD-500 encountered a sandy siltstone water bearing zone estimated at 20 gpm at a depth of 138' to 140' and diabase at 370' to 375' below ground surface.

Well PR-2 was drilled to 147 feet on February 26, 1981 as an open hole monitoring well. Diabase was intercepted in PR-2 at a depth of 18' to 110' and produced an estimated 80 gpm. By the end of September, 1981, PR-2 began full operation as a recovery well.

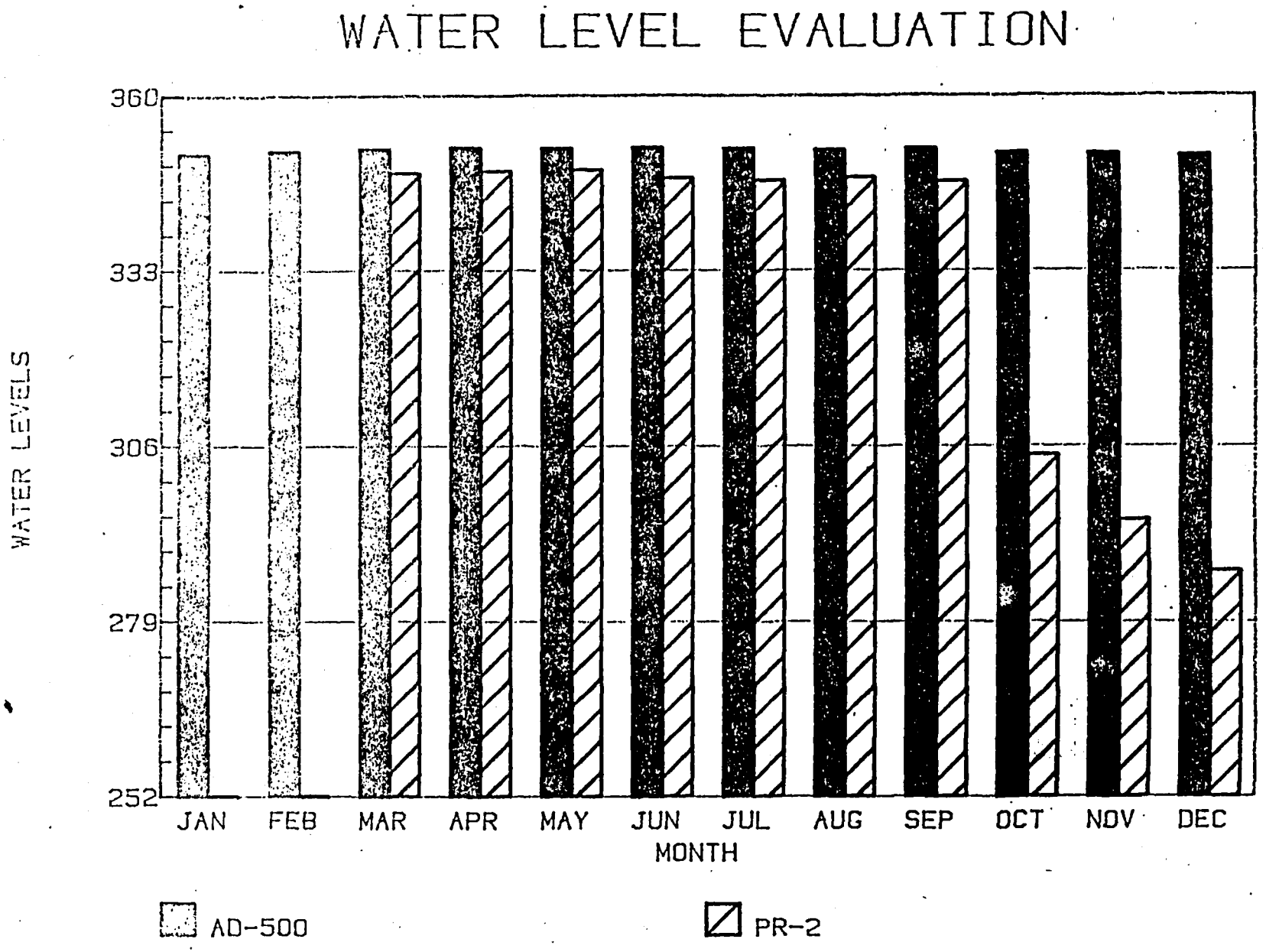
Throughout 1981, the water elevations in AD-500 and PR-2 were measured weekly by Industrial and Environmental Analysts. Figure 2 displays the average monthly water level for each well in 1981. Prior to the pumping of PR-2, the water level in PR-2 was consistently 3 to 4 feet lower than that of AD-500. At that time the hydraulic gradient was from AD-500 to PR-2. After PR-2 began production, its water level dropped 60 to 80 feet below normal and no change, other than seasonal fluctuations was observed in AD-500. Since drawdown of PR-2 had no effect on AD-500, no hydraulic connection exists between the two wells. The hydraulic gradient was from AD-500 to PR-2 both before and after pumping started at PR-2

IV. SUMMARY AND CONCLUSION OF RCRA FACILITY INVESTIGATION

The data collected during the M-Area investigations demonstrates 1) the M-Area and the main site organic plumes are separate; 2) no major conductive pathway for solute migration exists between the main site and the northern half of the M-Area; and 3) production well PR-2 has not altered groundwater flow in the M-Area.

The set of "clean" wells located in the most probable pathways for solute migration between the main organic plume and the M-Area and the absence of elevated chemistry in well AD-500 prior to the production of PR-2 establish separate plumes.

FIGURE 2


WATER LEVEL EVALUATION
360
333
306
279
252
WATER LEVELS
JAN
FEB
MAR
APR
MAY
JUN
JUL
AUG
SEP
OCT
NOV
DEC
MONTH
AD-500
PR-2

The recent PR-2 recovery and M-4-Dike drawdown tests and the 1987 PR-5-B drawdown test rule out possible conductive paths between the main site and the M-Area. None of the observation wells experienced both recovery and drawdown during the PR-2/ M-4-Dike investigations. The influences of PR-2 and PR-5-B only extend north as far as wells M-1-300 and M-3-300. M-1-55 and M-3-50 did not appear to be affected. The southernmost boundary of the M-4-Dike drawdown encompassed only the shallow M-3 and M-6 nested wells. Historical 1981 water level data for AD-500 and PR-2 corroborates the lack of connection between the northern boundary and the main site.

Well AD-500 clearly establishes that groundwater flow in the M-Area has not been altered by the drawdown of PR-2. Current data shows the groundwater flows from off-site (north) to on-site (south). Historical data demonstrates that AD-500 is consistently higher in water elevation than PR-2. The M-4-Dike drawdown test demonstrates a hydraulic connection between AD-500 and the other M-wells along Alexander Drive. If AD-500 remains unaffected by PR-2 and is interconnected to northern M-wells, then the interconnected wells are expected to be unaffected by PR-2. Throughout the drawdown test, the water levels along the northern border were higher than the recovery well PR-2 levels before pumping started.

Analysis of the drawdown pattern resulting from the M-4-Dike tests shows that pumping at this same rate from combined domestic wells yields north of the M-Area would not have resulted in sufficient drawdown in the M-Area perimeter wells to produce a gradient reversal from the main plant area to the M-Area. Therefore, the chemicals found in the M-Area wells and one domestic well off site to the north must originate from some off-site source to the north.

REFERENCE 14

REVIEW AND ANALYSIS OF GROUNDWATER DATA
M-AREA INVESTIGATION

PROJECT NO. IBM-81

Prepared for
IBM Corporation
Research Triangle Park, North Carolina

July 8, 1988

by

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REVIEW AND ANALYSIS OF GROUNDWATER DATA
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1 INTRODUCTION

This report presents the results of Groundwater Sciences Corporation's review of data provided by IBM Corporation for its M-Area investigation at the Research Triangle Park, North Carolina plant site (IBM, RTP). The M-Area is located in the northeast quadrant of the plant site, and is, as yet, undeveloped (Figure 1). The area that is used for manufacturing, here termed the "Main Plant Area" (Figure 1), is located south and southwest from the M-Area.

1.1 Background Information

Over the course of operations at IBM, RTP, various industrial solvents have been used which prior to 1976 had been stored in buried tanks. As a result of releases from these buried facilities, groundwater beneath the site contains various industrial chemicals including 1,1,1-trichloroethane (TCA), its daughter products, 1,1-dichloroethane (1,1-DCA) and 1,1-dichloroethylene (DCE) and other commonly used solvents.

As a result of these releases and the site's status as a RCRA regulated treatment, storage and disposal (TSD facility), the site has implemented a groundwater monitoring program and performed an assessment of all solid waste management units (SWMU's), including these tanks. As part of this assessment, it was necessary that the site evaluate the full extent of chemicals in groundwater resulting from such releases and identify appropriate corrective action to be taken to mitigate associated impacts.

This RCRA facility investigation (RFI) has been completed at IBM, RTP. The results indicate that these chemicals in the groundwater have been contained within the property for releases from the solvent storage tanks and other SWMU's. However, this investigation also revealed the presence of chemicals in the groundwater in the northeast corner of the property (M-Area) which are not downgradient from any of the manufacturing operations on site. In fact, this area is at the upgradient property line and groundwater flow is onto the site as opposed to off the site (Figure 1).

IBM reported the occurrence of these chemicals moving on to the site to the USEPA Region 4 and the State of North Carolina. In so doing, IBM stated that the chemicals in this area did not originate from any of IBM's operations and, therefore, were not part of a plume requiring corrective action.

While IBM was in the process of addressing additional data requirements necessary to confirm that these chemicals were moving on site, the county environmental health and state environmental agencies determined that these same chemicals were present in an off-site domestic drinking water well immediately north of the M-Area. The chemicals present in this well occurred at levels even higher than the levels detected on the IBM plant site immediately downgradient. Since the direction of groundwater flow under current conditions is onto the property in this area, IBM concluded that the chemicals present in the domestic well were in all likelihood from the same source of chemicals as those found in the M-Area. IBM believed this source was north of its northern property line in an area of mixed manufacturing and residential development.

However, as a result of the need to control chemicals in the groundwater in the Main Plant Area, IBM has been operating a recovery well known as PR-2 (Figure 1). Therefore, it was suggested by the agencies that the flow of groundwater onto the site under current conditions may result from this recovery well, inducing flow across the property line. Furthermore, it was postulated that prior to the beginning of PR-2 pumping, the stresses caused by off-site domestic wells to the north of IBM's property may have induced the flow of groundwater from the Main Plant Area, through the M-Area, and across the property line to the north, resulting in IBM's operations being the source of the chemicals present in the M-Area and one off-site domestic well.

In order to test this scenario, IBM performed a testing program in the areas shown on Figure 1, including a shutdown test of well PR-2 to monitor recovery in the Main Plant Area and the M-Area, and a pumping test in the M-Area to simulate the drawdown pattern that might result from off-site domestic well stresses. These two tests were also used to establish the degree of connectivity between the two areas. These tests were performed during the last week of May and the first week of June 1988. The results were transmitted by IBM to Groundwater Sciences Corporation for our review.

1.2 Purpose and Scope

The purpose of this report is to present the results of our data review for the shutdown and pumping tests performed by IBM and their local consultants and contractors. Although Groundwater Sciences assisted in the design of the testing protocols, IBM and the local contractors had full responsibility for the collection and management of data bases. In addition to water level data from each of these two tests, IBM has provided historical information on

water levels and chemistry and current information on the chemistry of the M-Area wells. This data has also been incorporated into Groundwater Sciences review and the development of opinions based on that review.

2 DATA REVIEW AND ANALYSIS

2.1 Aquifer Tests
Recovery and Drawdown Tests

Two aquifer tests were conducted at IBM, RTP in order to investigate the hydraulic and transport properties of the fractured bedrock aquifer underlying the site. The Main Plant Area's production well (PR-2) was shut down at 10:15 a.m. on May 24, 1988, while water level recovery data were obtained from 38 wells. A drawdown test was performed on well M-4, north of the Main Plant Area, starting at 9:30 a.m. on May 31, 1988. The function of this test was to investigate the hydraulic response of the aquifer underlying the M-Area in order to predict the impact of nearby pumping on solute migration paths.

Both tests were performed in order to (1) establish the existence, if any, of major conductive pathways between the Main Plant Area and the M-Area, and (2) determine if off-site pumping north of the M-Area historically could have reversed natural hydraulic gradients to the point that solute migration could have followed a northerly route, from the Main Plant Area across the M-Area and off site.

2.1.1 PR-2 Recovery Test

The Main Plant Area's production well (PR-2) was shut down at 10:15 a.m. on May 24, 1988 in order to effect a water-level recovery test. Water levels were monitored in wells AD-50, CO-150, DO-5, DO-5-70, GTE-SH, GTE-500, L-300, M-1-55, M-1-150, M-2-SH, M-2-300, M-3-SH, M-3-300, M-4-SH, M-4--Dike, M-4-200, M-5-50, M-5-300, M-6-50, M-6-55, M-6-300, M-10-SH, P-6-300, PR-1, PR-3, PR-5-A, PR-5-C, SO 6-A, X-1-100, 310-SH, 310-70, 310-100, 310-200-R, 310-300, 310-500, 401-M, 627-100 and PR-2 itself.

Of those wells listed, only the following wells recovered sufficiently such that their responses were considered to result from the shutdown of well PR-2: L-300, P-6-300, and 401-M. Wells CO-150, PR-1, 310-300, and 627-100 may have exhibited a slight recovery; however, this is

uncertain. The responses of the remaining wells were sufficiently small as to be indistinguishable from effects caused by other forces such as earth tides or changes in barometric pressure. Wells M-1-150, M-2-SH, M-3-SH, M-3-300, and M-5-300 exhibited apparent recoveries. However, these wells were recently sampled and were still recovering from purging operations prior to sampling.

Due to the nature of the site geology, analysis of the results of the recovery test by traditional methods is not possible. For this reason, the PR-2 recovery test should be viewed as a "connectivity test" more than anything else. Application of a traditional analysis, such as the method of C.V. Theis (1935) is predicated on numerous assumptions, many of which do not apply on the Main Plant Area: the aquifer is strongly anisotropic (i.e., the diabase dikes exert strong directional control on the movement of groundwater and dissolved constituents), dikes and possibly sills act as high-conductivity conduits for the movement of groundwater, and the bedrock is of low permeability in comparison to the dikes.

Figure 2 shows time-recovery plots for wells L-300, P-6-300, PR-2 and 401-M. The fact that the four curves are nearly superimposable is very significant. All four of these wells are located along one of two intersecting dikes underlying the Main Plant Area. Radial distances from PR-2 exceed (in the case of 401-M) 1400 feet. Wells which are located much closer to PR-2 but off the dikes (for example, PR-1 and CO-150) exhibit a much slow time-drawdown response. This behavior indicates that the dike structures are highly transmissive and that the surrounding country rock is far less so.

The near-simultaneous response of L-300, P-6-300, PR-2, and 401-M indicates that the dikes act as a linear collection system or "drain" when pumped. Water levels fall rapidly within the dikes until slow leakage from the surrounding bedrock into the dikes can keep up with pumping demand. Such systems, while uncommon, are not unheard of (Jenkins & Prentice, 1982).

Well P-6-300 represents the northernmost point at which conclusive recovery was measured (Figure 1). Well 310-300, just south of the M-Area, may have exhibited a slight recovery. Apparent recovery in well M-3-Shallow was believed to have been purge recovery from pretest sampling. Therefore, a test was run in mid-June to characterize the purge-recovery behavior of well M-3-Shallow which confirmed that this apparent recovery was from purging and not from the PR-2 shutdown.

2.1.2 M-4 Pumping Test

Well M-4, at the horizon where it was found to intersect a dike, was subjected to a long-term, radially-converging aquifer test, beginning at 9:30 a.m. on May 31, 1988. Water-level declines were measured in wells AD-SH, CO-150, DO-5, DO-5-70, L-300, M-1-55, M-1-150, M-1-300, M-2-SH, M-2-300, M-3-SH, M-3-300, M-4-SH, M-4-200, M-5-50, M-5-300, M-6-50, M-6-55, M-6-300, M-7, M-8, M-9, M-10-SH, M-10-300, GTE-SH, GTE-500, P-6-300, PR-1, PR-2, PR-3, PR-5A, PR-5-C, SO-6-A, X-1-100, 310-SH, 310-70, 310-100, 310-200-R, 310-300, 310-500, 401-M, 627-100 and M-4-Dike itself.

Of those wells listed, only the following wells are believed to have responded to the test: AD-SH, M-3-SH, M-4-SH, M-4-200, M-5-50, M-6-50, M-6-55, M-6-300, M-8 and M-9. Well M-1-55 may have responded to the test. Wells CO-150, L-300, M-1-150, M-5-300, P-6-300, PR-1, PR-2, PR-3, X-1-100, and 401-M all underwent recovery, either as purge recovery from sampling operations or as continued recovery from the PR-2 test. The responses of the remaining wells were indistinguishable from background effects.

The response of the aquifer during the test was noteworthy in that the presence of one or more geophysical anomalies thought to be dikes caused no noticeable influence on the drawdown response. The hydraulic behavior of the M-Area is very much unlike the response of the Main Plant Area.

Figures 3 through 7 present time-drawdown data obtained from wells AD-Shallow, M-3-Shallow, M-4-Shallow, M-4-Dike, and M-9 during the M-4-Dike converging aquifer test. Values of aquifer transmissivity were calculated from these data by the method of Cooper and Jacob (1948) which involves determining the drawdown produced over a one-order-of-magnitude change in time. The results of these calculations are discussed below. In general, they appear to indicate that the shallow aquifer underlying the M-area is very slightly anisotropic, with a preferred transmissivity ratio of approximately 2 to 1 in a north-south direction. Three circumstances could explain this anisotropy: (1) the material comprising the shallow aquifer is itself anisotropic, (2) the thickness of the shallow aquifer varies in such a way that it produces an anisotropy in a material which is otherwise isotropic, or (3) a combination of these two effects is present.

Figure 8 presents a rudimentary distance-drawdown plot for the above-mentioned wells. That these data do not fall on a straight line reinforces the conclusion that a slight anisotropy exists. The overall effect of this anisotropy is to produce an oval-shaped (instead of circular) drawdown cone in response to pumping. The orientation of the cone is such that its major axis is oriented roughly north-south. Precise quantification (exact orientation and aspect ratio) would require the execution of a small-scale aquifer test designed for that purpose in the M-Area. Drawdowns will tend to be somewhat broad and shallow in a north-south direction and will be slightly steeper but narrower in an east-west direction. The aspect ratio for these drawdowns is estimated to be 1.4 (north-south) to 1.0 (east-west), where 1.4 is the square root of the transmissivity aspect ratio.

Figure 3, which shows the time-drawdown response of well AD-Shallow (Figure 1), appears to indicate that this well undergoes a slight transmissivity decrease as the test continues. Early time data (before 1000 minutes) yields a transmissivity of 463 gpd/ft; during this interval, the hydraulic response of the well appears to be relatively consistent. Late-time data yields a lesser transmissivity of about 433 gpd/ft. It is speculated that this decrease is caused by a thinning of the aquifer. As the expanding cone-of depression from well M-4-Dike continues to grow, it encounters aquifer materials with differing, constantly changing, hydraulic properties. Geologic data would indicate that the direction of this thinning is most likely towards the east.

Figure 4 presents time-drawdown data for well M-3-Shallow (Figure 1). This well exhibited a transmissivity value of approximately 805 gpd/ft. The higher value may be the result of a thickening of the producing zone, may reflect a slight north-south anisotropy in the shallow aquifer material, or may reflect a combination of both effects. We believe that the well is seeing a change in hydrogeologic regime caused by the presence of a north-south trending dike. The anisotropy is considered to be slight, especially when compared to the dike-dominated response seen at the Main Plant Area. The final data point presented in this figure, if real, also indicates a decrease in transmissivity near the end of the test.

Figure 5 presents the time-drawdown response of the M-4-Shallow well (Figure 1). An early transient in the data resulted from a short-term pump failure. Late-time data yielded a transmissivity value of 406 gpd/ft with an overall increase in transmissivity as the test progressed. Unlike the previous two wells where transmissivity decreases were somewhat

subjective, the increase in this well is clearly indicated. Interestingly, the very-late-time data indicates a transmissivity decrease, consistent with the response of the previous two wells. At this time, the reason for this decrease has not been determined.

Figure 6 presents time-drawdown data for the pumping well itself. The reported transmissivity value of 471 gpd/ft is an average value, representative of the overall behavior of the aquifer, and is not interpretable in a directional sense. Again, an early time transient in pumping rate is visible. Data after 10 minutes appear to be consistent and reflect a fairly constant transmissivity.

Figure 7 presents the drawdown response for well M-9. A transmissivity value of 471 gpd/ft was calculated from the late-time data. However, due to the scarcity of data for this well, the value is not considered to be reliable, even though it appears to be representative.

Figure 8 presents a distance-drawdown plot of those wells showing significant response. Horizontal straight-line radial distances were calculated from survey coordinates as: AD-Shallow (411.65 feet); M-3-Shallow (1098.10 feet); M-4-Shallow (7.68 feet); and M-9 (190.18 feet). Theoretically, these data should plot as a straight line. However, the fact that they do not confirms the presence of some hydrogeologic factor which generates a slight anisotropy.

Based on the results of this test, it is highly unlikely that off-site pumping could ever develop sufficient drawdown to cause a gradient reversal from the Main Plant Area, across the M-Area and off site to the north. The M-4 test was conducted at a pumping rate comparable to the combined estimated off-site pumping rate. Drawdowns of less that two feet were measured at radial distances of about 1000 feet from M-4. If a pumping center located off site operated at a similar rate, similar drawdown response would be expected. Such drawdown would be far too small to create the gradient reversal necessary to cause northerly migration of solutes.

In addition to the two aquifer tests performed recently at the site, IBM has also supplied data on historical water levels and chemistry, as well as information on the geology of the plant site and the area to the north. Also provided by IBM were the results of a pumping test performed on well PR-5 in 1987 and continuous water level charts from a monitoring well in the M-Area, which is believed to show responses to pumping stresses other than those known to occur on the site.

2.2 Historical Data

Historical data have been reviewed for both water level and chemistry in selected wells in the M-Area and the Main Plant Area. Water level data for well AD-500, the oldest monitoring location in the M-Area, when compared to the water level data for PR-2 prior to beginning pumping shows clearly that the groundwater elevation in the M-Area at well AD-500 was consistently higher that the groundwater elevation at PR-2 prior to the start of pumping. This would confirm that the operation of domestic wells to the north of the plant site had not resulted in the reversal of the natural flow gradient in the M-Area.

The chemistry results for AD-500 show that prior to the beginning of pumping at PR-2 only trace amounts of industrial chemicals were detected. However, after that pumping operation began, the concentrations of these chemicals increased somewhat. This chemistry data would suggest that prior to PR-2 pumping, chemicals had not moved north from the Main Plant Area to the M-Area and from there off site, but rather that after the pumping of PR-2 started, chemicals moved on site into the M-Area, although probably not as a result of induced stresses from PR-2, but rather under the natural groundwater gradients in this area.

PR-5 is a monitoring location intermediate between the M-Area and the Main Plant Area. The very low water level at this site while PR-2 is pumping clearly indicates good communication with PR-2. Similar levels are seen in monitoring well M-1-300 which is farther away from recovery well PR-2.

A pumping test was performed on well PR-5 from May 18 - June 1, 1987. The pumping rate for this test was 15 gallons per minute. Numerous observation wells were monitored in the M-Area and the Main Plant Area. Response to this pumping test in the M-Area occurred only in the two monitoring wells closest to PR-5 (M-1-300 and M-3), both of which showed a strong response indicating a high degree of connectivity to well PR-5. None of the other M-Area wells showed any measurable or significant response to this test, indicating poor connectivity between the northern portion of the M-Area and well PR-5.

Although monitoring well PR-5 itself responds strongly to drawdown in well PR-2, the reverse was not true during this pumping test. Well PR-2 did not respond at all to the significant drawdown in well PR-5. This apparent contradiction most likely results from the existence of

good communication between PR-2 and PR-5 only above a certain elevation (probably on the order of 310 feet above mean sea level). This type of connectivity could occur if the degree of fracturing diminishes with depth or if there is an isolated low permeability zone within the high permeability pathway between the two wells. This low permeability zone would have the effect of a "dam" at elevation 310 feet, which would prevent wells PR-2 and PR-5 from responding mutually to stresses occurring when their water levels are below that elevation.

The important information to be derived from the PR-5 pumping test is the poor connectivity between PR-5 and the northern portion of the M-Area in spite of the demonstrated connectivity to PR-2, at least above an elevation of 310 feet.

2.3 Current Data

The current water level and chemistry data in the M-Area shows that with the exception of increased chemical occurrence in the shallow wells along the northern property boundary, the head distribution has not changed from that which was in existence in this area prior to the PR-2 operations. The occurrence of the chemicals in the shallow portion of the groundwater flow system along the norther property line reinforces the conclusion that these chemicals are moving onto the site from a local source north of the property line and have not yet penetrated to significant depths below the M-Area.

2.4 Geology

The well logs for the newly-completed monitoring wells in the M-Area along the northern perimeter of the site show that there is a higher percentage of sandstone at the AD and M-4 locations than there is at the M-5, M-7, M-8, and M-9 locations (Figure 1). In these latter monitoring well locations, the predominant bedrock type is siltstone as opposed to sandstone.

Personal communication with Mr. Charles William Hoffman, Senior Geologist with the North Carolina State Geological Survey has provided information which confirms IBM's data regarding rock types in the M-Area. In this regard, Mr. Hoffman indicated the survey has mapped the area along Alexander Drive. The results indicate that the area encompassing wells M-4 and AD is underlain predominantly by sandstone, whereas the area encompassing M-5, M-7, M-8, and M-9 is underlain predominantly by siltstone. In general, Mr. Hoffman has indicated that the area to the north of Alexander Drive between Southern Railroad and South

Miami Boulevard continues the predominantly sandstone trend. This area would include most if not all of the domestic wells north of the M-Area site, which could produce pumping stresses that might influence the flow of groundwater in the northeast corner of IBM's property.

Basically, this geologic mapping confirms IBM's drilling data which showed that the sandstone provides higher yields to the bedrock wells than does the siltstone, which is the predominant rock type on most of the IBM plant site. Therefore, the area encompassing the M-4 and AD series wells and the domestic wells to the north should be characterized more by localized radial flow to individual producing wells and less by the strongly directional permeability characteristics exhibited by the diabase dikes within the low permeability siltstone rock type in the Main Plant Area. This circumstance would strongly suggest that any stresses created by the off-site domestic wells would dissipate over shorter distances and therefore be less likely to cause sufficient distance-drawdown effects to reverse the gradient between the M-Area and the Main Plant Area.

2.5 Other Stresses

Figure 9 is a tracing of a four-day Stevens recorder chart that was in operation on well M-10-300 from June 24 - June 27, 1988. The purpose of this recording of water levels was to confirm the occurrence of a periodic drawdown and recovery cycle that was observed in the recorder charts for this location before and during the pumping test at the M-4-Dike well.

This chart confirms that there is a periodic drawdown-recovery cycle at well M-10-300. This particular tracing shows the beginning of recovery for one cycle, when the chart was first installed on June 24 and a subsequent drawdown and recovery cycle beginning in the early morning hours of June 26 and running through to the morning of June 27. The amplitude of the full cycle shown on this chart is $\pm$ 2 ft. which is much greater than the amplitude that would be expected to occur from earth tides or barometric changes. In fact, lower amplitude fluctuations superimposed on this drawdown and recovery cycle may be the effects of earth tides at this location (Figure 9).

The presence of this drawdown recovery cycle indicates that there is some other pumping stress present in the aquifer, unrelated to PR-2 pumping (which was shut down when this cycle was first identified) and also independent of the M-4-Dike pumping which had ceased before the

measurements shown on Figure 9 were taken. It is important to understand the location and magnitude of this additional pumping stress and additional data should be collected in the M-Area relative to the areal extent of these stresses and the variation in their amplitude. In this manner, it may be possible to pinpoint the location at which this pumping stress occurs.

3 CONCLUSIONS

On the basis of our review of the data provided by IBM, RTP, we have drawn the following conclusions:

How does this vary with depth

1. The natural direction of groundwater flow in the M-Area is onto the IBM site from the north to the south.

2. Our analysis of the shutdown and pumping tests performed in May and June 1988 indicates that this natural gradient would not have been reversed as a result of off-site pumping stresses at domestic wells to the north of the M-Area.

3. These same tests indicate that there is not an identifiable groundwater flow path between the Main Plant Area and M-Area, along which chemicals in the groundwater in the Main Plant Area could have been drawn to the M-Area and then off site. This conclusion is supported by the absence of these chemicals in the monitoring wells intermediate between the two areas.

4. The distribution of chemicals in the shallow groundwater along Alexander Drive strongly suggests the presence of a local source for these chemicals to the north of the IBM property. This local source also may be the source of chemicals identified in an adjacent domestic water supply well.

5. There is no basis for concluding that IBM's use of chemicals in the Main Plant Area could in any way account for the occurrence of chemicals in groundwater along the northern property line and off site to the north in the previously-referenced domestic water supply well.

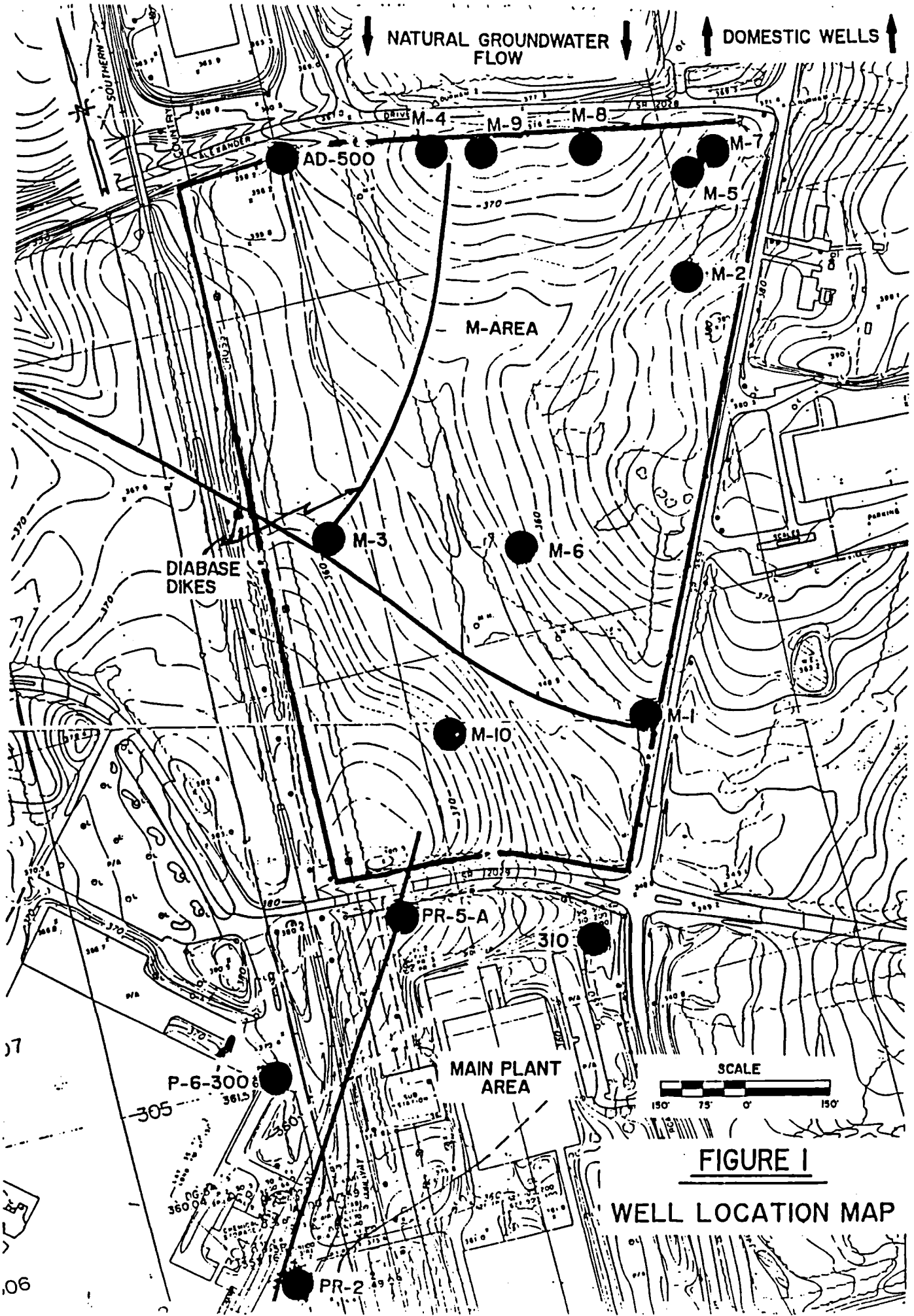


FIGURE I

WELL LOCATION MAP

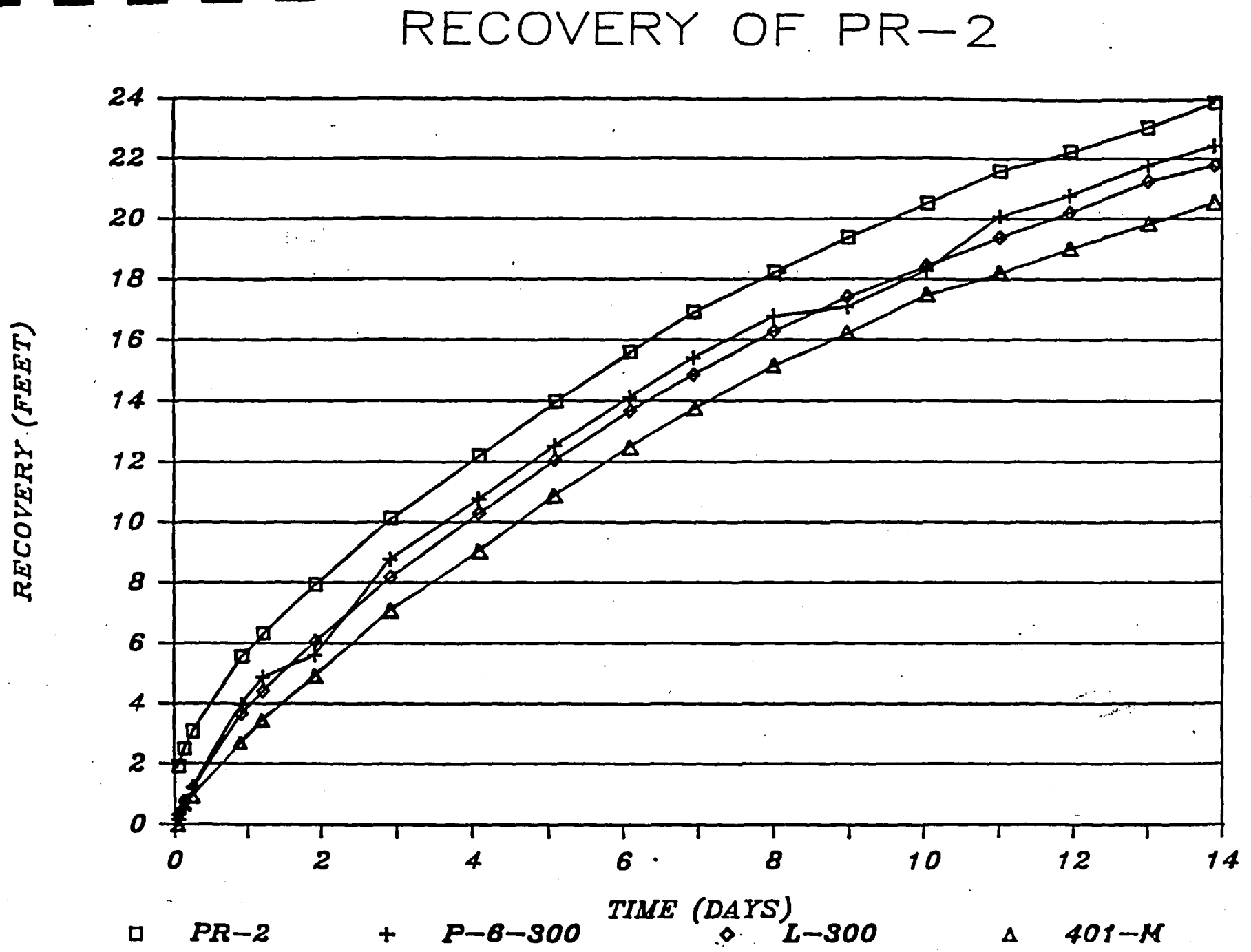


FIGURE 2
PR-2 RECOVERY
TEST RESULTS

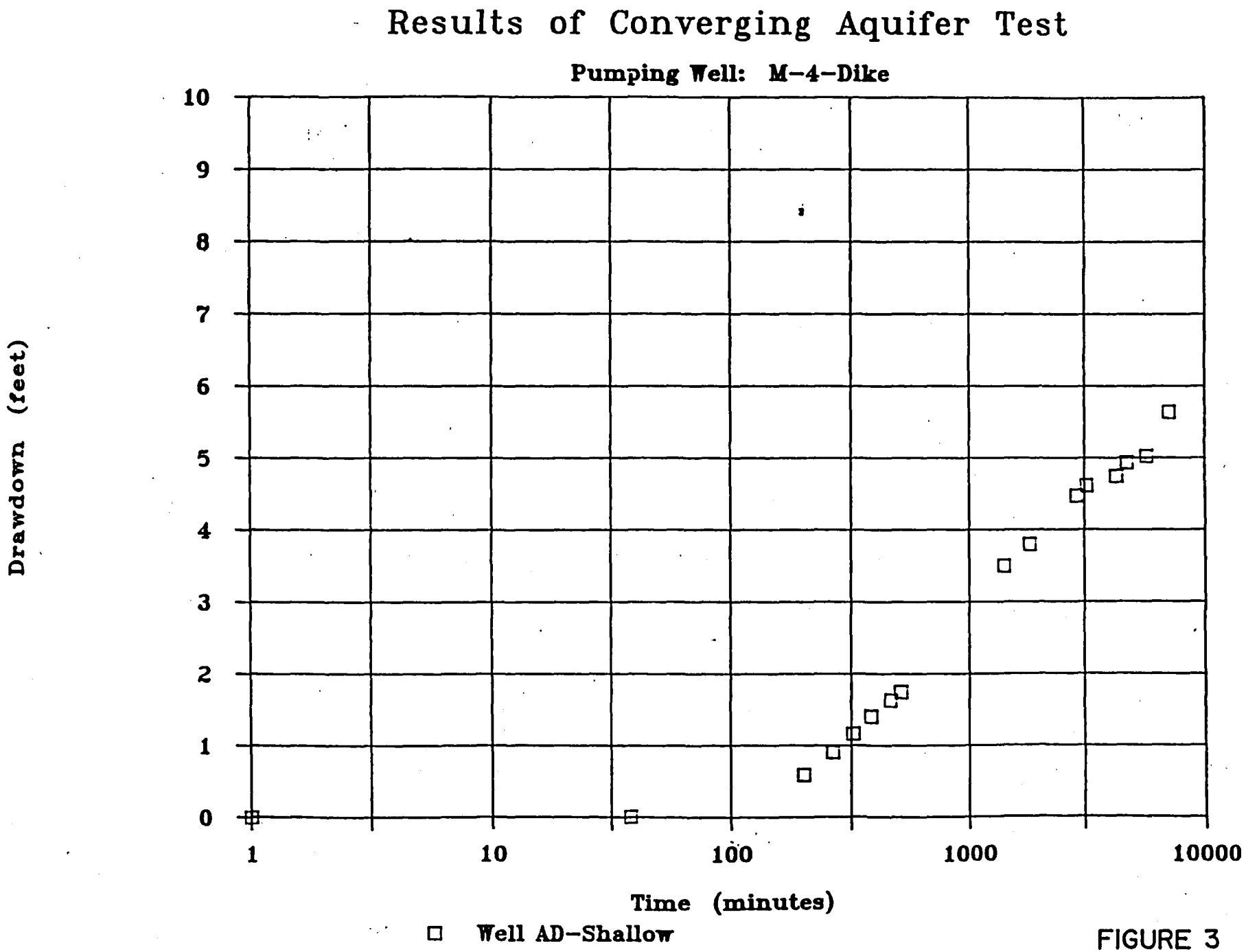

Results of Converging Aquifer Test
Pumping Well: M-4-Dike
Drawdown (feet)
10
9
8
7
6
5
4
3
2
1
0
1
10
100
1000
10000
Time (minutes)
Well AD-Shallow

FIGURE 3

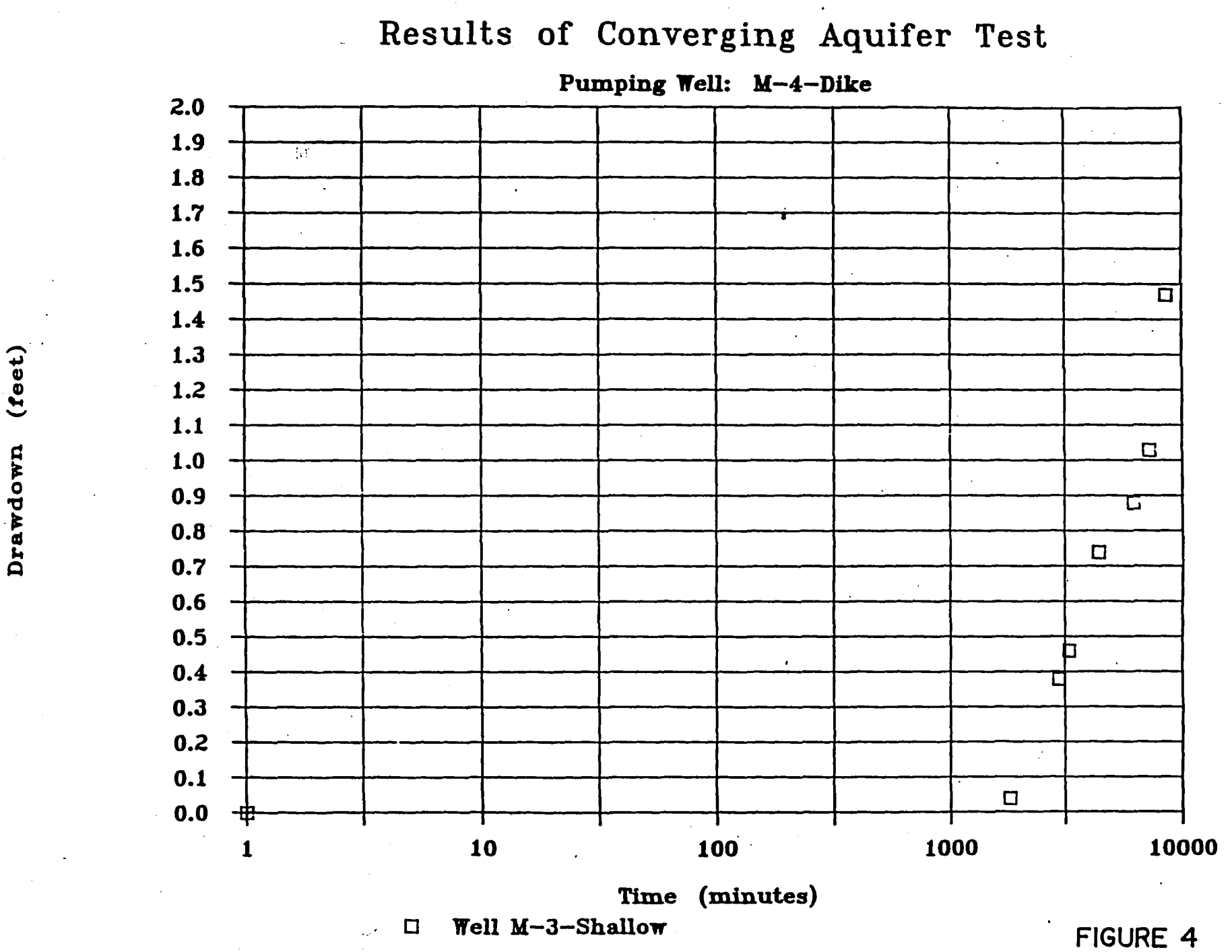

Results of Converging Aquifer Test
Pumping Well: M-4-Dike
Drawdown (feet)
2.0
1.9
1.8
1.7
1.6
1.5
1.4
1.3
1.2
1.1
1.0
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0.0
1
10
100
1000
10000
Time (minutes)
Well M-3-Shallow

FIGURE 4

Results of Converging Aquifer Test

Pumping Well: M-4-Dike

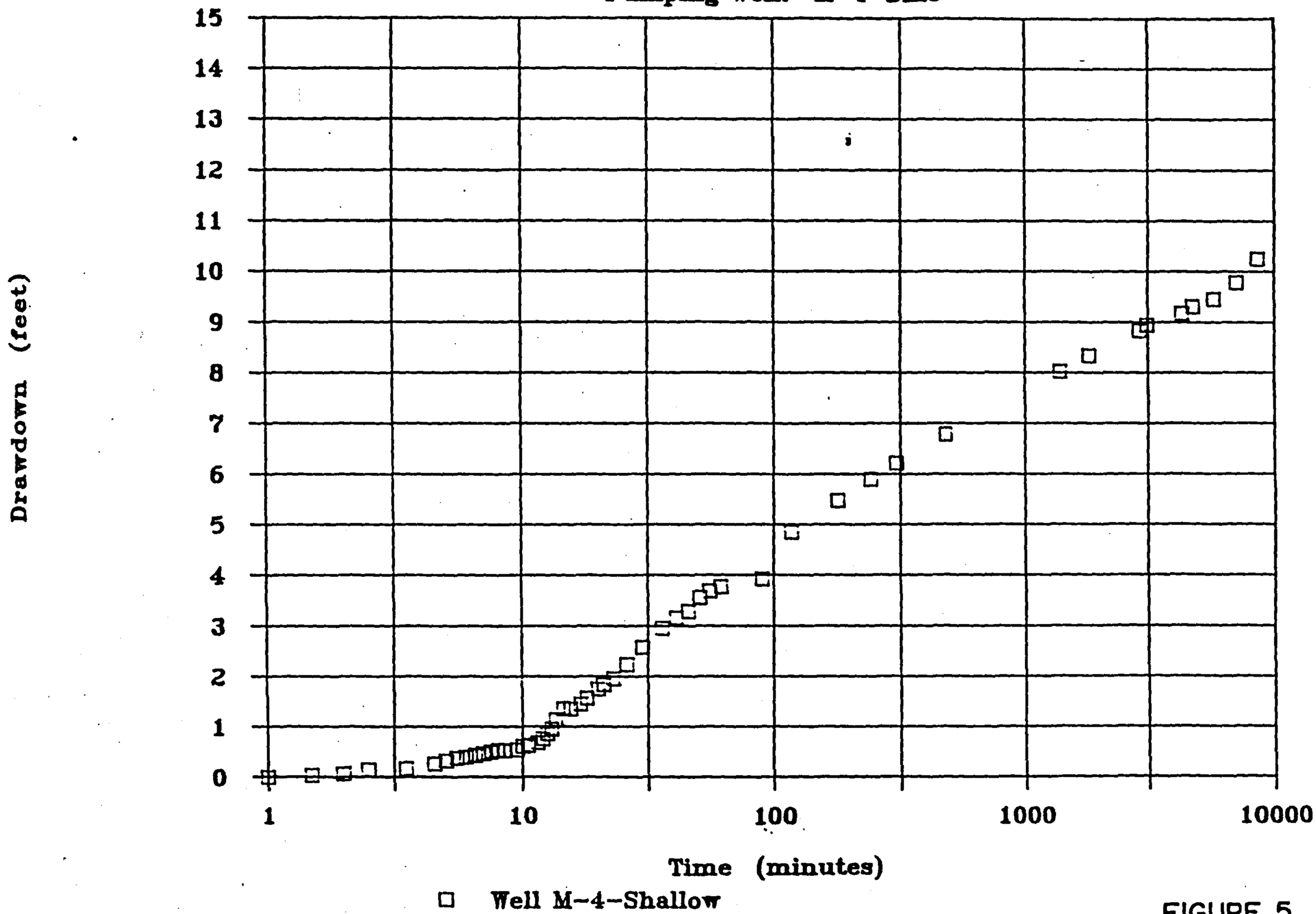


FIGURE 5

Results of Converging Aquifer Test

Pumping Well: M-4-Dike

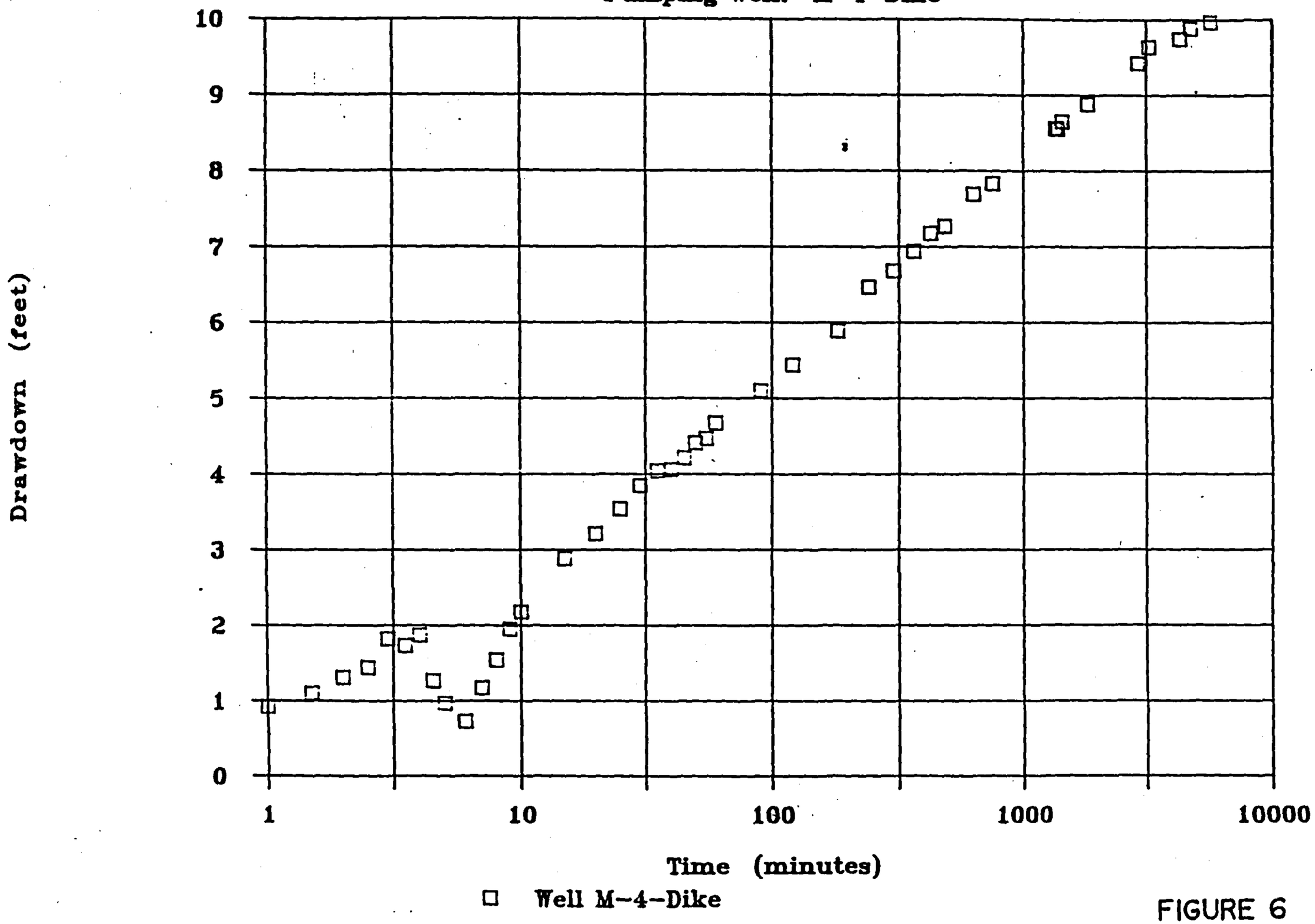


FIGURE 6

RESULTS OF CONVERGING AQUIFIER TEST

PUMPING WELL: M-4-DIKE

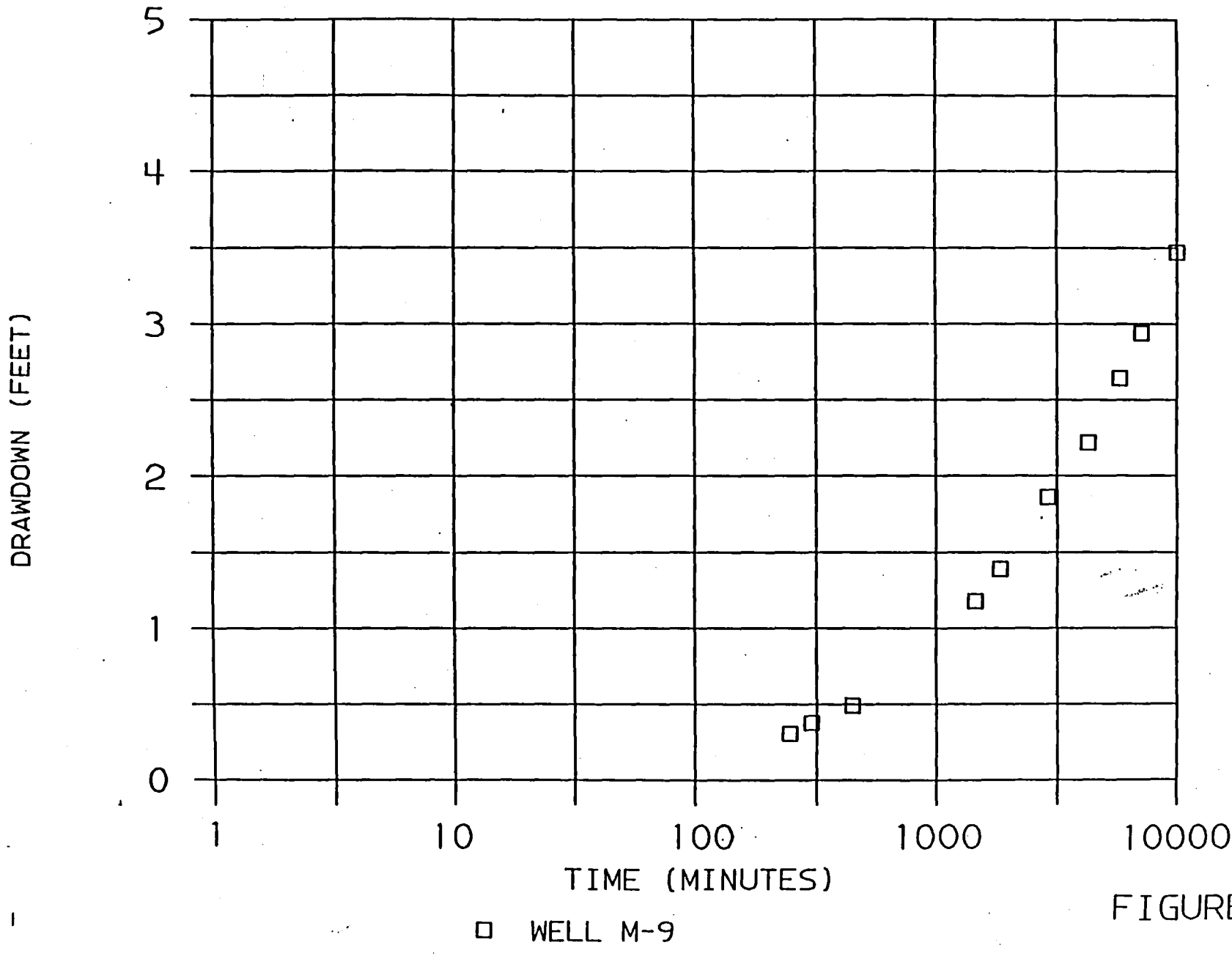


FIGURE 7

RTP 1

RESULTS OF CONVERGING AQUIFIER TEST

DISTANCE-DRAWDOWN PLOT

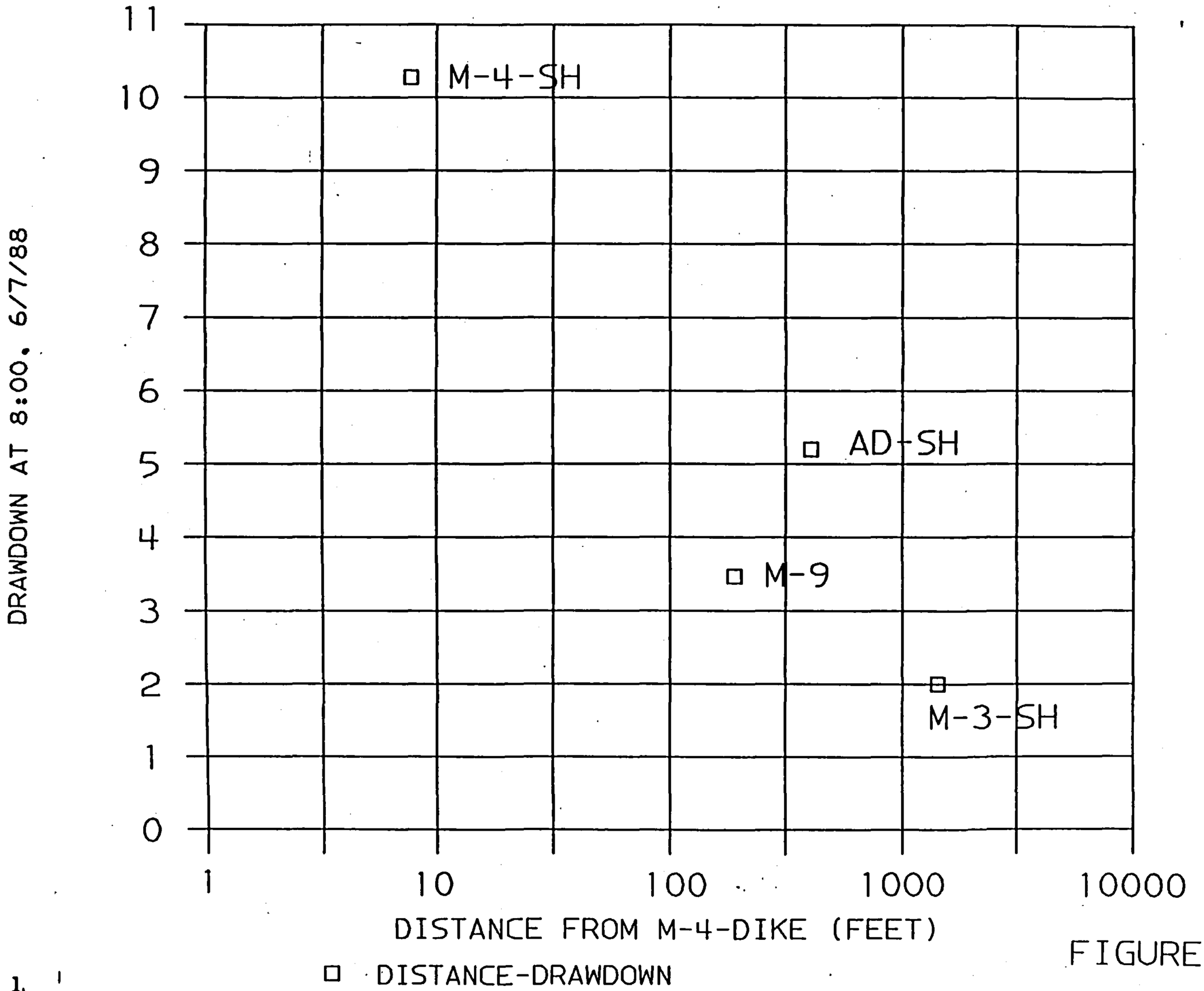


FIGURE 8

RTP 1

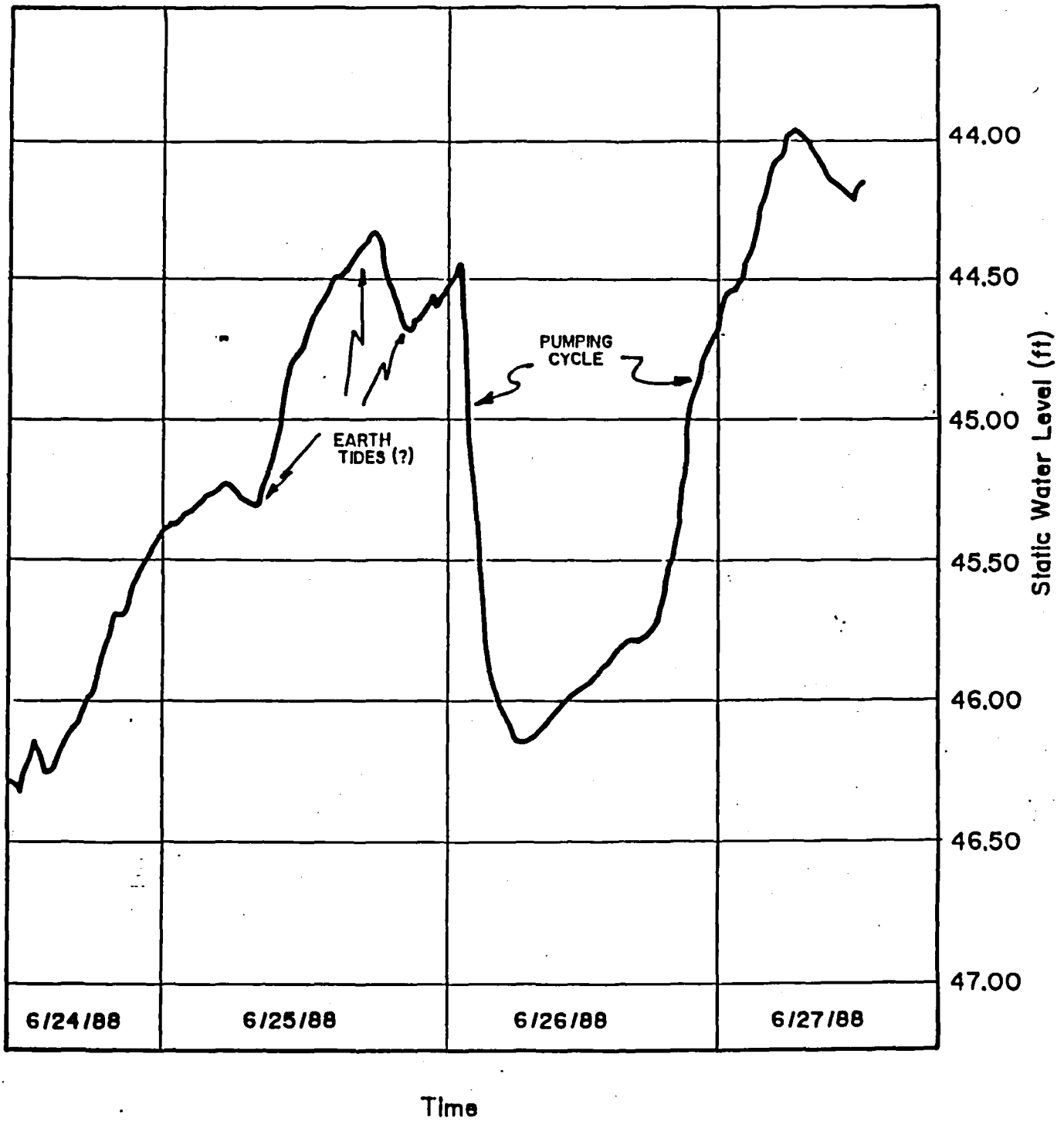
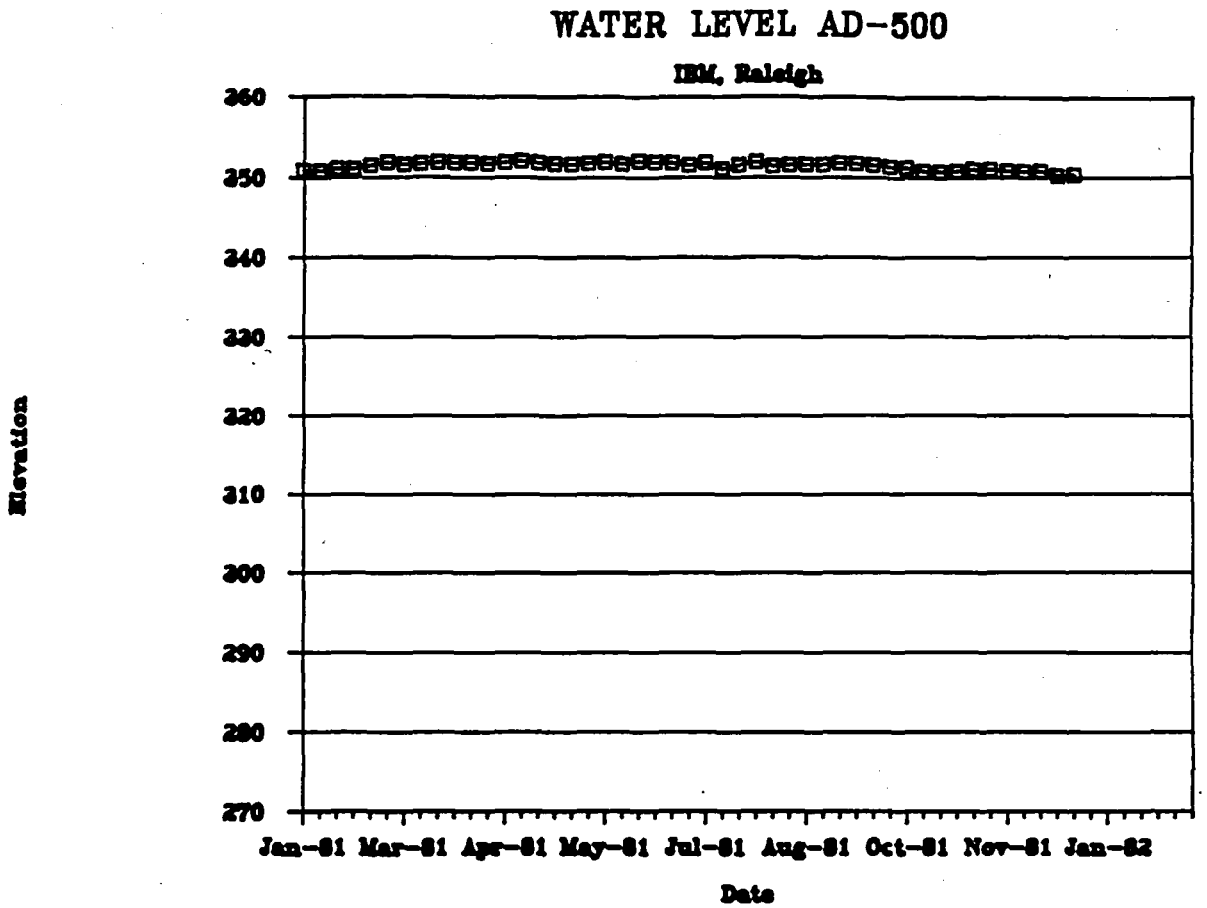
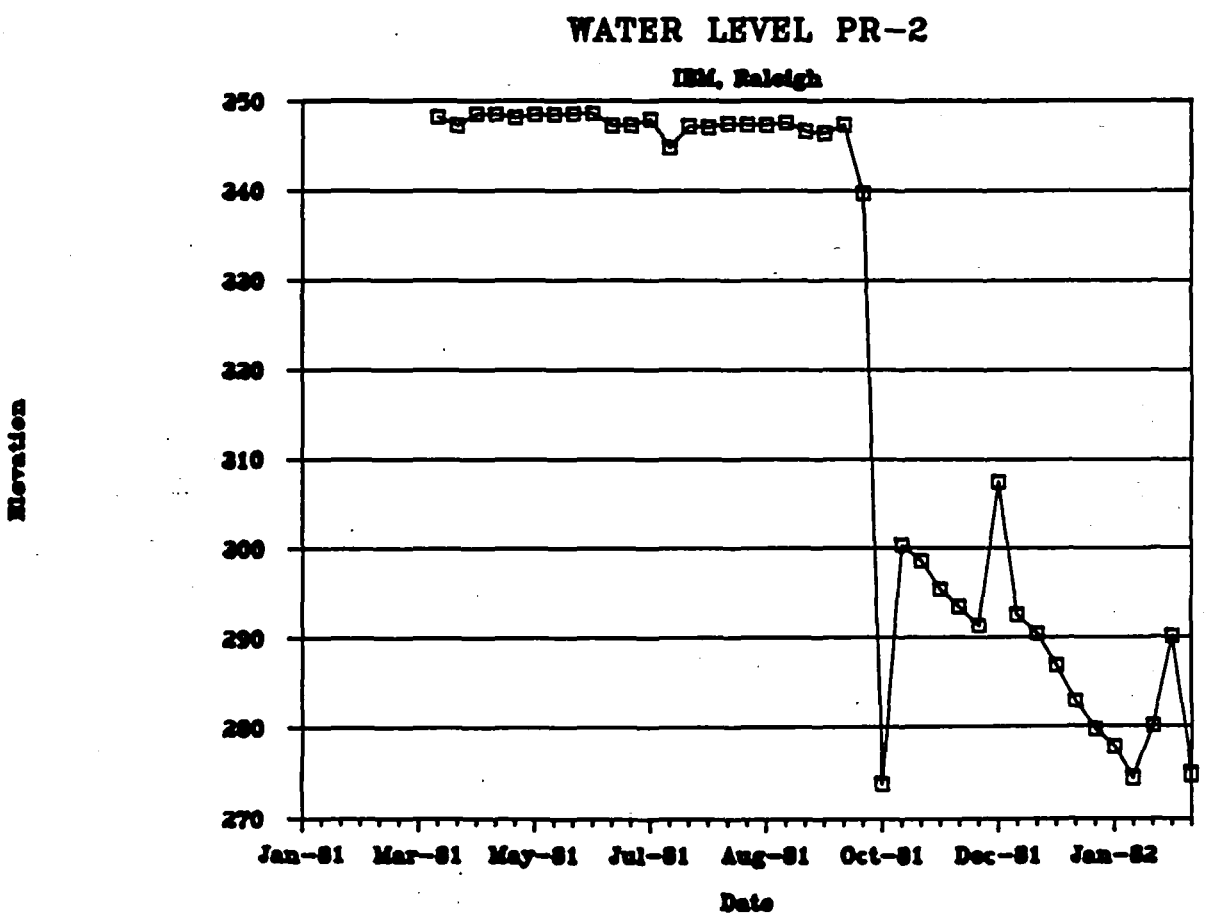


FIGURE 9

M-10-300
WATER LEVEL
FLUCTUATIONS


WATER LEVEL AD-500
IBM, Raleigh
Elevation
260
250
240
230
220
210
200
190
180
170
Jan-81
Mar-81
Apr-81
May-81
Jul-81
Aug-81
Oct-81
Nov-81
Jan-82
Date


WATER LEVEL PR-2
IBM, Raleigh
Elevation
250
240
230
220
210
200
190
180
170
Jan-81
Mar-81
May-81
Jul-81
Aug-81
Oct-81
Dec-81
Jan-82
Date

REFERENCE 15

NUS CORPORATION AND SUBSIDIARIES — **TELECON NOTE**

CONTROL NO:	DATE: 11/7/88	TIME: 1635

DISTRIBUTION:

BETWEEN: Terry Roland, Director of Water Resources	OF: Durham County Water Dept.	PHONE: (919) 683-4381

AND: Eric Corbin, N.US Corp.

DISCUSSION:

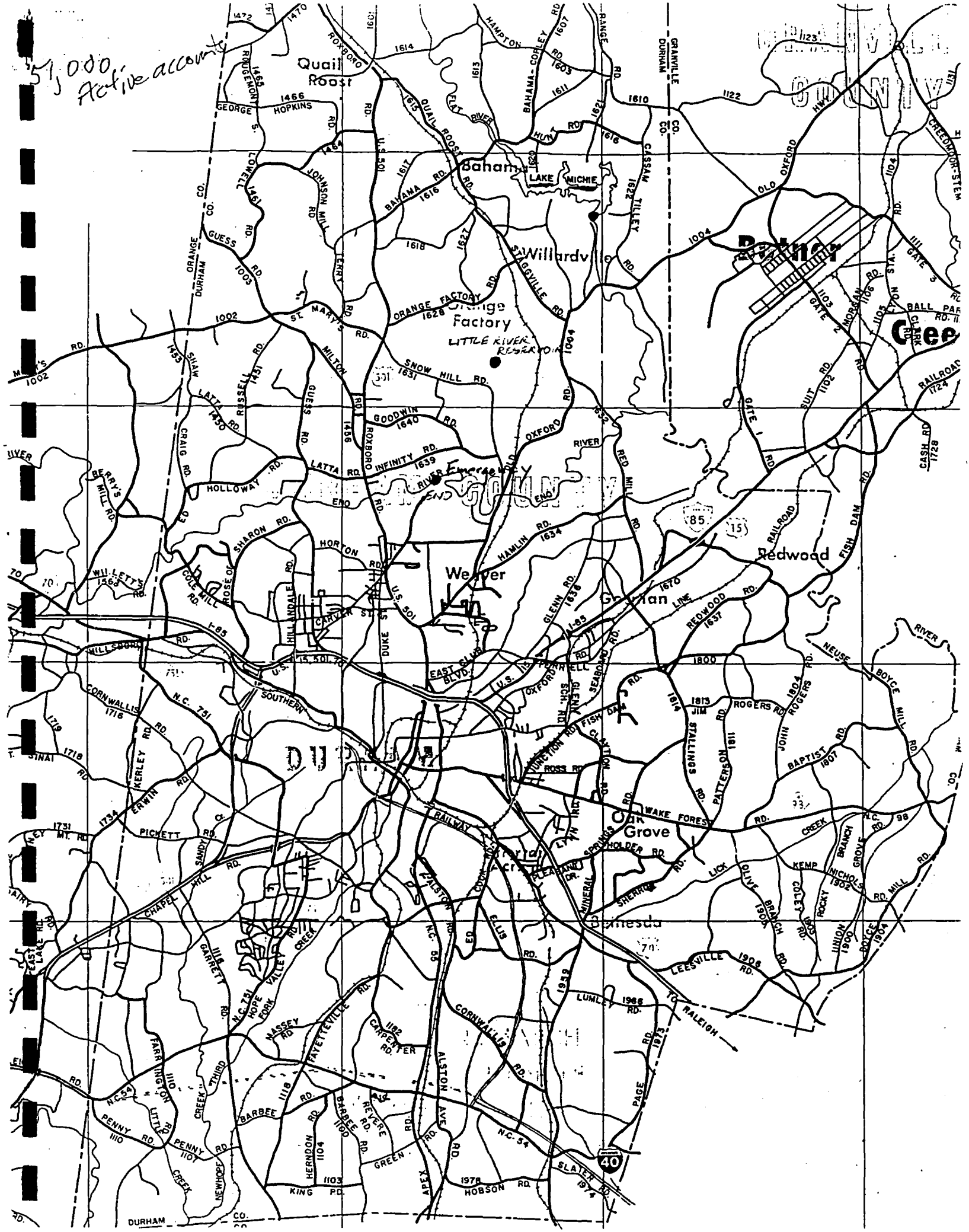
Mr. Roland was contacted in an effort to determine the locations of surface water intakes for Durham County Water Dept's water system. He stated that water for the system was obtained from two surface water intakes, one on the Little River and the other on Flat River, both of which are north of Durham. He stated that they have a third emergency supply intake on Eno River but that it is not used. He also stated that a few individual homeowners have not yet subscribed to municipal service.

Eric Corbin 11/7/88

ACTION ITEMS:

NUS 067 REVISED 0685

51,000 Active accounts



REFERENCE 16

NUS CORPORATION AN

TELECON NOTE

CONTROL NO:	DATE: 11/7/88	TIME: 1200

DISTRIBUTION:

BETWEEN: Don Baker	OF: N.C. Wildlife Commission	PHONE: (919) 733-3633

AND: Eric Corlin, NUS Corp.

DISCUSSION:

Mr. Baker was contacted in an effort to determine the types of recreational activities conducted on Northeast Creek and the Everett B. Jordan Lake as well as Stirrup Iron Creek and Crabtree Creek. He stated that Northeast Creek & Everett B. Jordan Lake are fished recreationally as well as Crabtree Creek. He did not know if Stirrup Iron Creek was fished. Species caught in these waters include sunfish, and bass. He also stated that EBJ Lake was utilized by boaters yearround.

Eric Corlin 11/7/88

ACTION ITEMS:

NUS 067 REVISED 0685

Reference 5

"Rite in the Rain"
WEATHERPROOF

LEVEL

NOTEBOOK NO. 311

FA 8825

FA 8804 25

IBM CORPORATION

RESEARCH TRIANGLE PARK, N. CAROLINA

THOMAS D SHERROD, PROJ MGR.

REFERENCE 17

a product of

J. L. DARLING CORPORATION
TACOMA, WASHINGTON 98421 U.S.A.

LOGBOOK REQUIREMENTS
REVISED - JANUARY 6, 1988

NOTE: ALL LANGUAGE SHOULD BE FACTUAL AND OBJECTIVE

1. Record on front cover of the Logbook:

   TDD No., Site Name, Site Location, Project Manager

2. All entries are made using ink.
3. Provide statement referencing Equipment Location Log.
4. Statement of Work Plan, Study Plan, and Safety Plan discussion and distribution to field team with team member signatures.
5. Sign and date each page. Project Manager is to review and sign off on each logbook daily.
6. A single line is drawn through error. Each correction is dated/initialed.
7. Report weather conditions. Provide general site description and remarks.
8. Document all changes from project planning documents.
9. Provide a site sketch with sample locations.
10. Document all calibration and pre-operational checks of equipment.
11. Provide reference to Sampling Field Sheets for detailed sampling information.
12. Maintain photo log by completing the stamped information at the end of the logbook.
13. If no site representative is on hand to accept the receipt for samples an entry to that effect must be placed in the logbook.

000001

4-26-88

This log book will be used to record data from the Phase I Preliminary Reassessment of IBM Corporation's Research Triangle Park Plant in Durham Co., N. Carolina.

All entries will be made by myself, and each page verified by signature. All errors and corrections will be initialed.

No samples will be collected as part of this recon. No equipment or materials will be utilized.

A work plan detailing activities is on file under TDD#F9880425. No Study Plan on Health and Safety plan is required at this point in investigation.

J. Schmid

4-26-88

1500 Travel to RTP from Apex, N.C. after completing unrelated recon.

Arrive at IBM Corp - RTP plant. Facility occupies several hundred acres including office complexes.

Drive through complex from Cornelius Rd. Pass by two large office complexes, but production areas are restricted. Area of spill therefore not accessible. Drive around perimeter of IBM property - observe hydrants in area, curbing and sewer drains throughout area. Appears to be no access to rear of plant where storage tanks are located. High fencing and a guarded gate in rear.

Drive to hotel in Chapel Hill, NC.

000002

Jon Sherrod

4-27-88

0800 Drive to Durham, N.C., Department of Water & Sewer for city and surrounding area. Meet with Larry McGlothlin asst. engineer in department. Larry provides me with a map of water supply lines in the RTP area. Apparently, all businesses and residences are using or have available city water. Larry knew of no private drinking water wells in the area, but thought there may be some houses not tied in to city service. He will try to locate them.

1120 Drive through RTP area. Can find no private wells within 4 mile radius of IBM facility. Complete survey checklist on following pages.

Jon Sherrod

000003

4/27/88

RECONNAISSANCE CHECKLIST FOR HRS2 CONCERNS

Instructions: Obtain as much "up front" information as possible prior to conducting fieldwork. Complete the form in as much detail as you can, providing attachments as necessary. Cite the source for all information obtained.

Site name: IBM Corp
City, County, State: Research Triangle Park, Durham Co, N.C.
EPA ID No.: NCD041463761
Person responsible for form: T. Sherrod
Date: 4-27-88

Air Pathway

Describe any potential air emission sources onsite: unknown

Identify any sensitive environments within 4 miles: N/A

Identify the maximally exposed individual (nearest residence or regularly occupied building - workers do count): IBM Building

Groundwater Pathway

Identify any areas of karst terrain: N/A

Identify additional population due to consideration of wells completed in overlying aquifers to the AOC: N/A

Do significant targets exist between 3 and 4 miles from the site? No

Is the AOC a sole source aquifer according to Safe Drinking Water Act? (i.e. is the site located in Dade, Broward, Volusia, Putnam, or Flager County, Florida) No

Sam Schmid

4/27/88

4

Surface Water Pathway

Are there intakes located on the extended 15-mile migration pathway?
N/A

Are there recreational areas, sensitive environments, or human food chain targets (fisheries) along the extended pathway? N/A

Onsite Exposure Pathway

Is there waste or contaminated soil onsite at 2 feet below land surface or higher?
Unknown, but possible from previous reports. Soil was removed

Is the site accessible to non-employees (workers do not count)?
No

Are there residences, schools, or daycare centers onsite or in close proximity?
All industrial area

Are there barriers to travel (e.g., a river) within one mile? No

1320 call Larry McGlothlin of Durham water at sewer. He had not been able to locate a single private well in area now identify areas where water service is not available. In response to my questions, he did say that the area creeks are sometimes fished. Municipal water supply is from reservoir north of Durham

Sam Schmid

4/27/88

000007

Geophysical Reconnaissance Checklist

1. Take representative photos that show site. See log
2. Note all man-made features and their relative distances from areas of interest. Buildings and associated power lines
3. The presence of background areas near suspected waste areas is important. If there is a vacant lot, field, etc. next to the site, inquire about ownership so that access can be obtained if necessary. Industrial area, possible interference
4. Show or describe site conditions. Is it wooded, brushy? Can it be easily walked over? Not Known
5. Type of soil, moisture content. Typical depth to water table. saprolite
6. Geology of area. Piedmont: saprolite w/ diabase dikes
7. Information on wells. No private wells known in area

The work plan for this investigation has been read and understood by myself and the following team members

Dan Sherrod

James E. Bartkowski

This concludes the phase I of this investigation.

000006

Dan Sherrod

REFERENCE 18

WATER USE SURVEY

(1)

Name and address of resident

Jim Rich
Rt. 4
Elizabeth N.C.
( ) 544-8041

Check water source(s) used by resident

1. DRILLED WELL ✓ DEPTH 2000' WATER LEVEL
2. DUG WELL DEPTH WATER LEVEL
3. SPRING ARTESIAN GRAVITY
4. SURFACE WATER
5. PUBLIC SUPPLY
6. OTHER

Check water use(s) and specify water source of each

DRINKING ✓ NUMBER OF USERS 4 SOURCE Well
HOUSEHOLD ✓ NUMBER OF USERS 4 SOURCE Well
IRRIGATION ACRES CROP SOURCE
OTHER

ANY PROBLEMS WITH WATER? None

HOW LO[illegible] IN USE? @ 40 yrs.

ANY MONITORING WELLS ON PROPERTY?

PREPARED BY Eric Corbin DATE 10-13-88

COMMENTS Mr. Rich stated that his next door neighbor, Mrs. Davis is also on a private well.

2

(1)

WATER USE SURVEY

Name and address of resident

Augusta High
4901 South Austin
Durham S.C.
(____) _____

(Larry Booth next door neighbor supplies water to her from his 19464-5013 Deep River

EPA has Storage Unit next door that they lease from Mr. Booth

Check water source(s) used by resident

1. DRILLED WELL _____ DEPTH _____ WATER LEVEL _____
2. DUG WELL _____ DEPTH _____ WATER LEVEL _____
3. SPRING _____ ARTESIAN _____ GRAVITY _____
4. SURFACE WATER _____ _____
5. PUBLIC SUPPLY _____ _____
6. OTHER _____ _____

Check water use(s) and specify water source of each

DRINKING _____ NUMBER OF USERS _____ SOURCE _____

HOUSEHOLD _____ NUMBER OF USERS _____ SOURCE _____

IRRIGATION _____ ACRES _____ CROP _____ SOURCE _____

OTHER _____

ANY PROBLEMS WITH WATER? Baderiological problem 1½ - 2 months. Durham Co. Health [illegible] t was safe to drink

HOW LO[illegible]EN IN USE? _____

ANY MONITORING WELLS ON PROPERTY? _____

PREPARED BY Phil Henderson DATE 10-13-88

COMMENTS Due to poor taste - They drink bottled water. Mrs High drinks the water

RCRA/NPL POLICY QUESTIONNAIRE FOR INITIAL SCREENING

Site Name: Union Carbide Ag Products Company

City: Research Triangle Park State: North Carolina

EPA I.D. Number: NCD986690274

Type of Facility: Generator ✓ Transporter ___ Disposal ___
Treatment ___ Storage (more than 90 days) ___

I. RCRA APPLICABILITY	yes	no
Has this facility treated, stored or disposed of a RCRA hazardous waste since Nov. 19, 1980?	✓	
Has a RCRA Facility Assessment (RFA) been performed on this site?		
Does the facility have a RCRA operating or post-closure permit? If so, date issued _____		
Did the facility file a RCRA Part A application?	✓	
If so:		
1) Does the facility currently have interim status?		✓
2) Did the facility withdraw its interim status?	✓	
3) Is the facility a known or possible protective filer?		✓
Is the facility a late (after Nov. 19, 1980) or non-filer that has been identified by EPA or the State?		✓

STOP HERE IF ALL ANSWERS TO QUESTIONS IN SECTION I ARE NO

II. FINANCIAL STATUS		
Is the facility owned by an entity that has filed for bankruptcy under federal or State laws?		✓

III. RCRA ENFORCEMENT STATUS		
Has the facility lost authorization to operate or had its interim status revoked?		✓
Has the facility been involved in any other RCRA enforcement action? * General state conducted facility inspections	* ✓	

United States
Environmental Protection
Agency

Office of Emergency and
Remedial Response
Washington, DC 20460

EPA Form 2070-13
July 1981

EPA

Potential Hazardous Waste Site

Site Inspection Report

Site Inspection Report

EPA

POTENTIAL HAZARDOUS WASTE SITE
SITE INSPECTION REPORT
PART 1 - SITE LOCATION AND INSPECTION INFORMATION

I. IDENTIFICATION

01 STATE	02 SITE NUMBER
NC	

II. SITE NAME AND LOCATION

01 SITE NAME (Legal, common, or descriptive name of site)	02 STREET, ROUTE NO., OR SPECIFIC LOCATION IDENTIFIER
Union Carbide Agricultural Products Co. (Currently Rhone-Poulenc)	P.O. Box 12014 (T.W. Alexander Drive)

03 CITY	04 STATE	05 ZIP CODE	06 COUNTY	07 COUNTY CODE	08 CONG DIST
Research Triangle Park	NC	27709	Durham	32	2

09 COORDINATES: LATITUDE 35° 44 41.N LONGITUDE 78° 51 05.W

10 TYPE OF OWNERSHIP (Check one): ☑ A. PRIVATE ☐ B. FEDERAL ☐ C. STATE ☐ D. COUNTY ☐ E. MUNICIPAL ☐ F. OTHER ☐ G. UNKNOWN

III. INSPECTION INFORMATION

01 DATE OF INSPECTION: 10,13,88 (MONTH DAY YEAR)

02 SITE STATUS: ☑ ACTIVE ☐ INACTIVE

03 YEARS OF OPERATION: 1980 (BEGINNING YEAR) (Currently Active) (ENDING YEAR) ___ UNKNOWN

04 AGENCY PERFORMING INSPECTION (Check all that apply): ☑ A. EPA ☑ B. EPA CONTRACTOR NUS Corp. (Name of firm) ☐ C. MUNICIPAL ☐ D. MUNICIPAL CONTRACTOR ___ (Name of firm) ☐ E. STATE ☐ F. STATE CONTRACTOR ___ (Name of firm) ☐ G. OTHER ___ (Specify)

05 CHIEF INSPECTOR	06 TITLE	07 ORGANIZATION	08 TELEPHONE NO
Eric Corbin	Environmental Scientist	NUS Corp.	(404) 938-7710

09 OTHER INSPECTORS	10 TITLE	11 ORGANIZATION	12 TELEPHONE NO.
Phil Henderson	Geologist	NUS Corp.	(404) 938-7710
Undine Johnson	EPA State Project Officer	EPA	(404) 347-5065
Robert Morris	EPA State Project Officer	EPA	(404) 347-5065
			( )
			( )

13 SITE REPRESENTATIVES INTERVIEWED	14 TITLE	15 ADDRESS	16 TELEPHONE NO
			( )
			( )
			( )
			( )
			( )
			( )

17 ACCESS GAINED BY (Check one)	18 TIME OF INSPECTION	19 WEATHER CONDITIONS
☐ PERMISSION ☐ WARRANT	1100	Sunny skies with highs in the low-to mid 60's

IV. INFORMATION AVAILABLE FROM

01 CONTACT	02 OF (Agency/Organization)	03 TELEPHONE NO.
		( )

04 PERSON RESPONSIBLE FOR SITE INSPECTION FORM	05 AGENCY	06 ORGANIZATION	07 TELEPHONE NO.	08 DATE
Eric Corbin	EPA	NUS Corp.	404-938-7710	11.9.88 (MONTH DAY YEAR)

EPA FORM 2070-13 (7-81)

EPA

POTENTIAL HAZARDOUS WASTE SITE
SITE INSPECTION REPORT
PART 2 - WASTE INFORMATION

I. IDENTIFICATION

01 STATE	02 SITE NUMBER
NC	D980600274

II. WASTE STATES, QUANTITIES, AND CHARACTERISTICS

01 PHYSICAL STATES (Check all that apply)

- ☑ A SOLID
- ☐ B POWDER, FINES
- ☐ C SLUDGE
- ☐ D OTHER rags, gloves, etc (Specify)
- ☐ E SLURRY
- ☑ F LIQUID
- ☐ G GAS

02 WASTE QUANTITY AT SITE (Measures of waste quantities must be independent)

TONS _____

CUBIC YARDS _____

NO. OF DRUMS _____

03 WASTE CHARACTERISTICS (Check all that apply)

- ☐ A. TOXIC
- ☐ 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			On 7-2-81, Union Carbide applied for
OLW	OILY WASTE			interim status under RCRA section 3005(e).
SOL	SOLVENTS			The estimated annual quantity of waste
PSD	PESTICIDES	133,730	lbs/yr.	generated is listed in that application
OCC	OTHER ORGANIC CHEMICALS			as 133,730 lb./yr. On 1-6-82, UC
IOC	INORGANIC CHEMICALS			withdrew this application. The gross amount
ACD	ACIDS			figure represents that indicated by U.C. on
BAS	BASES			7-2-81; this figure might not apply
MES	HEAVY METALS			at present.

IV. HAZARDOUS SUBSTANCES (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
D001	Ignitability	—	Containerized in drums	Unknown	
D002	Corrosivity	—	and removed from site	"	—
F002	Spent halog. solvents	—	within 90 days as	"	—
F003	Spent non-halog. solvents	—	provided by 40 CFR	"	—
F005	Spent halog. solvents	—	Section 262.34.	"	—
P066	Methomyl	16752775		"	—
P070	2-Methyl-... Oxime	?	"	"	—
P089	Parathion	56382	"	"	—
U011	Amitrole	61825	"	"	—
U019	Benzene	71432	"	"	—
U044	Chloroform	67663	"	"	—
U056	Cyclohexane	110827	"	"	—
U108	1,4-Dioxane	123911	"	"	—
U165	Naphthalene	91203	"	"	—
U211	Tetrachloromethane	56235	"	"	—
U232	2,4,5-T. Acid	93765	"	"	—

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)

1) RCRA Part A applications, 7-2-81
2) RCRA notifications dated 9-2-81 and 1-5-82 (EPA Form 8700-12)(6-80)
3) Personal conversation with Paul Borna of Union Carbide Ag Products by O.W. Strickland NCDHR
4) EPA CERCLA + State of North Carolina CERCLA File material.

EPA FORM 2070-13 (7-81)

EPA

POTENTIAL HAZARDOUS WASTE SITE
SITE INSPECTION REPORT
PART 3 - DESCRIPTION OF HAZARDOUS CONDITIONS AND INCIDENTS

I. IDENTIFICATION	
01 STATE	02 SITE NUMBER
NC	D980620274

II. HAZARDOUS CONDITIONS AND INCIDENTS

01 ☑ A. GROUNDWATER CONTAMINATION — 02 ☐ OBSERVED (DATE: 11/13-14/88) — ☑ POTENTIAL — ☐ ALLEGED
03 POPULATION POTENTIALLY AFFECTED: 98
04 NARRATIVE DESCRIPTION

01 ☑ B. SURFACE WATER CONTAMINATION — 02 ☐ OBSERVED (DATE: _____) — ☑ POTENTIAL — ☐ ALLEGED
03 POPULATION POTENTIALLY AFFECTED: _____
04 NARRATIVE DESCRIPTION

01 ☐ C. CONTAMINATION OF AIR — 02 ☐ OBSERVED (DATE: _____) — ☐ POTENTIAL — ☐ ALLEGED
03 POPULATION POTENTIALLY AFFECTED: _____
04 NARRATIVE DESCRIPTION

Unknown

01 ☐ D. FIRE/EXPLOSIVE CONDITIONS — 02 ☐ OBSERVED (DATE: _____) — ☐ POTENTIAL — ☐ ALLEGED
03 POPULATION POTENTIALLY AFFECTED: _____
04 NARRATIVE DESCRIPTION

Unknown

01 ☑ E. DIRECT CONTACT — 02 ☐ OBSERVED (DATE: _____) — ☐ POTENTIAL — ☐ ALLEGED
03 POPULATION POTENTIALLY AFFECTED: Workers at Rhone-Poulenc
04 NARRATIVE DESCRIPTION

01 ☐ F. CONTAMINATION OF SOIL — 02 ☐ OBSERVED (DATE: _____) — ☐ POTENTIAL — ☐ ALLEGED
03 AREA POTENTIALLY AFFECTED: _____ (Acres)
04 NARRATIVE DESCRIPTION

Unknown

01 ☐ G. DRINKING WATER CONTAMINATION — 02 ☐ OBSERVED (DATE: _____) — ☐ POTENTIAL — ☐ ALLEGED
03 POPULATION POTENTIALLY AFFECTED: _____
04 NARRATIVE DESCRIPTION

Unknown

01 ☐ H. WORKER EXPOSURE/INJURY — 02 ☐ OBSERVED (DATE: _____) — ☐ POTENTIAL — ☐ ALLEGED
03 WORKERS POTENTIALLY AFFECTED: _____
04 NARRATIVE DESCRIPTION

Unknown

01 ☐ I. POPULATION EXPOSURE/INJURY — 02 ☐ OBSERVED (DATE: _____) — ☐ POTENTIAL — ☐ ALLEGED
03 POPULATION POTENTIALLY AFFECTED: _____
04 NARRATIVE DESCRIPTION

Unknown

EPA

POTENTIAL HAZARDOUS WASTE SITE
SITE INSPECTION REPORT
PART 3 - DESCRIPTION OF HAZARDOUS CONDITIONS AND INCIDENTS

I. IDENTIFICATION

01 STATE	02 SITE NUMBER
NC	D980600274

II. HAZARDOUS CONDITIONS AND INCIDENTS (Continued)

01 ☐ J. DAMAGE TO FLORA — 02 ☐ OBSERVED (DATE: _____) ☐ POTENTIAL ☐ ALLEGED
04 NARRATIVE DESCRIPTION

Unknown

01 ☐ K. DAMAGE TO FAUNA — 02 ☐ OBSERVED (DATE: _____) ☐ POTENTIAL ☐ ALLEGED
04 NARRATIVE DESCRIPTION (Include names(s) of species)

Unknown

01 ☐ L. CONTAMINATION OF FOOD CHAIN — 02 ☐ OBSERVED (DATE: _____) ☐ POTENTIAL ☐ ALLEGED
04 NARRATIVE DESCRIPTION

Unknown

01 ☐ M. UNSTABLE CONTAINMENT OF WASTES (Spills, Runoff, Standing liquids, Leaking drums) — 02 ☐ OBSERVED (DATE: _____) ☐ POTENTIAL ☐ ALLEGED
03 POPULATION POTENTIALLY AFFECTED: _____ 04 NARRATIVE DESCRIPTION

Unknown

01 ☐ N. DAMAGE TO OFFSITE PROPERTY — 02 ☐ OBSERVED (DATE: _____) ☐ POTENTIAL ☐ ALLEGED
04 NARRATIVE DESCRIPTION

Unknown

01 ☐ O. CONTAMINATION OF SEWERS, STORM DRAINS, WWTPs — 02 ☐ OBSERVED (DATE: _____) ☐ POTENTIAL ☐ ALLEGED
04 NARRATIVE DESCRIPTION

Unknown

01 ☐ P. ILLEGAL/UNAUTHORIZED DUMPING — 02 ☐ OBSERVED (DATE: _____) ☐ POTENTIAL ☐ ALLEGED
04 NARRATIVE DESCRIPTION

Unknown

05 DESCRIPTION OF ANY OTHER KNOWN, POTENTIAL, OR ALLEGED HAZARDS

III. TOTAL POPULATION POTENTIALLY AFFECTED: _____

IV. COMMENTS

V. SOURCES OF INFORMATION (Cite specific references, e. g., state files, sample analysis, reports)

EPA CERCLA and State of North Carolina CERCLA and NUS Corp. file material.

EPA

POTENTIAL HAZARDOUS WASTE SITE
SITE INSPECTION
PART 4 - PERMIT AND DESCRIPTIVE INFORMATION

I. IDENTIFICATION

01 STATE	02 SITE NUMBER
NC	D980600274

II. PERMIT INFORMATION

01 TYPE OF PERMIT ISSUED (Check all that apply)	02 PERMIT NUMBER	03 DATE ISSUED	04 EXPIRATION DATE	05 COMMENTS
☐ A. NPDES				
☐ B. UIC				
☐ C. AIR				
☐ D. RCRA				
☐ E. RCRA INTERIM STATUS				
☐ F. SPCC PLAN				
☐ G. STATE (Specify)				
☐ H. LOCAL (Specify)				
☐ I. OTHER (Specify)				
☐ J. NONE				

III. SITE DESCRIPTION

01 STORAGE/DISPOSAL (Check all that apply)	02 AMOUNT	03 UNIT OF MEASURE
☐ A. SURFACE IMPOUNDMENT		
☐ B. PILES		
☑ C. DRUMS, ABOVE GROUND	133,730 lbs./yr	
☐ D. TANK, ABOVE GROUND		
☐ E. TANK, BELOW GROUND		
☐ F. LANDFILL		
☐ G. LANDFARM		
☐ H. OPEN DUMP		
☐ I. OTHER (Specify)		

04 TREATMENT (Check all that apply)
- ☐ A. INCENERATION
- ☐ B. UNDERGROUND INJECTION
- ☐ C. CHEMICAL/PHYSICAL
- ☐ D. BIOLOGICAL
- ☐ E. WASTE OIL PROCESSING
- ☐ F. SOLVENT RECOVERY
- ☐ G. OTHER RECYCLING/RECOVERY
- ☐ H. OTHER (Specify)

05 OTHER
- ☑ A. BUILDINGS ON SITE

06 AREA OF SITE: _____ (Acres)

07 COMMENTS
133,730 lbs/yr. of waste ~~was~~ generated by Union Carbide as of 7-2-81, waste was containerized in drums and removed from site within 90 days.

IV. CONTAINMENT

01 CONTAINMENT OF WASTES (Check one)

☐ A. ADEQUATE, SECURE ☐ B. MODERATE ☐ C. INADEQUATE, POOR ☐ D. INSECURE, UNSOUND, DANGEROUS

02 DESCRIPTION OF DRUMS, DIKING, LINERS, BARRIERS, ETC.

V. ACCESSIBILITY

01 WASTE EASILY ACCESSIBLE: ☑ YES ☐ NO

02 COMMENTS
If waste areas are actually present outside the ~~area~~ the accessibility ~~to these~~ areas is possible.

VI. SOURCES OF INFORMATION (Cite specific references, e.g. state files, sample analysis, reports)

EPA CERCLA, State of North Carolina CERCLA file material

EPA

POTENTIAL HAZARDOUS WASTE SITE
SITE INSPECTION REPORT
PART 5 - WATER, DEMOGRAPHIC, AND ENVIRONMENTAL DATA

I. IDENTIFICATION

01 STATE	02 SITE NUMBER
NC	D980600274

II. DRINKING WATER SUPPLY

01 TYPE OF DRINKING SUPPLY (Check as applicable)	SURFACE	WELL	02 STATUS: ENDANGERED	AFFECTED	MONITORED	03 DISTANCE TO SITE
COMMUNITY	A. ☑	B. ☐	A. ☐	B. ☐	C. ☐	A. @18 (mi)
NON-COMMUNITY	C. ☐	D. ☐	D. ☐	E. ☐	F. ☐	B. _____ (mi)

III. GROUNDWATER

01 GROUNDWATER USE IN VICINITY (Check one)

☐ A. ONLY SOURCE FOR DRINKING ☑ B. DRINKING (Other sources available) COMMERCIAL, INDUSTRIAL, IRRIGATION (No other water sources available) ☐ C. COMMERCIAL, INDUSTRIAL, IRRIGATION (Limited other sources available) ☐ D. NOT USED, UNUSEABLE

02 POPULATION SERVED BY GROUND WATER @98 within 4 miles of facility 03 DISTANCE TO NEAREST DRINKING WATER WELL <1 (mi)

04 DEPTH TO GROUNDWATER	05 DIRECTION OF GROUNDWATER FLOW	06 DEPTH TO AQUIFER OF CONCERN	07 POTENTIAL YIELD OF AQUIFER	08 SOLE SOURCE AQUIFER
@ 30 (ft)	Unknown	_____ (ft)	_____ (gpd)	☐ YES ☑ NO

09 DESCRIPTION OF WELLS (Including usage, depth, and location relative to population and buildings)

10 RECHARGE AREA		11 DISCHARGE AREA	
☐ YES ☐ NO	COMMENTS	☐ YES ☐ NO	COMMENTS

IV. SURFACE WATER

01 SURFACE WATER USE (Check one)

☐ A. RESERVOIR, RECREATION DRINKING WATER SOURCE ☐ B. IRRIGATION, ECONOMICALLY IMPORTANT RESOURCES ☐ C. COMMERCIAL, INDUSTRIAL ☑ D. NOT CURRENTLY USED

02 AFFECTED/POTENTIALLY AFFECTED BODIES OF WATER

NAME:	AFFECTED	DISTANCE TO SITE
Stinking Iron Creek	☐	<1 (mi)
Crutchfield Creek	☐	@10 (mi)
	☐	_____ (mi)

V. DEMOGRAPHIC AND PROPERTY INFORMATION

01 TOTAL POPULATION WITHIN

ONE (1) MILE OF SITE A. _____ NO. OF PERSONS TWO (2) MILES OF SITE B. _____ NO. OF PERSONS THREE (3) MILES OF SITE C. _____ NO. OF PERSONS

02 DISTANCE TO NEAREST POPULATION _____ (mi)

03 NUMBER OF BUILDINGS WITHIN TWO (2) MILES OF SITE _____

04 DISTANCE TO NEAREST OFF-SITE BUILDING _____ (mi)

05 POPULATION WITHIN VICINITY OF SITE (Provide narrative description of nature of population within vicinity of site, e.g., rural, village, densely populated urban area)

EPA

POTENTIAL HAZARDOUS WASTE SITE
SITE INSPECTION REPORT
PART 5 - WATER, DEMOGRAPHIC, AND ENVIRONMENTAL DATA

I. IDENTIFICATION	
01 STATE	02 SITE NUMBER
NC	D980600274

VI. ENVIRONMENTAL INFORMATION

01 PERMEABILITY OF UNSATURATED ZONE (Check one)

☐ A. $10^{-6} - 10^{-8}$ cm/sec ☐ B. $10^{-4} - 10^{-6}$ cm/sec ☐ C. $10^{-4} - 10^{-3}$ cm/sec ☐ D. GREATER THAN 10^{-3} cm/sec

02 PERMEABILITY OF BEDROCK (Check one)

☐ A. IMPERMEABLE (Less than 10^{-6} cm/sec) ☐ B. RELATIVELY IMPERMEABLE ($10^{-4} - 10^{-6}$ cm/sec) ☐ C. RELATIVELY PERMEABLE ($10^{-2} - 10^{-4}$ cm/sec) ☐ D. VERY PERMEABLE (Greater than 10^{-2} cm/sec)

03 DEPTH TO BEDROCK	04 DEPTH OF CONTAMINATED SOIL ZONE	05 SOIL pH
10,000 (ft)	(ft)	

06 NET PRECIPITATION	07 ONE YEAR 24 HOUR RAINFALL	08 SLOPE SITE SLOPE	DIRECTION OF SITE SLOPE	TERRAIN AVERAGE SLOPE
3.0 (in)	3.0 (in)	0 %		0 %

09 FLOOD POTENTIAL

SITE IS IN _____ YEAR FLOODPLAIN

10 ☐ SITE IS ON BARRIER ISLAND, COASTAL HIGH HAZARD AREA, RIVERINE FLOODWAY

11 DISTANCE TO WETLANDS (5 acre minimum)

ESTUARINE: A. _____ (mi)

OTHER: B. _____ (mi)

12 DISTANCE TO CRITICAL HABITAT (of endangered species)

_____ (mi)

ENDANGERED SPECIES: _____

13 LAND USE IN VICINITY

DISTANCE TO:

COMMERCIAL/INDUSTRIAL	RESIDENTIAL AREAS; NATIONAL/STATE PARKS, FORESTS, OR WILDLIFE RESERVES	AGRICULTURAL LANDS PRIME AG LAND	AGRICULTURAL LANDS AG LAND
A. <1 (mi)	B. <1 (mi)	C. _____ (mi)	D. _____ (mi)

14 DESCRIPTION OF SITE IN RELATION TO SURROUNDING TOPOGRAPHY

VII. SOURCES OF INFORMATION (Cite specific references, e.g., state files, sample analysis, reports)

EPA CERCLA and State of North Carolina and NUS Corp. file materials

EPA FORM 2070-13 (7-81)

EPA

POTENTIAL HAZARDOUS WASTE SITE
SITE INSPECTION REPORT
PART 6 - SAMPLE AND FIELD INFORMATION

I. IDENTIFICATION

01 STATE	02 SITE NUMBER
NC	D980600274

II. SAMPLES TAKEN

SAMPLE TYPE	01 NUMBER OF SAMPLES TAKEN	02 SAMPLES SENT TO	03 ESTIMATED DATE RESULTS AVAILABLE
GROUNDWATER			
SURFACE WATER			
WASTE			
AIR			
RUNOFF			
SPILL			
SOIL			
VEGETATION			
OTHER			

III. FIELD MEASUREMENTS TAKEN

01 TYPE	02 COMMENTS

IV. PHOTOGRAPHS AND MAPS

01 TYPE ☐ GROUND ☐ AERIAL

02 IN CUSTODY OF _____ (Name of organization or individual)

03 MAPS ☐ YES ☐ NO

04 LOCATION OF MAPS _____

V. OTHER FIELD DATA COLLECTED (Provide narrative description)

VI. SOURCES OF INFORMATION (Cite specific references, e.g., state files, sample analysis, reports)

EPA CERCLA, State of North Carolina CERCLA + NUS Corp. file material.

EPA FORM 2070-13 (7-81)

EPA

POTENTIAL HAZARDOUS WASTE SITE
SITE INSPECTION REPORT
PART 7 - OWNER INFORMATION

I. IDENTIFICATION

01 STATE	02 SITE NUMBER
NC	D980606274

II. CURRENT OWNER(S)

01 NAME	02 D+B NUMBER	03 STREET ADDRESS (P.O. Box, RFD #, etc.)	04 SIC CODE	05 CITY	06 STATE	07 ZIP CODE
Rhone-Poulenc Ag. Co.		2 T.W. Alexander Drive		P.O. Box 12014 Research Triangle Park	N.C.	27709

PARENT COMPANY (If applicable)

08 NAME	09 D+B NUMBER	10 STREET ADDRESS (P.O. Box, RFD #, etc.)	11 SIC CODE	12 CITY	13 STATE	14 ZIP CODE
(Rhone-Poulenc Agrochimie Rhone-Poulenc Inc.		Monmouth Junction, N.J.		Monmouth Junction Lyons France	N.J.	

III. PREVIOUS OWNER(S) (List most recent first)

01 NAME	02 D+B NUMBER	03 STREET ADDRESS (P.O. Box, RFD #, etc.)	04 SIC CODE	05 CITY	06 STATE	07 ZIP CODE
Union Carbide Ag Products Co.		P.O. Box 12014 (T.W. Alexander Drive)		Research Triangle Park	NC	27709

IV. REALTY OWNER(S) (If applicable; list most recent first)

01 NAME	02 D+B NUMBER	03 STREET ADDRESS (P.O. Box, RFD #, etc.)	04 SIC CODE	05 CITY	06 STATE	07 ZIP CODE

V. SOURCES OF INFORMATION (Cite specific references, e.g., state files, sample analysis, reports)

EPA CERCLA, ~~State~~ of N.C. CERCLA + NUS Corp. file material.

EPA FORM 2070-13 (7-81)

EPA

POTENTIAL HAZARDOUS WASTE SITE
SITE INSPECTION REPORT
PART 8 - OPERATOR INFORMATION

I. IDENTIFICATION

01 STATE	02 SITE NUMBER
NC	D980600274

II. CURRENT OPERATOR (Provide if different from owner)

01 NAME: Rhone-Poulenc Ag. Co.	02 D+B NUMBER:
03 STREET ADDRESS (P.O. Box, RFD #, etc.): 2 T. W. Alexander Dr. P.O. Box 12014	04 SIC CODE:
05 CITY: Research Triangle Park	06 STATE: NC.
07 ZIP CODE: 27709	
08 YEARS OF OPERATION:	09 NAME OF OWNER:

OPERATOR'S PARENT COMPANY (If applicable)

10 NAME: Rhone-Poulenc Inc. Rhone-Poulenc Agrochimie	11 D+B NUMBER:
12 STREET ADDRESS (P.O. Box, RFD #, etc.): Monmouth Junction N.J. Lyon France	13 SIC CODE:
14 CITY: Monmouth Junction, N.J. Lyon France	15 STATE: N.J.
16 ZIP CODE:	

III. PREVIOUS OPERATOR(S) (List most recent first; provide only if different from owner)

01 NAME: Union Carbide Ag. Products Co	02 D+B NUMBER:
03 STREET ADDRESS (P.O. Box, RFD #, etc.): P.O. Box 12014 (T.W. Alexander Dr)	04 SIC CODE:
05 CITY: Research Triangle Park	06 STATE: N.C.
07 ZIP CODE: 27709	
08 YEARS OF OPERATION: 1980-1987	09 NAME OF OWNER DURING THIS PERIOD: Union Carbide Ag Prod. Co.

PREVIOUS OPERATORS' PARENT COMPANIES (If applicable)

10 NAME:	11 D+B NUMBER:
12 STREET ADDRESS (P.O. Box, RFD #, etc.):	13 SIC CODE:
14 CITY:	15 STATE:
16 ZIP CODE:	

01 NAME:	02 D+B NUMBER:
03 STREET ADDRESS (P.O. Box, RFD #, etc.):	04 SIC CODE:
05 CITY:	06 STATE:
07 ZIP CODE:	
08 YEARS OF OPERATION:	09 NAME OF OWNER DURING THIS PERIOD:

10 NAME:	11 D+B NUMBER:
12 STREET ADDRESS (P.O. Box, RFD #, etc.):	13 SIC CODE:
14 CITY:	15 STATE:
16 ZIP CODE:	

01 NAME:	02 D+B NUMBER:
03 STREET ADDRESS (P.O. Box, RFD #, etc.):	04 SIC CODE:
05 CITY:	06 STATE:
07 ZIP CODE:	
08 YEARS OF OPERATION:	09 NAME OF OWNER DURING THIS PERIOD:

10 NAME:	11 D+B NUMBER:
12 STREET ADDRESS (P.O. Box, RFD #, etc.):	13 SIC CODE:
14 CITY:	15 STATE:
16 ZIP CODE:	

IV. SOURCES OF INFORMATION (Cite specific references, e.g., state files, sample analysis, reports)

EPA CORCLA, State of N.C. CORCLA and NUS Corp. file material.

EPA

POTENTIAL HAZARDOUS WASTE SITE
SITE INSPECTION REPORT
PART 9 - GENERATOR/TRANSPORTER INFORMATION

I. IDENTIFICATION	
01 STATE	02 SITE NUMBER
NC	D280600274

II. ON-SITE GENERATOR

01 NAME	02 D+B NUMBER
03 STREET ADDRESS (P.O. Box, RFD #, etc.)	04 SIC CODE
05 CITY	06 STATE / 07 ZIP CODE

III. OFF-SITE GENERATOR(S)

01 NAME	02 D+B NUMBER	01 NAME	02 D+B NUMBER
03 STREET ADDRESS (P.O. Box, RFD #, etc.)	04 SIC CODE	03 STREET ADDRESS (P.O. Box, RFD #, etc.)	04 SIC CODE
05 CITY	06 STATE / 07 ZIP CODE	05 CITY	06 STATE / 07 ZIP CODE
01 NAME	02 D+B NUMBER	01 NAME	02 D+B NUMBER
03 STREET ADDRESS (P.O. Box, RFD #, etc.)	04 SIC CODE	03 STREET ADDRESS (P.O. Box, RFD #, etc.)	04 SIC CODE
05 CITY	06 STATE / 07 ZIP CODE	05 CITY	06 STATE / 07 ZIP CODE

IV. TRANSPORTER(S)

01 NAME	02 D+B NUMBER	01 NAME	02 D+B NUMBER
03 STREET ADDRESS (P.O. Box, RFD #, etc.)	04 SIC CODE	03 STREET ADDRESS (P.O. Box, RFD #, etc.)	04 SIC CODE
05 CITY	06 STATE / 07 ZIP CODE	05 CITY	06 STATE / 07 ZIP CODE
01 NAME	02 D+B NUMBER	01 NAME	02 D+B NUMBER
03 STREET ADDRESS (P.O. Box, RFD #, etc.)	04 SIC CODE	03 STREET ADDRESS (P.O. Box, RFD #, etc.)	04 SIC CODE
05 CITY	06 STATE / 07 ZIP CODE	05 CITY	06 STATE / 07 ZIP CODE

V. SOURCES OF INFORMATION (Cite specific references, e.g., state files, sample analysis, reports)

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POTENTIAL HAZARDOUS WASTE SITE
SITE INSPECTION REPORT
PART 10 - PAST RESPONSE ACTIVITIES

I. IDENTIFICATION	
01 STATE	02 SITE NUMBER
NC	D980600274

II. PAST RESPONSE ACTIVITIES

01 ☐ A. WATER SUPPLY CLOSED — 02 DATE _____ — 03 AGENCY _____
04 DESCRIPTION

01 ☐ B. TEMPORARY WATER SUPPLY PROVIDED — 02 DATE _____ — 03 AGENCY _____
04 DESCRIPTION

01 ☐ C. PERMANENT WATER SUPPLY PROVIDED — 02 DATE _____ — 03 AGENCY _____
04 DESCRIPTION

01 ☐ D. SPILLED MATERIAL REMOVED — 02 DATE _____ — 03 AGENCY _____
04 DESCRIPTION

01 ☐ E. CONTAMINATED SOIL REMOVED — 02 DATE _____ — 03 AGENCY _____
04 DESCRIPTION

01 ☐ F. WASTE REPACKAGED — 02 DATE _____ — 03 AGENCY _____
04 DESCRIPTION

01 ☐ G. WASTE DISPOSED ELSEWHERE — 02 DATE _____ — 03 AGENCY _____
04 DESCRIPTION

01 ☐ H. ON SITE BURIAL — 02 DATE _____ — 03 AGENCY _____
04 DESCRIPTION

01 ☐ I. IN SITU CHEMICAL TREATMENT — 02 DATE _____ — 03 AGENCY _____
04 DESCRIPTION

01 ☐ J. IN SITU BIOLOGICAL TREATMENT — 02 DATE _____ — 03 AGENCY _____
04 DESCRIPTION

01 ☐ K. IN SITU PHYSICAL TREATMENT — 02 DATE _____ — 03 AGENCY _____
04 DESCRIPTION

01 ☐ L. ENCAPSULATION — 02 DATE _____ — 03 AGENCY _____
04 DESCRIPTION

01 ☐ M. EMERGENCY WASTE TREATMENT — 02 DATE _____ — 03 AGENCY _____
04 DESCRIPTION

01 ☐ N. CUTOFF WALLS — 02 DATE _____ — 03 AGENCY _____
04 DESCRIPTION

01 ☐ O. EMERGENCY DIKING/SURFACE WATER DIVERSION — 02 DATE _____ — 03 AGENCY _____
04 DESCRIPTION

01 ☐ P. CUTOFF TRENCHES/SUMP — 02 DATE _____ — 03 AGENCY _____
04 DESCRIPTION

01 ☐ Q. SUBSURFACE CUTOFF WALL — 02 DATE _____ — 03 AGENCY _____
04 DESCRIPTION

EPA

POTENTIAL HAZARDOUS WASTE SITE
SITE INSPECTION REPORT
PART 10 - PAST RESPONSE ACTIVITIES

I. IDENTIFICATION
01 STATE: NC
02 SITE NUMBER: D980600274

II PAST RESPONSE ACTIVITIES (Continued)

01 ☐ R. BARRIER WALLS CONSTRUCTED — 02 DATE _____ — 03 AGENCY _____
04 DESCRIPTION

01 ☐ S. CAPPING/COVERING — 02 DATE _____ — 03 AGENCY _____
04 DESCRIPTION

01 ☐ T. BULK TANKAGE REPAIRED — 02 DATE _____ — 03 AGENCY _____
04 DESCRIPTION

01 ☐ U. GROUT CURTAIN CONSTRUCTED — 02 DATE _____ — 03 AGENCY _____
04 DESCRIPTION

01 ☐ V. BOTTOM SEALED — 02 DATE _____ — 03 AGENCY _____
04 DESCRIPTION

01 ☐ W. GAS CONTROL — 02 DATE _____ — 03 AGENCY _____
04 DESCRIPTION

01 ☐ X. FIRE CONTROL — 02 DATE _____ — 03 AGENCY _____
04 DESCRIPTION

01 ☐ Y. LEACHATE TREATMENT — 02 DATE _____ — 03 AGENCY _____
04 DESCRIPTION

01 ☐ Z. AREA EVACUATED — 02 DATE _____ — 03 AGENCY _____
04 DESCRIPTION

01 ☐ 1. ACCESS TO SITE RESTRICTED — 02 DATE _____ — 03 AGENCY _____
04 DESCRIPTION

01 ☐ 2. POPULATION RELOCATED — 02 DATE _____ — 03 AGENCY _____
04 DESCRIPTION

01 ☐ 3. OTHER REMEDIAL ACTIVITIES — 02 DATE _____ — 03 AGENCY _____
04 DESCRIPTION

III. SOURCES OF INFORMATION (Cite specific references, e.g., state files, sample analysis, reports)

EPA

POTENTIAL HAZARDOUS WASTE SITE
SITE INSPECTION REPORT
PART 11 - ENFORCEMENT INFORMATION

I. IDENTIFICATION	
01 STATE	02 SITE NUMBER
NC	D980600274

II. ENFORCEMENT INFORMATION

01 PAST REGULATORY/ENFORCEMENT ACTION ☐ YES ☐ NO

02 DESCRIPTION OF FEDERAL, STATE, LOCAL REGULATORY/ENFORCEMENT ACTION

III. SOURCES OF INFORMATION *(Cite specific references, e.g., state files, sample analysis, reports)*

POTENTIAL HAZARDOUS WASTE SITE
SITE INSPECTION REPORT

General Information

The Potential Hazardous Waste Site, Site Inspection Report form is used to record information collected during, or associated with, an inspection of the site and other information about responsible parties and past response activities.

The Site Inspection Report form contains eleven parts:

Part 1 — Site Location and Inspection Information

Part 2 — Waste Information

Part 3 — Description of Hazardous Conditions and Incidents

Part 4 — Permit and Descriptive Information

Part 5 — Water, Demographic, and Environmental Data

Part 6 — Sample and Field Information

Part 7 — Owner Information

Part 8 — Operator Information

Part 9 — Generator/Transporter Information

Part 10— Past Response Activities

Part 11— Enforcement Information

Part 1 — Site Location and Inspection Information contains all of the data elements also contained on the Site Identification and Preliminary Assessment forms required to add a site to the automated Site Tracking System (STS). It is therefore possible to add a site to STS at the Site Inspection stage. Instructions are given below.

Part 2 — Waste Information and Part 3 — Description of Hazardous Conditions and Incidents are used to record specific information about substances, amounts, hazards, and targets, e.g., population potentially affected. Parts 2 and 3 are also contained in the Potential Hazardous Waste Site, Preliminary Assessment form. Information recorded on Part 2 and Part 3 during a preliminary assessment may be updated, added, deleted, or corrected on the Site Inspection Report form.

An Appendix with feedstock names and CAS Numbers and the most frequently cited hazardous substances and CAS Numbers is located behind the instructions for the Site Inspection Report.

A number of the data items collected throughout the Site Inspection Report support the Site Ranking Model. The majority of these data items are found in Part 5 — Water, Demographic, and Environmental Data.

General Instructions

1. Complete the Site Inspection Report form as completely as possible.

2. Starred items (*) are required before inspection information can be added to STS. The system will not accept incomplete inspection information.

3. To add a site to STS at the Site Inspection stage, write "New" across the top of the form and complete items II-01, 02, 03, 04, and 06, Site Name and Location, II-09 Coordinates, and II-10, Type of Ownership.

4. Data items carried in STS, which are identical to those on the Site Identification and Preliminary Assessment forms and which can be added, deleted, or changed using the Site Inspection Report form, are indicated with a pound sign (#). To ensure that the proper action is taken, outline the item(s) to be added, deleted, or changed with a bright color and indicate the proper action with "A" (add), "D" (delete) or "C" (change).

5. There are two options available for adding, deleting, or changing information supplied on the Site Inspection Report form. The first is to use a new Site Inspection Report form, completing only those items to be added, deleted, or changed. Mark the form clearly, using "A", "D", or "C", to indicate the action to be taken. If only data in STS are to be altered, the Site Source Data Report may be used. Using the report, mark clearly the items to be changed and the action to be taken.

Detailed Instructions

Part 1 Site Location and Inspection Information

I. **Identification:** Identification (State and Site Number) is the site record key, or primary identifier, for the site. Site records in the STS are updated based on Identification. It is essential that State and Site Number are correctly entered on each form.

*I-01 **State:** Enter the two character alpha FIPS code for the state in which the site is located. It must be identical to State on the Site Identification form.

*I-02 **Site Number:** Enter the ten character alphanumeric code for sites which have a Dun and Bradstreet or EPA "user" Dun and Bradstreet number or the ten character numeric GSA identification code for federal sites. The Site Number must be identical to the Site Number on the Site Identification and Preliminary Assessment forms.

II. **Site Name and Location:** If Site Name and Location information require no additions or changes, these items are not required on the Site Inspection Report form. However, completing these items will facilitate use of the completed form and records management procedures.

#II-01 **Site Name:** Enter the legal, common, or descriptive name of the site.

#II-02 **Site Street:** Enter the street address and number (if appropriate) where the site is located. If the precise street address is unavailable for this site, enter brief direction identifier, e.g., NW Jct I-295 & US 99; Post Rd, 5 mi W of Rt. 5.

#II-03 **Site City:** Enter the city, town, village, or other municipality in which the site is located. If the site is not located in a municipality, enter the name of the municipality (or place) which is nearest the site or which most easily locates the site.

#II-04 **Site State:** Enter the two character alpha FIPS code for the state in which the site is located. The code must be the same as in.item I-01.

#II-05 **Site Zip Code:** Enter the five character numeric zip code for the postal zone in which the site is located.

#II-06 Site County: Enter the name of the county, parish (Louisiana), or borough (Alaska) in which the site is located.

#II-07 County Code: Enter the three character numeric FIPS county code for the county, parish, or borough in which the site is located. (The regional data analyst can furnish this data item.)

#II-08 Site Congressional District: Enter the two character number for the congressional district in which the site is located.

*#II-09 Coordinates: Enter the Coordinates, Latitude and Longitude, of the site in degrees, minutes, seconds, and tenths of seconds. If a tenth of a second is insignificant at this site, enter "0" in the tenths position.

#II-10 Type of Ownership: Check the appropriate box to indicate the type of site ownership. If the site is under the jurisdiction of an activity of the federal government, enter the name of the department, agency, or activity. If Other is indicated, specify the type of ownership and name.

III. Inspection Information

*III-01 Date of Inspection: Enter the date the inspection occurred, or began for multiple day inspections.

*III-02 Site Status: Check the appropriate box(es) to indicate the current status of the site. Active sites are those which treat, store, or dispose of wastes. Check Active for those active sites with an inactive storage or disposal area. Inactive sites are those at which treatment, storage, or disposal activities no longer occur.

#III-03 Years of Operation: Enter the beginning and ending years (or beginning only if operations at the site are on-going), e.g., 1878/1932, of site operation. Check Unknown if years of operation are not known.

*III-04 Agency Performing Inspection: Check the appropriate box(es) to indicate parties participating in the inspection. If contractors participate, provide the name of the firm(s).

III-05 Chief Inspector: Enter the name of the chief, or lead inspector.

III-06 Title: Enter the Chief Inspector's title, e.g., Team Leader, FIT team.

III-07 Organization: Enter the name of the organization where the Chief Inspector is employed, e.g., EPA – Region 4, VA State Health Dept., Environmental Research Co.

III-08 Telephone Number: Enter the Chief Inspector's area code and local commercial telephone number.

III-09 Other Inspectors: Enter the names of other parties participating in the inspection.

III-10 Title: Enter the titles of other parties participating in the inspection.

III-11 Organization: Enter the names of the organizations where other parties participating in the inspection are employed.

III-12 Telephone Number: Enter the area code and local commercial telephone numbers of other parties participating in the inspection.

III-13 Site Representatives Interviewed: Enter the names of individuals representing responsible parties interviewed in connection with the inspection. Interviews do not necessarily occur during the inspection.

III-14 Title: Enter the titles of the individuals interviewed.

III-15 Address: Enter the business, mailing, or residential addresses of the individuals interviewed.

III-16 Telephone Number: Enter the area code and local commercial telephone numbers of the individuals interviewed.

III-17 Access Gained By: Check the appropriate box to indicate whether access to the site was gained through permission or warrant.

III-18 Time of Inspection: Using a 24-hour clock, enter the time the inspection began, e.g., for 3:24 p.m. enter 1524.

III-19 Weather Conditions: Describe the weather conditions during the site inspection, especially any unusual conditions which might affect results or observations taken.

IV. Information Available From

IV-01 Contact: Enter the name of the individual who can provide information about the site.

IV-02 Of: If appropriate, enter the name of the public or private agency, firm, or company and the organization within the agency, firm, or company of the individual named as Contact.

IV-03 Telephone Number: Enter the area code and local telephone number of the individual named as contact.

IV-04 Person Responsible for Site Inspection Report Form: Enter the name of the individual who was responsible for the information entered on the Site Inspection Report form. The person responsible for the Site Inspection Report form may be different from the individual who prepared the form.

IV-05 Agency: Enter the name of the Agency where the individual who is responsible for the Site Inspection Report form is employed.

IV-06 Organization: Enter the name of the organization within the Agency.

IV-07 Telephone Number: Enter the area code and local telephone number of the individual who is responsible for the Site Inspection Report form.

IV-08 Date: Enter the date the Site Inspection Report form was prepared.

Part 2 Waste Information

*I. Identification: Refer to Part 1—I.

II. Waste States, Quantities, and Characteristics: Waste States, Quantities, and Characteristics provide information about the physical structure and form of the waste, measures of gross amounts at the site, and the hazards posed by the waste, considering acute and chronic health effects and mobility along a pathway.

*II-01 Physical States: Check the appropriate box(es) to indicate the state(s) of waste present at the site. If Other is indicated, specify the physical state of the waste.

*II-02 Waste Quantity at Site: Enter estimates of amounts of waste at the site. Estimates may be in weight (Tons) or volume (Cubic Yards or Number of Drums). Use as many entries as are appropriate; however, measurements must be independent. For example, do not measure the same amounts of waste as both tons and cubic yards.

*II-03 Waste Characteristics: Check all appropriate entries to indicate the hazards posed by waste at the site. If waste at the site poses no hazard, check Not Applicable.

III. Waste Category: General categories of waste typically found are listed here. Enter the estimated gross amount of each category of waste and the appropriate unit of measure.

*III-01 Gross Amount: Gross Amount is the estimate of the amount of the waste category found at the site. Estimates should be furnished in metric tons (MT), tons (TN), cubic meters (CM), cubic yards (CY), drums (DR), acres (AC), acre feet (AF), liters (LT), or gallons (GA). Enter the estimated amount next to the appropriate waste category.

*III-02 Unit of Measure: Enter the appropriate unit of measure, MT (metric tons), TN (tons), CM (cubic meters), CY (cubic yards), DR (number of drums), AC (acres), AF (acre feet), LT (liters), or GA (gallons) next to the estimate of gross amount.

III-03 Comments: Comments may be used to further explain, or provide additional information, about particular waste categories.

IV. Hazardous Substances: Specific hazardous, or potentially hazardous, chemicals, mixtures, and substances found at the site are listed here. For each substance listed those data items marked with an "at" sign (@) must be included.

@IV-01 Category: Enter in front of the substance name the three character waste category from Section III which best describes the substance, e.g., OLW (Oily Waste).

@IV-02 Substance Name: Enter one of the following: the name of the substance registered with the Chemical Abstract Service, the common or accepted abbreviation of the substance, the generic name of the substance, or commercial name of the substance.

@IV-03 CAS Number: Enter the number assigned to the substance when it was registered with the Chemical Abstract Service. Refer to the Appendix for most frequently cited CAS Numbers. CAS Numbers must be furnished for each substance listed. If a CAS Number for this substance has not been assigned, enter "999".

@IV-04 Storage/Disposal Method: Enter the type of storage or disposal facility in which the substance was found: SI (surface impoundment, including pits, ponds, and lagoons), PL (pile), DR (drum), TK (tank), LF (landfill), LM (landfarm), OD (open dump).

IV-05 Concentration: Enter the concentration of the substance found in samples taken at the site.

IV-06 Measure of Concentration: Enter the appropriate unit of measure for the measured concentration of the substance found in the sample, e.g., MG/L, UG/L.

V. Feedstocks

V-01 Feedstock Name: If feedstocks, or substances derived from one or more feedstocks, are present at the site, enter the name of each feedstock found. See the Appendix for the feedstock list.

V-02 CAS Number: Enter the CAS Number for each feedstock named. See the Appendix for feedstock CAS Numbers.

VI. Sources of Information: List the sources used to obtain information for this form. Sources cited may include: sample analysis, reports, inspections, official records, or other documentation. Sources cited provide the basis for information entered on the form and may be used to obtain further information about the site.

Part 3 Description of Hazardous Conditions and Incidents

*I. Identification: Refer to Part 1—I.

II. Hazardous Conditions and Incidents:

II-01 Hazards: Indicate each hazardous, or potentially hazardous, condition known, or claimed, to exist at the site.

II-02 Observed, Potential, or Alleged: Check Observed and enter the date, or approximate date, of occurrence if a release of contaminants to the environment, or some other hazardous incident, is known to have occurred. In cases of a continuing release, e.g., groundwater contamination, enter the date, or approximate date, the condition first became apparent. If conditions exist for a potential release, check potential. Check Alleged for hazardous, or potentially hazardous, conditions claimed to exist at the site.

II-03 Population Potentially Affected: For each hazardous condition at the site, enter the number of people potentially affected. For Soil enter the number of acres potentially affected.

II-04 Narrative Description: Provide a narrative description, or explanation, of each condition. Include any additional information which further explains the condition.

II-05 Description of Any Other Known, Potential, or Alleged Hazards: Provide a narrative description of any other hazardous, or potentially hazardous, conditions at the site not covered above.

III. Total Population Potentially Affected: Enter the total number of people potentially affected by the existence of hazardous, or potentially hazardous, conditions at the site. Do not sum the numbers shown for each condition.

IV. Comments: Other information relevant to observed, potential, or alleged hazards may be entered here.

V. **Sources of Information:** List the sources used to obtain information for this form. Sources cited may include: sample analysis, reports, inspections, official records, or other documentation. Sources cited provide the basis for information entered on the form and may be used to obtain further information about the site.

Part 4 Permit and Descriptive Information

*I. **Identification:** Refer to Part 1—I.

II. **Permit Information**

II-01 Type of Permit Issued: Check the appropriate box(es) to indicate the types of permits issued to the site. If state, local, or other types of environmental permits have been issued, specify the type.

II-02 Permit Number: Enter the permit number for each issued permit.

II-03 Date Issued: Enter the date each permit was issued.

II-04 Expiration Date: Enter the date each permit expires or expired.

II-05 Comments: Enter any information which further explains the types of permits issued or status of the permits.

III. **Site Description**

*III-01 Storage/Disposal: Check the appropriate box(es) to indicate the types of storage/disposal facilities found at the site. If Other is checked, specify the type of facility.

*III-02 Amount: Enter the gross amount of waste associated with each type of storage/disposal facility. Amounts may be measured in: metric tons, tons, cubic meters, cubic yards, drums, acres, acre feet, liters, or gallons.

*III-03 Unit of Measure: Enter the appropriate unit of measure for each entry. Units of measure are MT (metric tons), TN (tons), CM (cubic meters), CY (cubic yards), DR (drums), AC (acres), AF (acre feet), LT (liters), or GA (gallons).

*III-04 Treatment: If waste is treated at the site, check the appropriated box(es) to indicate treatment methods used. If Other is checked, specify treatment method.

III-05 Other: If there are buildings on site, check this box.

*III-06 Area of Site: Enter total area of site in acres.

III-07 Comments: Enter any other pertinent information.

IV. **Containment:** Containment is a measure of the natural or artificial means taken to minimize or preclude health hazards and to minimize or prevent contamination of the environment from waste at the site.

*IV-01 Containment of Wastes: Check the appropriate box to indicate the condition of containment measures at the site. When choosing the appropriate box, consider the potential for environmental contamination, i.e., the worst case for containment in conjunction with the most hazardous substances.

IV-02 Description of Drums, Diking, Liners, Barriers: Provide a narrative description of the condition of containment measures at the site, e.g., waste adequately contained, drums rusting and leaking, diking collapsing, liners leaking and contaminants leaching into soil and groundwater.

V. **Accessibility:** Accessibility is an indicator of the potential for direct contact with hazardous substances.

*V-01 Waste Easily Accessible: If there are no real barriers preventing human access to hazardous waste, check Yes, otherwise check No.

V-02 Comments: Additional information about accessibility to hazardous waste may be provided.

VI. **Sources of Information:** List the sources used to obtain information for this form. Sources cited may include: sample analysis, reports, inspections, official records, or other documentation. Sources cited provide the basis for information entered on the form and may be used to obtain further information about the site.

Part 5 Water, Demographic, and Environmental Data

*I. **Identification:** Refer to Part 1—I.

II. **Drinking Water Supply**

II-01 Type of Drinking Water Supply: Check the appropriate box(es) to indicate the types and sources of drinking water within the vicinity of the site. Community refers to municipal sources. Non-community refers to private sources, e.g., private wells.

II-02 Status: Check the appropriate box(es) to indicate whether the water supply is endangered or affected by contaminants from the site. Check the appropriate box to indicate if the water supply is being monitored for possible contamination.

II-03 Distance to Site: Enter the distance in miles to the nearest tenth, hundredth, or thousandth (as needed to indicate the precision required) from the site to nearest drinking water source.

III. **Groundwater**

III-01 Groundwater Use in Vicinity: Check the appropriate box to indicate groundwater use in the vicinity of the site. The concern is to indicate the seriousness of groundwater contamination from waste at the site. Only Source for Drinking indicates that current water sources are limited to wells in the vicinity of the site. Drinking; Commercial, Industrial, Irrigation indicates that groundwater is used for drinking, but that other limited drinking sources are available and that no other sources for these additional uses are available. Commercial, Industrial, Irrigation indicates that groundwater is used for these purposes, but that limited other sources of water are available. Not used, Unuseable indicates that groundwater use in the area is not critical.

III-02 Population Served by Groundwater: Enter the number of people served by groundwater in the vicinity of the site. Population for the purposes of the Site Inspection Report includes residents and daytime workers and students but excludes transients in the neighborhood or on local highways and roads. When estimating population from aerial photographs or other sources, the conversion factor is 3.8 persons for each dwelling unit or 3 persons per acre in rural areas.

III-03 Distance to Nearest Drinking Water Well: Enter the distance in miles to the nearest tenth, hundredth, or thousandth (as needed to indicate the precision required) from the site to the nearest drinking water well.

III-04 Depth to Groundwater: Enter the depth in feet to groundwater.

III-05 Depth of Groundwater Flow: Enter the cardinal direction of groundwater flow, e.g., NNW.

III-06 Depth to Aquifer of Concern: Enter the depth in feet to the aquifer of concern.

III-07 Potential Yield of Aquifer: Enter the potential yield of the aquifer in gallons per day.

III-08 Sole Source Aquifer: Check the appropriate box to indicate the aquifer of concern is, or is not, a sole source aquifer.

III-09 Description of Wells: Provide a narrative description of wells in the vicinity of the site, including useage, depth, and location relative to population and buildings.

III-10 Recharge Area: Check the appropriate box to indicate the site is located in a recharge area. Comments provide additional information on the recharge area.

III-11 Discharge Area: Check the appropriate box to indicate the site is located in a discharge area. Comments provide additional information on the discharge area.

IV. Surface Water

IV-01 Surface Water Use: Check the appropriate box to indicate surface water use in the vicinity of the site. The order of precedence is Reservoir, Recreation, Drinking Water Source; Irrigation, Economically Important Reserves; Commercial/Industrial; Not Currently Used.

IV-02 Affected/Potentially Affected Bodies of Water: Enter the names of bodies of surface water affected, or potentially affected, by contaminants from the site. List the body of surface water nearest the site first. For each body of water check Affected if contaminents have been identified in samples of the water. Enter the shortest distance from the body of water to the site in miles to the nearest tenth, hundredth, or thousandth (as needed to indicate the precision required).

V. Demographic and Property Information

V-01 Total Population Within: Enter the total population within one (1) mile, two (2) miles, and three (3) miles of the site. Distances are measured from site boundaries. Population for the purposes of the Site Inspection Report includes residents and daytime workers and students but excludes transients in the neighborhood or on local highways and roads. When estimating population from aerial photographs or other sources, the conversion factor is 3.8 persons for each dwelling unit or 3 persons per acre in rural areas.

V-02 Distance to Nearest Population: Enter in miles to the nearest tenth, hundredth, or thousandth (as needed to indicate the precision required) the distance from the site boundary to the nearest population (one person minimum).

V-03 Number of Buildings Within Two (2) Miles of Site: Enter the number of buildings within two miles from the boundaries of the site.

V-04 Distance to Nearest Off-Site Building: Enter the distance in miles to the nearest tenth, hundredth, or thousandth (as needed to indicate the precision required) from the site boundary to the nearest off-site building.

V-05 Population in Vicinity of Site: Provide a narrative description of the nature of the population within the vicinity of the site. Examples include rural area, small truck farms, urban industrial area, densely populated urban residential area.

VI. Environmental Information

VI-01 Permeability of Unsaturated Zone: Check the appropriate box to indicate the permeability of the earth material above the water table in the vicinity of the site.

VI-02 Permeability of Bedrock: Check the appropriate box to indicate the permeability of the bedrock in the vicinity of the site.

VI-03 Depth to Bedrock: Enter the depth to bedrock in feet.

VI-04 Depth of Contaminated Soil Zone: Enter the depth of the contaminated soil zone in feet.

VI-05 Soil pH: Enter the pH of the soil in the vicinity of the site.

VI-06 Net Precipitation: Enter net precipitation in inches. If net precipitation is not known, subtract the average evaporation figure on the U.S. National Weather Service map showing average annual evaporation in inches from the U.S. Environmental Data Service map showing mean annual precipitation.

VI-07 One Year 24 Hour Rainfall: Enter in inches the figure for one year 24 hour rainfall.

VI-08 Slope: Enter the percentage of site slope, the direction of site slope, and the percentage of the surrounding terrain average slope.

VI-09 Flood Potential: Enter the boundary year for the floodplain in which the site is located. Sites flooded annually are in a 1 (one) year floodplain. Other examples include 10, 20, 50, 100, 500, etc., indicating the probability of flooding within that time period.

VI-10 Site is on Barrier Island, Coastal High Hazard Area, Riverine Floodway: If site is located in one of these areas, check this box.

VI-11 Distance to Wetlands: If applicable, enter the distance in miles to the nearest tenth, hundredth, or thousandth (as needed to indicate the precision required) from the site to the closest wetlands (five acre minimum) for Estuarine and Other types of wetlands.

VI-12 Distance to Critical Habitat: If applicable, enter the distance in miles to the nearest tenth, hundredth, or thousandth (as needed to indicate the precision required) from the site to the nearest critical habitat

of an endangered species. Enter the name(s) of the endangered species.

VI-13 Land Use in Vicinity: Enter the distance in miles to the nearest tenth, hundredth, or thousandth (as needed to indicate the precision required) to the nearest Commercial/Industrial area; Residential Area, National/State Parks, Forests, or Wildlife Reserves; or Agricultural Lands, Prime Ag Land and Ag Land. Prime Ag Land is that crop, pasture, range, or forest land which produces the highest yield in relation to inputs. Ag Land is the remaining agricultural land, frequently considered marginal.

VI-14 Description of Site in Relation to Surrounding Topography: Provide a narrative description of significant or unusual aspects of the surrounding topography in relation to the site. Examples might include: site is in a valley surrounded on all sides by mountains, site is at edge of a river or stream which floods frequently, etc.

VII. Sources of Information: List the sources used to obtain information for this form. Sources cited may include: sample analysis, reports, inspections, official records, or other documentation. Sources cited provide the basis for information entered on the form and may be used to obtain further information about the site.

Part 6 Sample and Field Information

*I. Identification: Refer to Part 1—I.

II. Samples Taken

II-01 Number of Samples Taken: Next to each sample type enter the number of samples of that type taken.

II-02 Samples Sent To: Enter the name of the laboratory or other facility where the samples were sent for analysis.

II-03 Estimated Date Results Available: Enter the estimated date the results are expected to be available.

III. Field Measurements Taken

III-01 Type: Enter the type, e.g., radioactivity, explosivity, organic vapor or gas detection and analysis, reagent type gas detection, of each field measurement taken.

III-02 Comments: Describe results of field measurements, whether they were taken on or off site, and if applicable, the type of disposal facility tested, e.g., drum, surface impoundment, landfill.

IV. Photographs and Maps

IV-01 Type: If photographs of the site have been taken, check the appropriate box(es) to indicate the type.

IV-02 In Custody Of: Enter the name of the organization or person who has custody of the photographs.

IV-03 Maps: Check the appropriate box to indicate that maps of the site area have been prepared or obtained.

IV-04 Location of Maps: If site maps are available, indicate their location, e.g., Region 1 Air and Hazardous Materials Division.

V. Other Field Data Collected: Provide a narrative description of any other field data collected.

VI. Sources of Information: List the sources used to obtain information for this form. Sources cited may include: sample analysis, reports, inspections, official records, or other documentation. Sources cited provide the basis for information entered on the form and may be used to obtain further information about the site.

Part 7 Owner Information

*I. Identification: Refer to Part 1—I.

II. Current Owner(s) — Parent Company: Current owner(s) and parent companies, for those owners which are companies partly or wholly owned by another company, provide locator information about responsible parties. Each Part 7 provides space for four (4) current owners and their respective parent companies. If additional space is required, complete another Part 7.

II-01 Name: Enter the legal name of the owner of the site. The owner may be a firm, government agency, association, individual, etc.

II-02 D&B Number: Where available, enter the owner's D&B (Dun and Bradstreet) number. If the current owner is a federal agency, enter the GSA identification code.

II-03 Street Address: Enter the business, mailing, or residential street address of the owner.

II-04 SIC Code: If applicable, enter the owner's primary SIC Code.

II-05 City: Enter the city of the owner's business, mailing, or residential address.

II-06 State: Enter the two character alpha FIPS code for the state of the owner's business, mailing, or residential address.

II-07 Zip Code: Enter the five digit zip code for the owner's business, mailing, or residential address.

II-08 Name: If the owner is a partly or wholly owned subsidiary of another company, enter the legal name of the owner's parent company.

II-09 D&B Number: Enter the parent company's Dun and Bradstreet number.

II-10 Street Address: Enter the business or mailing street address of the parent company.

II-11 SIC Code: If applicable, enter the parent company's primary SIC code.

II-12 City: Enter the city of the parent company's business or mailing address.

II-13 State: Enter the two character alpha FIPS code for the state of the parent company's business or mailing address.

II-14 Zip Code: Enter the five digit zip code for the parent company's business or mailing address.

III. Previous Owner(s): List previous owners in reverse chronological order, i.e., most recent first. If additional space is required, complete another Part 7.

III-01 Name: Enter the legal name of the previous owner. The previous owner may have been a firm, government agency, association, individual, etc.

III-02 D&B Number: Enter the previous owner's Dun and Bradstreet number if available. If the previous owner was a federal agency, enter the GSA identification code if available.

III-03 Street Address: Enter the business, mailing, or residential street address of the previous owner.

III-04 SIC Code: If applicable, enter the primary SIC Code of the previous owner.

III-05 City: Enter the city of the previous owner's business, mailing, or residential address.

III-06 State: Enter the two character alpha FIPS code for the state of the previous owner's business, mailing, or residential address.

III-07 Zip Code: Enter the zip code of the previous owner's business, mailing, or residential address.

IV. **Realty Owner(s):** Realty owner applies when the owner leased to another entity property which was used for the storage or disposal of hazardous waste. List current or most recent first.

IV-01 Name: Enter the legal name of the realty owner. The realty owner may be a firm, government agency, association, individual, etc.

IV-02 D&B Number: Enter the previous owner's Dun and Bradstreet number if available. If the previous owner was a federal agency, enter the GSA identification code if available.

IV-03 Street Address: Enter the realty owner's business, mailing, or residential street address.

IV-04 SIC Code: If applicable, enter the realty owner's primary SIC Code.

IV-05 City: Enter the city of the realty owner's business, mailing, or residential address.

IV-06 State: Enter the two character alpha FIPS code for the state of the realty owner's business, mailing, or residential address.

IV-07 Zip Code: Enter the zip code of the realty owner's business, mailing, or residential address.

V. **Sources of Information:** List the sources used to obtain information for this form. Sources cited may include: sample analysis, reports, inspections, official records, or other documentation. Sources cited provide the basis for information entered on the form and may be used to obtain further information about the site.

Part 8 Operator Information

I. **Identification:** Refer to Part 1—I.

II. **Current Operator—Operator's Parent Company:** Information on operators is applicable when the operator is not the owner.

II-01 Name: Enter the legal name of the operator. The operator may be a firm, government agency, association, individual, etc.

II-02 D&B Number: Enter the operator's Dun and Bradstreet number if available. If the operator is a federal agency, enter the GSA identification code if available.

II-03 Street Address: Enter the operator's business, mailing, or residential street address.

II-04 SIC Code: If applicable, enter the operator's primary SIC Code.

II-05 City: Enter the city of the operator's business, mailing, or residential address.

II-06 State: Enter the two character alpha FIPS code for the state of the operator's business, mailing, or residential address.

II-07 Zip Code: Enter the zip code of the operator's business, mailing, or residential address.

II-08 Years of Operation: Enter the beginning and ending years (or beginning only if operations are on-going), e.g., 1932/1948, of operation at the site.

II-09 Name of Owner: Enter the name of the owner for the period cited for this operator.

II-10 Name: If applicable, enter the legal name of the operator's parent company.

II-11 D&B Number: Enter the operator's parent company Dun and Bradstreet number if available.

II-12 Street Address: Enter the operator's parent company business, mailing, or residential street address.

II-13 SIC Code: If applicable, enter the operator's parent company primary SIC Code.

II-14 City: Enter the city of the operator's parent company business, mailing, or residential address.

II-15 State: Enter the two character alpha FIPS code for the state of the operator's parent company business, mailing, or residential address.

II-16 Zip Code: Enter the zip code of the operator's parent company business, mailing, or residential address.

III. **Previous Operator(s)—Previous Operators' Parent Companies**

III-01 Name: Enter the legal name of the previous operator. The previous operator may be a firm, government agency, association, individual, etc.

III-02 D&B Number: Enter the previous operator's Dun and Bradstreet number if available. If the previous operator was a federal agency, enter the GSA identification code if available.

III-03 Street Address: Enter the previous operator's business, mailing, or residential street address.

III-04 SIC Code: If applicable, enter the previous operator's primary SIC Code.

III-05 City: Enter the city of the previous operator's business, mailing, or residential address.

III-06 State: Enter the two character alpha FIPS code for the state of the previous operator's business, mailing, or residential address.

III-07 Zip Code: Enter the zip code of the previous operator's business, mailing, or residential address.

III-08 Years of Operation: Enter the beginning and ending years of operation for this operator at the site.

III-09 Name of Owner: Enter the name of the owner for the period cited for this operator.

III-10 Name: If applicable, enter the legal name of the previous operator's parent company.

III-11 D&B Number: Enter the previous operator's parent company Dun and Bradstreet number if available.

III-12 Street Address: Enter the previous operator's parent company business, mailing, or residential street address.

III-13 SIC Code: If applicable, enter the previous operator's parent company primary SIC Code.

III-14 City: Enter the city of the previous operator's parent company business, mailing, or residential address.

III-15 State: Enter the two character alpha FIPS code for the state of the previous operator's parent company business, mailing, or residential address.

III-16 Zip Code: Enter the zip code of the previous operator's parent company business, mailing, or residential address.

IV. **Sources of Information:** List the sources used to obtain information for this form. Sources cited may include: sample analysis, reports, inspections, official records, or other documentation. Sources cited provide the basis for information entered on the form and may be used to obtain further information about the site.

Part 9 Generator/Transporter Information

*I. **Identification:** Refer to Part 1—I.

II. **On-Site Generator:** A company or agency, located within the contiguous area of the site and generating waste disposed on the site, is entered here.

II-01 Name: If there is an on-site generator, enter the legal name of the on-site generator. The on-site generator may be a firm or government agency.

II-02 D&B Number: Where available, enter the on-site generator's D&B (Dun and Bradstreet) number. If the on-site generator is a federal agency, enter the GSA identification code.

II-03 Street Address: Enter the business or mailing street address of the on-site generator.

II-04 SIC Code: If applicable, enter the on-site generator's primary SIC Code.

II-05 City: Enter the city of the on-site generator's business or mailing address.

II-06 State: Enter the two character alpha FIPS code for the state of the on-site generator's business or mailing address.

II-07 Zip Code: Enter the five digit zip code for the on-site generator's business or mailing address.

III. **Off-Site Generator(s):** Those companies or agencies off-site who have generated waste which has been disposed at the site are listed here.

III-01 Name: Enter the legal name of the off-site generator. The off-site generator may be a firm or government agency.

III-02 D&B Number: Where available, enter the off-site generator's D&B (Dun and Bradstreet) number. If the off-site generator is a federal agency, enter the GSA identification code.

III-03 Street Address: Enter the business or mailing street address of the off-site generator.

III-04 SIC Code: If applicable, enter the off-site generator's primary SIC Code.

III-05 City: Enter the city of the off-site generator's business or mailing address.

III-06 State: Enter the two character alpha FIPS code for the state of the off-site generator's business or mailing address.

III-07 Zip Code: Enter the five digit zip code for the off-site generator's business or mailing address.

IV. **Transporter(s):** Those carriers who are known to have transported waste to the site are listed here.

IV-01 Name: Enter the legal name of the transporter. The transporter may be a firm, government agency, association, individual, etc.

IV-02 D&B Number: Where available, enter the transporter's D&B (Dun and Bradstreet) number. If the transporter is a federal agency, enter the GSA identification code.

IV-03 Street Address: Enter the business, mailing, or residential street address of the transporter.

IV-04 SIC Code: If applicable, enter the transporter's primary SIC Code.

IV-05 City: Enter the city of the transporter's business, mailing, or residential address.

IV-06 State: Enter the two character alpha FIPS code for the state of the transporter's business, mailing, or residential address.

IV-07 Zip Code: Enter the five digit zip code for the transporter's business, mailing, or residential address.

V. **Sources of Information:** List the sources used to obtain information for this form. Sources cited may include: sample analysis, reports, inspections, official records, or other documentation. Sources cited provide the basis for information entered on the form and may be used to obtain further information about the site.

Part 10 Past Response Activities

*I. **Identification:** Refer to Part 1—I.

II. **Past Response Activities**

II-01 Past Response Activities: Check the appropriate box(es) to indicate response activities initiated prior to the passage of CERCLA, December, 1980.

II-02 Date: Enter the start date (or approximate date) of the activity.

II-03 Agency: Enter the name of the Agency responsible for the activity.

II-04 Description: Provide a brief narrative description of the activity.

III. **Sources of Information:** List the sources used to obtain information for this form. Sources cited may include: sample analysis, reports, inspections, official records, or other documentation. Sources cited provide the basis for information entered on the form and may be used to obtain further information about the site.

Part 11 Enforcement Information

*I. **Identification:** Refer to Part 1—I.

II. **Enforcement Information**

II-01 Past Regulatory/Enforcement Action: Check the appropriate box to indicate past regulatory or enforcement action at the federal, state, or local level related to this site.

II-02 Description of Federal, State, Local Regulatory or Enforcement Action: Provide a narrative description of regulatory or enforcement action to date. Do not include any enforcement action contemplated in the process of development.

III. **Sources of Information:** List the sources used to obtain information for this form. Sources cited may include: sample analysis, reports, inspections, official records, or other documentation. Sources cited provide the basis for information entered on the form and may be used to obtain further information about the site.

APPENDIX

I. FEEDSTOCKS

CAS Number	Chemical Name
1. 7664-41-7	Ammonia
2. 7440-36-0	Antimony
3. 1309-64-4	Antimony Trioxide
4. 7440-38-2	Arsenic
5. 1327-53-3	Arsenic Trioxide
6. 21109-95-5	Barium Sulfide
7. 7726-95-6	Bromine
8. 106-99-0	Butadiene
9. 7440-43-9	Cadmium
10. 7782-50-5	Chlorine
11. 12737-27-8	Chromite
12. 7440-47-3	Chromium
13. 7440-48-4	Cobalt
14. 1317-38-0	Cupric Oxide
15. 7758-98-7	Cupric Sulfate
16. 1317-39-1	Cuprous Oxide
17. 74-85-1	Ethylene
18. 7647-01-0	Hydrochloric Acid
19. 7664-39-3	Hydrogen Fluoride
20. 1335-25-7	Lead Oxide
21. 7439-97-6	Mercury
22. 74-82-8	Methane
23. 91-20-3	Napthalene
24. 7440-02-0	Nickel
25. 7697-37-2	Nitric Acid
26. 7723-14-0	Phosphorus
27. 7778-50-9	Potassium Dichromate
28. 1310-58-3	Potassium Hydroxide
29. 115-07-1	Propylene
30. 10588-01-9	Sodium Dichromate
31. 1310-73-2	Sodium Hydroxide
32. 7646-78-8	Stannic Chloride
33. 7772-99-8	Stannous Chloride
34. 7664-93-9	Sulfuric Acid
35. 108-88-3	Toluene
36. 1330-20-7	Xylene
37. 7646-85-7	Zinc Chloride
38. 7733-02-0	Zinc Sulfate

II. HAZARDOUS SUBSTANCES

CAS Number	Chemical Name
1. 75-07-0	Acetaldehyde
2. 64-19-7	Acetic Acid
3. 108-24-7	Acetic Anhydride
4. 75-86-5	Acetone Cyanohydrin
5. 506-96-7	Acetyl Bromide
6. 75-36-5	Acetyl Chloride
7. 107-02-8	Acrolein
8. 107-13-1	Acrylonitrile
9. 124-04-9	Adipic Acid
10. 309-00-2	Aldrin
11. 10043-01-3	Aluminum Sulfate
12. 107-18-6	Allyl Alcohol
13. 107-05-1	Allyl Chloride
14. 7664-41-7	Ammonia
15. 631-61-8	Ammonium Acetate
16. 1863-63-4	Ammonium Benzoate
17. 1066-33-7	Ammonium Bicarbonate
18. 7789-09-5	Ammonium Bichromate
19. 1341-49-7	Ammonium Bifluoride
20. 10192-30-0	Ammonium Bisulfite
21. 1111-78-0	Ammonium Carbamate
22. 12125-02-9	Ammonium Chloride
23. 7788-98-9	Ammonium Chromate
24. 3012-65-5	Ammonium Citrate, Dibasic
25. 13826-83-0	Ammonium Fluoborate
26. 12125-01-8	Ammonium Fluoride
27. 1336-21-6	Ammonium Hydroxide
28. 6009-70-7	Ammonium Oxalate
29. 16919-19-0	Ammonium Silicofluoride
30. 7773-06-0	Ammonium Sulfamate
31. 12135-76-1	Ammonium Sulfide
32. 10196-04-0	Ammonium Sulfite
33. 14307-43-8	Ammonium Tartrate
34. 1762-95-4	Ammonium Thiocyanate
35. 7783-18-8	Ammonium Thiosulfate
36. 628-63-7	Amyl Acetate
37. 62-53-3	Aniline
38. 7647-18-9	Antimony Pentachloride
39. 7789-61-9	Antimony Tribromide
40. 10025-91-9	Antimony Trichloride
41. 7783-56-4	Antimony Trifluoride
42. 1309-64-4	Antimony Trioxide
43. 1303-32-8	Arsenic Disulfide
44. 1303-28-2	Arsenic Pentoxide
45. 7784-34-1	Arsenic Trichloride
46. 1327-53-3	Arsenic Trioxide
47. 1303-33-9	Arsenic Trisulfide
48. 542-62-1	Barium Cyanide
49. 71-43-2	Benzene
50. 65-85-0	Benzoic Acid
51. 100-47-0	Benzonitrile
52. 98-88-4	Benzoyl Chloride
53. 100-44-7	Benzyl Chloride
54. 7440-41-7	Beryllium
55. 7787-47-5	Beryllium Chloride
56. 7787-49-7	Beryllium Fluoride
57. 13597-99-4	Beryllium Nitrate
58. 123-86-4	Butyl Acetate
59. 84-74-2	n-Butyl Phthalate
60. 109-73-9	Butylamine
61. 107-92-6	Butyric Acid
62. 543-90-8	Cadmium Acetate
63. 7789-42-6	Cadmium Bromide
64. 10108-64-2	Cadmium Chloride
65. 7778-44-1	Calcium Arsenate
66. 52740-16-6	Calcium Arsenite
67. 75-20-7	Calcium Carbide
68. 13765-19-0	Calcium Chromate
69. 592-01-8	Calcium Cyanide
70. 26264-06-2	Calcium Dodecylbenzene Sulfonate
71. 7778-54-3	Calcium Hypochlorite
72. 133-06-2	Captan
73. 63-25-2	Carbaryl
74. 1563-66-2	Carbofuran
75. 75-15-0	Carbon Disulfide
76. 56-23-5	Carbon Tetrachloride
77. 57-74-9	Chlordane
78. 7782-50-5	Chlorine
79. 108-90-7	Chlorobenzene
80. 67-66-3	Chloroform
81. 7790-94-5	Chlorosulfonic Acid
82. 2921-88-2	Chlorpyrifos
83. 1066-30-4	Chromic Acetate
84. 7738-94-5	Chromic Acid
85. 10101-53-8	Chromic Sulfate
86. 10049-05-5	Chromous Chloride
87. 544-18-3	Cobaltous Formate
88. 14017-41-5	Cobaltous Sulfamate
89. 56-72-4	Coumaphos
90. 1319-77-3	Cresol
91. 4170-30-3	Crotonaldehyde
92. 142-71-2	Cupric Acetate
93. 12002-03-8	Cupric Acetoarsenite
94. 7447-39-4	Cupric Chloride
95. 3251-23-8	Cupric Nitrate
96. 5893-66-3	Cupric Oxalate
97. 7758-98-7	Cupric Sulfate
98. 10380-29-7	Cupric Sulfate Ammoniated
99. 815-82-7	Cupric Tartrate
100. 506-77-4	Cyanogen Chloride
101. 110-82-7	Cyclohexane
102. 94-75-7	2,4-D Acid
103. 94-11-1	2,4-D Esters
104. 50-29-3	DDT
105. 333-41-5	Diazinon
106. 1918-00-9	Dicamba
107. 1194-65-6	Dichlobenil
108. 117-80-6	Dichlone
109. 25321-22-6	Dichlorobenzene (all isomers)
110. 26638-19-7	Dichloropropane (all isomers)
111. 26952-23-8	Dichloropropene (all isomers)
112. 8003-19-8	Dichloropropene-Dichloropropane Mixture
113. 75-99-0	2-2-Dichloropropionic Acid
114. 62-73-7	Dichlorvos
115. 60-57-1	Dieldrin
116. 109-89-7	Diethylamine
117. 124-40-3	Dimethylamine
118. 25154-54-6	Dinitrobenzene (all isomers)
119. 51-28-5	Dinitrophenol
120. 25321-14-6	Dinitrotoluene (all isomers)
121. 88-09-7	Diquat
122. 298-04-4	Disulfoton
123. 330-54-1	Diuron
124. 27176-87-0	Dodecylbenzenesulfonic Acid
125. 115-29-7	Endosulfan (all isomers)
126. 72-20-8	Endrin and Metabolites
127. 106-89-8	Epichlorohydrin
128. 563-12-2	Ethion
129. 100-41-4	Ethyl Benzene
130. 107-15-3	Ethylenediamine
131. 106-93-4	Ethylene Dibromide
132. 107-06-2	Ethylene Dichloride
133. 60-00-4	EDTA
134. 1185-57-5	Ferric Ammonium Citrate
135. 2944-67-4	Ferric Ammonium Oxalate
136. 7705-08-0	Ferric Chloride